IT TAKES TWO! UNDERSTANDING MALE INVOLVEMENT WITHIN PREGNANCY & CHILDCARE IN KINSHASA, DEMOCRATIC REPUBLIC OF CONGO

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ABSTRACT

Francine Eva Nana Bosua Wood: It takes two! Understanding male involvement within pregnancy and childcare in Kinshasa, DRC,
(Under the direction of Anastasia J. Gage)

Background: There has been increased recognition of the inclusion of men in maternal and child health programs. Engaging men as partners in pregnancy and childrearing is vital because of the positive ramifications for the child, the mother, and even the men themselves. Despite this growing evidence, there are a limited number of studies exploring male involvement during pregnancy and in childcare in the Democratic Republic of Congo (DRC).

Objective: Using a mixed-methods approach, this dissertation aimed to contribute to the literature on male involvement by exploring male involvement during pregnancy and in childcare as a complex process determined by multiple factors. More specifically, the dissertation [1] explored the role of fathers during pregnancy and in childcare, the perceived barriers to and enablers of involvement, and the normative determinants of participation in childcare; [2] identified the factors associated with male involvement during pregnancy and a male partner's willingness to be involved in routine childcare activities

Methods: Employing a three-paper approach, this dissertation analyzed secondary data from the Gates-funded MOMENTUM study in Kinshasa, the capital of DRC. In paper 1, 12 focus group transcripts from 125 first-time mothers (FTMs) and male partners of FTMs collected during the formative evaluation were analyzed using thematic content analysis. Papers 2 and 3 used cross-sectional data from 1,674 male partners interviewed at the baseline, and the analysis was restricted to participants without missing data on any of the variables. Factor analysis was employed to characterize involvement and multivariate regressions were used to estimate the associations between involvement during pregnancy, gender-

equitable attitudes, co-parental relationship factors, and personal agency in Paper 2. Finally, paper 3 used multivariate regressions and path analysis to explore the associations between male partners' willingness to be involved in childcare and gender-equitable attitudes, co-parental relationship factors, personal agency, and perceived norms and beliefs about paternal involvement.

Results: Findings from the qualitative paper suggests that men played and were expected to play multiple roles during pregnancy and in childcare; however, many faced sanctions for their involvement. Several participants reported involvement was often low, although they mentioned that fathers would continue to be involved despite these sanctions. Fathers also faced many barriers that deterred involvement, and the perception of pregnancy as a woman's domain and the lack of financial resources were the most reported. The quantitative results indicated various dimensions of involvement during pregnancy and willingness to be involved in childcare. Participation in pregnancy-related activities was low, ranging from 11% (finding a blood donor) to 49% (saving money during emergencies). For childcare, 50% were extremely willing to participate in all interactive activities and only 17% were extremely willing to participate in all caregiving responsibilities. Factors influencing involvement or willingness varied depending on the type of activity.

Conclusion: Results of the dissertation provide a nuanced understanding and insight into the male involvement during pregnancy and in childcare in Kinshasa, with the potential to inform intervention strategies and planning. Involvement is multidimensional and influenced by multiple factors. Interventions that integrate strategies addressing these factors can potentially impact male participation during pregnancy and in childcare.

This work is dedicated to my parents, my mother, Her Ladyship Mrs. Merley Wood and my father of blessed memory, Mr. James Wood. They walked this journey with me, encouraged and provided immense support every step of the way. Without them, this would not have been possible. They are my constant champions and because of them I found the strength and perseverance to complete this journey. I am truly blessed to have them as parents.

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LIST OF ABBREVIATIONS

ANC	antenatal care
BP	birth preparedness
CFA	confirmatory factor analysis
CFI	comparative fit index
CPSs	conflict tactics scales
DHS	Demographic and Health Survey
DRC	Democratic Republic of Congo
EFA	Exploratory Factor Analysis
FTM	first-time mother
GEM	gender-equitable men
ICPD	International Conference on Population and Development
KMO	Kaiser-Meyer-Olkin
MCH	maternal and child health
MMR	maternal mortality ratio
MNH	maternal and newborn health
NMR	neonatal mortality ratio
ORs	Odds Ratios
PMTCT	prevention of mother to child transmission
PNC	postnatal care
RAS	relationship assessment scale
RCA	routine childcare activities
RMESA	root mean squared error of approximation
SRMR	standardized root mean square residual
TLI	Tucker-Lewis Index
UN	United Nations
VIF	Variance Inflation Factor
WHO	World Health Organization

BACKGROUND

Over the years, there has been great interest in the involvement of men as partners in maternal and child health (MCH). In 1994, at the International Conference on Population and Development (ICPD) in Cairo, increased recognition was placed on men's inclusion in maternal and child health programs.[1] Specifically, the ICPD Programme of Action called for joint responsibilities of men and women, so they become equal partners in public and private lives and encouraged men to take responsibility for their sexual and reproductive behavior.[1] This intensified the focus on a rights-based health agenda that included both men and women to address gender norms and values.[1] Thus, increasing the role and responsibility of men in health.

To accelerate the inclusion of men in MCH and help achieve this, the World Health Organization (WHO) declared the involvement of men in MCH as a priority. Additionally, the "WHO recommendations for health promotion interventions for maternal and neonatal health"[2] recommended male involvement in health during pregnancy, childbirth and post-delivery. Men have an important role in maternal and child health as parents and partners and can influence the behaviors related to MCH in their households.[3] The emphasis of male involvement is widely recognized as men are usually key decision-makers, control and decide resources in the household, such as financial support to the family. Engaging men in health provides the opportunity to educate them on the importance of health, helps them support their partners effectively during pregnancy, birth preparedness, delivery and the postpartum period and increases their engagement with their children.[4,5]

Male involvement has been recognized to have an impact on pregnancy and infant outcomes.[4,6,7] When male partners are involved during pregnancy, there is a significant reduction in the risk of preterm birth, low-birth weight, and maternal stress.[6,8,9] It has also been associated with infant mortality up to a year after birth.[10] Male partners can influence maternal behaviors and maternal stress through emotional,

financial, and logistical support. For instance, pregnant women with involved partners had a higher likelihood of receiving early antenatal care (ANC) and increasing the use of antenatal, delivery and postnatal services.[7,11–15] Other studies found that support from partners led to more equitable couple communication and decision making,[16] discouragement of unhealthy maternal health practices,[17] and increased contraceptive use.[18] Many of the studies focused on child outcomes were conducted in developed countries, and findings suggest that father involvement was positively associated with the psychological well-being and social and cognitive development of children.[5,19–21] Men also benefit from involvement. Those who participate in pregnancy, birth and childcare were healthier and more connected socially.[22]

Definition and measurement of male involvement

The definition of male involvement has been characterized by the lack of consensus among researchers, and there is no universal definition.[23–27] Researchers have not always agreed on what dimensions are important, and involvement has been defined differently within different contexts and locations. Regardless, it is agreed that male partner involvement is a multifaceted and evolving construct. The conceptualization of male involvement has evolved from a one-dimensional construct to a multi-dimensional construct emphasizing a male partner's physical, economic, social, and emotional capacity within their cultural, economic, familial, social and political environment.[28–30] For example, Lamb, Pleck, Charnow, and Levine defined paternal involvement as consisting of three dimensions: engagement (direct contact and shared interactions with the child), accessibility (presence and accessibility to the child), and responsibility (arranging for resources to be available to the child).[26,31,32] The Commission on Paternal Involvement in Pregnancy Outcomes defined male involvement as "activities or practices by the male partner and a couple anticipating birth that ideally lead to an optimal pregnancy outcome."[33]

Male involvement in sub-Saharan Africa

In sub-Saharan Africa, several studies have measured the prevalence of male involvement in maternal health; however, many of these studies measured male involvement as part of HIV studies or focused solely on clinic attendance (see Appendix I for a summary). Regardless, these studies showed that male involvement in various aspects of maternal and child health was low. Using health facility data, a study in Mozambique reported that 34% of male partners were present at the first ANC visit compared to five percent prior to the intervention.[34] In Kenya, one study reported that one in four male partners (26%) attended ANC with their partners,[35] and in another study, less than 10% of men accompanied their partner to ANC and received antenatal ANC counseling messages (7.4%).[36] Similarly, in Zambia, Kashitala et al.[12] found that only 11% of women were accompanied by their partners during ANC visits. Their results also indicated that women who attended ANC with their partners had 1.5 times the odds of delivering at a facility as well as returning for postnatal visits compared to women who attended ANC alone.[12] In Ghana, a study found that male involvement varied depending on the health service.[37] A third of men accompanied their partners to ANC, 44% to delivery and 20% to postnatal care services.[37]

Studies using more complex measures of male involvement found low levels of involvement as well. Byamugisha et al.[38] found that 26% of men had a high male involvement index, whereby they participated in four to six ANC-related activities. In Kenya, only 19% of male partners had high involvement scores because they participated in three to five prevention of mother to child transmission (PMTCT) related activities during ANC.[39] Similarly in Tanzania, 20% of men had a high involvement in maternity care because they participated in three to four pregnancy-related activities.[40] In this study, male partner involvement varied across the pregnancy period. Involvement in ANC and postnatal care was high (54% and 59%, respectively), while the delivery period had lower levels of high involvement (16%).[40]

While the studies mentioned above measured low levels of involvement among male partners, a number of studies have measured higher levels in various pregnancy-related activities. In Uganda, a study

reported that about one in five men accompanied their partners during delivery, and a higher percentage (65%) did the same for antenatal care.[41] Kabanga et al.[42] found that in Tanzania, 57% of male partners attended ANC services with their partners; however, two in five of these men attended because it was required by the government. Another study in Ethiopia reported that 60% of their respondents were involved in pregnancy; however, the proportion who contributed to the differing roles varied.[43] Sixty-seven percent accompanied their partners to an ANC consultation, about half helped with household tasks, while only 34% made joint decisions about going to the health care facility.[43] In Ghana, over two in five male partners (43%) were present at ANC.[44] Results from a cross-sectional survey in Kenya revealed that 56% of male partners accompanied their partner to ANC and an equal percentage accompanied their partners to postnatal care visits.[45]

When it comes to childcare, most of the studies in sub-Saharan Africa have focused on measuring male involvement in utilization of child health services and less on home-based childcare activities. These studies found varying levels of participation depending on the outcome of interest. One study in Kenya found that over half of men (54%) accompanied their partner for their child's immunization.[45] Conversely, in Uganda, only 29% of men were highly involved in routine child immunization activities because they participated in four to five activities.[46] In Rwanda, men participated in an average of 1.84 out of five childcare and household tasks that were typically performed by women.[47] A multi-country study showed that between 10% and 56% of fathers reported being involved in at least one learning activity with their children, and fathers were less likely than mothers to read or write words and letters with their children.[48,49] Findings from the Multiple Indicator Cluster Surveys (MICS) in eight countries indicated that about 3% to 11% of fathers participated in four or more learning and readiness activities which included reading books, telling stories, singing songs, playing, taking the child outside the home, and naming, counting or drawing things with the child. [50–57]

Male involvement in the DRC

In general, little is known about the prevalence of male partner involvement during pregnancy and in childcare in the Democratic Republic of Congo (DRC). Only a few studies have documented the levels of male involvement in MCH, and these studies focused primarily on male involvement during pregnancy. For childcare, the 2018 MICS in the DRC found that 6.7% of fathers engaged in four or more learning and readiness activities.[57]

Two studies have examined involvement during pregnancy within the context of HIV. In the first study, a randomized control trial, male partners of pregnant women were invited to HIV counseling and testing (VCT) at various locations (church, bar, and health center) using invitation cards.[58] The study found that overall 22% of men who were invited attended VCT regardless of the location. A more recent intervention by the Elizabeth Glaser Pediatric AIDS Foundation (EDGAF), Malamu, used multiple approaches to improve male involvement in PMTCT of HIV programs.[59] At the national level, strategies included national media and community sensitization campaigns to encourage men to attend antenatal care services with their pregnant partners.[60] At the facility level, strategies included the expansion of health facility operation hours, removal of signs in facility prohibiting men, sending invitation letters to men, fast-tracking women who attend with their partners and training health workers on male partner sensitivity during service delivery.[60] However, the interventions were not implemented consistently, and male involvement remained low with only seven percent of male partners participating in activities at EGPAF-supported facilities during the implementation period.[60] A few qualitative studies have also focused on identifying barriers to and facilitators of male involvement in the DRC. [60,61]

Summary of the determinants of male involvement

Several factors including age, education, knowledge, relationship status, and employment could influence male involvement. Older age and having a higher education have been associated with

involvement.[39,58,62–64] For example, in Kinshasa, a study found that male involvement was significantly higher among men whose female partners are older than 25 years.[58] With regards to education, there is conflicting evidence. Three studies found that men with higher education were more involved,[39,62,64] while one found that education of both the male partner and pregnant women or mother does not influence involvement.[58] Location of residence is another deciding factor. In Ethiopia, statistically significant findings from a study suggest that men living in urban areas had twice the odds of being involved in PMTCT services compared to men living in rural areas.[64]

Knowledge about maternal and child health, including the benefits, is another important consideration. Studies suggest that men with increased knowledge about the benefits of knowledge of the benefits of ANC, PMTCT services and childcare were more involved in the respective services.[39,64] For instance, a study in Kenya found that partners who have read the mother-child booklet after an ANC visit were significantly more likely to be involved.[39] Several qualitive studies with similar findings also alluded to the idea that low male involvement is due to the lack of adequate knowledge about pregnancy, maternal and neonatal services, childcare, and its benefits.[65–68]

In Malawi, findings from a qualitative study suggested that the unwillingness or lack of interest to be involved limited involvement in PMTCT.[68] Additionally, men with extramarital pregnancies were rarely be involved because it could expose an extramarital affair and potentially cause problems with his wife, and unplanned pregnancies discouraged male involvement because men were not ready for the responsibility.[68]

A man's employment status can influence his involvement. For instance, in Kenya, employed men were three times more likely to be involved compared to unemployed males.[39] The type of profession is equally as important in influencing involvement. In Uganda, taxi drivers and motorbike riders were less likely to participate than men with other professions such as farmers or construction workers.[62] Similarly, in Kenya[69], male partners with occasional jobs were less likely to participate in MCH services, and in

Rwanda[70], those with well-paid jobs were more likely to participate in PMTCT interventions compared to those not well paid.

In addition, financial constraints may influence men's engagement during pregnancy and in childcare. Some studies found that men with financial constraints were less likely to participate.[63,69,71] Other studies that have explored this qualitatively suggested that male partners had to consider the opportunity cost associated with being involved.[59,66,68,72] Men have to decide if the money spent travelling to health facilities with their partners could be used for other needs, and the time spent traveling could be used for income-generating activities. Every hour missed from work could mean less income. In Uganda, this was reported most often for men who were constrained by busy work schedules, low wages and limited resources.[72]

Some studies suggest that health facility-related factors influence involvement. Lack of waiting areas or spaces big enough to accommodate couples deterred male attendance, and at times, men were left out of the sessions.[62,68,72] Secondly, when men decided to attend ANC, long wait times could act as a deterrent. Some felt that the long wait time was caused by the burdensome administrative procedures and lack of personnel at the health facilities.[62,73] Related to time, health facility opening hours limited involvement if men work during the day or have other commitments. In Kinshasa, increasing health facility hours for maternal health services to include evenings and weekend increased male participation in HIV couple testing.[58] Harsh critical behavior and language use was a barrier to male involvement. Some men perceived that health providers lacked professionalism, had unwelcoming attitudes and used harsh language thus preventing them from participating or returning to ANC or PMTCT services.[62,68]

While many factors influence involvement, social and gender norms play a large role. Evidence suggests that childcare, pregnancy, and most household tasks are perceived as a woman's domain, and this perception limits male involvement.[4,59,62,65,68,69,74] Societal norms have created roles based on gender, where men are perceived as the heads of households and are decision-makers. Women are perceived as

caregivers in the family. In the International Men and Gender Equity Survey, 61% of men in Rwanda and 53% in the DRC agreed with the statement: "changing diapers, giving kids a bath and feeding kids are the mother's responsibility."[75] More than three in five men also agreed that men should have the final say in decisions in his home (66% and 75% in Rwanda and DRC, respectively).[75] These perceptions in turn affect involvement. For example, one study found that men who did not perceive ANC as a woman's responsibility were twice as likely to be involved and men who did not have a negative perception of male involvement in PMTCT were three times more likely to be involved.[64]

These gender roles reinforced by the norms can prevent a man from being involved in pregnancy or childcare because it would undermine his position and masculinity. In the DRC, this caused men to be uncomfortable in places with a lot of women, and they found topics discussed at ANC sessions annoying and unrelatable.[59] Men who did not conform to societal gender roles were stigmatized, ridiculed and perceived to be dominated by their wives.[62,63,69] They were labelled as weak[72] or were perceived to have been poisoned or given traditional herbs.[68] Socio-cultural beliefs also influence women; a study in Malawi suggests that their beliefs prevented them from allowing men to perform tasks "assigned" to females.[66] These norms and beliefs normalize a woman's identity as a caregiver, emphasize a man's role as a provider, and reinforce the gendered division of labor and roles in the family. Deepening our understanding of these factors that influence involvement and men's perceptions can contribute to the development of programs and policies.

Gaps in scientific knowledge

Although male involvement in MCH is becoming more common in strategies and intervention, it has been operationalized in a variety of ways, and there is a lack of consensus on its definition.[4,7,18,24] For involvement during pregnancy, many studies have defined male engagement as a male partner attending antenatal visits.[36,76,77] This measures involvement in only one aspect of maternal health service during

pregnancy and at the health facility. It fails to measure involvement outside health facilities, such as decision-making and developing a birth preparedness plan. A study found that accompanying the wife to the first antenatal care visit was not sufficient to change the social behavior of men towards maternal health.[78] Thus, there is a need for a more comprehensive measure. The lack of a universal measure also affects the comparability of male involvement across studies, which is noted as a limitation in systematic reviews.[4,16,79–81]

The vast majority of studies on male involvement in pregnancy and childcare have been conducted in developed countries and the few studies focused on involvement during pregnancy in sub-Saharan Africa have focused on the behavior within HIV programs.[4,11,36,47,58,77,82] While for involvement with children, the limited number of studies in sub-Saharan Africa have focused on the engagement of fathers in child health and less on participation in home-based childcare activities. Third, several qualitative studies have explored the barriers and factors of male involvement,[6,34,65,72,83–86] however, they did not provide an in-depth inquiry on the role of social norms as a barrier to male involvement.

The role of father in the family varies by geographical location and context.[28–30] Little is known about male involvement in the role of fathers in childcare in the DRC; therefore, there is a need for studies that explore the role of the father in childcare, as well as their role in pregnancy. Additionally, very few studies on male involvement approaches have been guided by theory. Studies that have incorporated theories have used theories such as the gender theory, theories of gender and masculinities, social cognitive theory, and the trans-theoretical model.[86–92] The use of theory could provide a systematic way to understand the factors at play in male involvement and guide the intervention development process. Lastly, the quality of evidence regarding male involvement is low as statistical procedures used in studies have not been rigorous. For example, two studies assessed the association between male involvement and socio-demographic and other factors using Person Chi-Square and Fisher Tests.[37,43]

This dissertation aimed to fill important gaps in understanding male involvement beyond involvement in maternal and child health at the health facility. It builds upon the studies that have explored male involvement and the analysis was driven by theoretical concepts. While the literature is filled with factors influencing male involvement in pregnancy, a greater understanding is needed of factors associated with an expanded definition of male involvement and the use of more statistically rigorous approaches. Furthermore, there is a dearth of studies that are non-HIV related in the DRC and sub-Saharan Africa. The dissertation aims to contribute to the male involvement literature by attempting to shed light on the role of a father in pregnancy and childcare within the DRC, and the range of determinants including normative factors that influence male involvement. The more we know and understand male partners and fathers, the greater the likelihood that practitioners and policymakers may be able to develop and implement evidence-based interventions improving male involvement in MCH.

SIGNIFICANCE AND SPECIFIC AIMS

The dissertation fills important gaps in understanding male involvement in pregnancy and childcare in Kinshasa, DRC. Its overall aim was to analyze male involvement during pregnancy and in childcare as a complex process determined by normative factors, co-parenting factors, and personal factors. First, it proposed a more comprehensive measure to analyze male involvement in pregnancy and analyzed the behavior determined by several factors (e.g., for male involvement in pregnancy, the definition goes beyond attending antenatal visits and includes decision-making and birth preparedness activities). Second, it explored the determinants of male involvement during pregnancy and in childcare, including social norms in the DRC. Third, it identified the role of men during pregnancy and childcare and barriers to involvement. It is anticipated that the findings of this dissertation can provide a deeper insight into the various factors that influence male involvement. Moreover, the findings can inform programs that focus on involvement

not only during pregnancy and during the early stages of a child's life, but also into the late childhood and early adolescence.

The main objective was achieved through the three specific aims:

Aim 1: Explore the role of fathers during pregnancy and in childcare, the normative determinants of involvement in childcare and the perceived barriers to involvement

a) Identify the role of fathers during pregnancy and in childcare, barriers to and enablers of involvement during pregnancy and in childcare, and perceived social norms about involvement in childcare.
b) Examine the similarities and differences in the perceived roles of fathers, perceived barriers and enablers, and perceived norms as they relate to paternal involvement during pregnancy and in routine childcare.

Aim 2: Identify the factors associated with male involvement in pregnancy

a) Describe the pattern of male involvement in pregnancy.
b) Examine the factors associated with male partners' involvement in pregnancy.
c) Determine the moderating effect of gender-equitable attitudes and violence on the association between relationship satisfaction and male partner's involvement in pregnancy.

Aim 3: Identify the role of self-efficacy, gender-equitable attitudes, and perceived social norms in a male partner's willingness to be involved in routine childcare activities

a) Define male partners' willingness to be involved in routine childcare activities.
b) Examine and describe the background/socio-demographic characteristics associated with willingness to be involved in routine childcare activities.
c) Determine the association between male partners' personal agency, beliefs and perceived social norms about paternal involvement, gender-equitable attitudes and their willingness to

be involved in routine childcare activities, and examine if the age of the male partner moderates the association explored.

d) Determine the mediating effect of gender-equitable attitudes and self-efficacy on the association between willingness to be involved in routine childcare activities and educational level.

CONCEPTUAL FRAMEWORK

The overall conceptual model for this dissertation was adapted from the Responsible Fathering Conceptual Model (Figure 1), developed by Doherty, Kouneski, and Erickson in 1998. It was developed in an effort to synthesize the multiple determinants of father involvement and present a systematic ecological framework.[93] The framework was designed to increase understanding of factors that support involved fathering and how to engage uninvolved fathers effectively.[93,94]

This conceptual framework is grounded in a developmental fathering perspective and was developed to be inclusive of fathers from diverse socioeconomic, ethnic, racial backgrounds, regardless of whether or not they reside with their children. Doherty et al.[93] posit that father involvement in influenced by the nature of the intrafamilial relationships that exist between a father, mother and child, and that these relationships are impacted by the following factors: i) contextual, ii) father, iii) mother, iv) child, and iv) co-parental relationship. They recognize that fathering cannot be defined in isolation from mother's expectations, social expectations and social context.

The conceptual framework guided the selection and examination of the multitude of factors which (in)-directly determine male partners' involvement in maternal health and childcare. The framework for this dissertation focused on the variables available in the data set used for the analysis and illustrated how these factors were associated with to involvement in pregnancy and childcare.

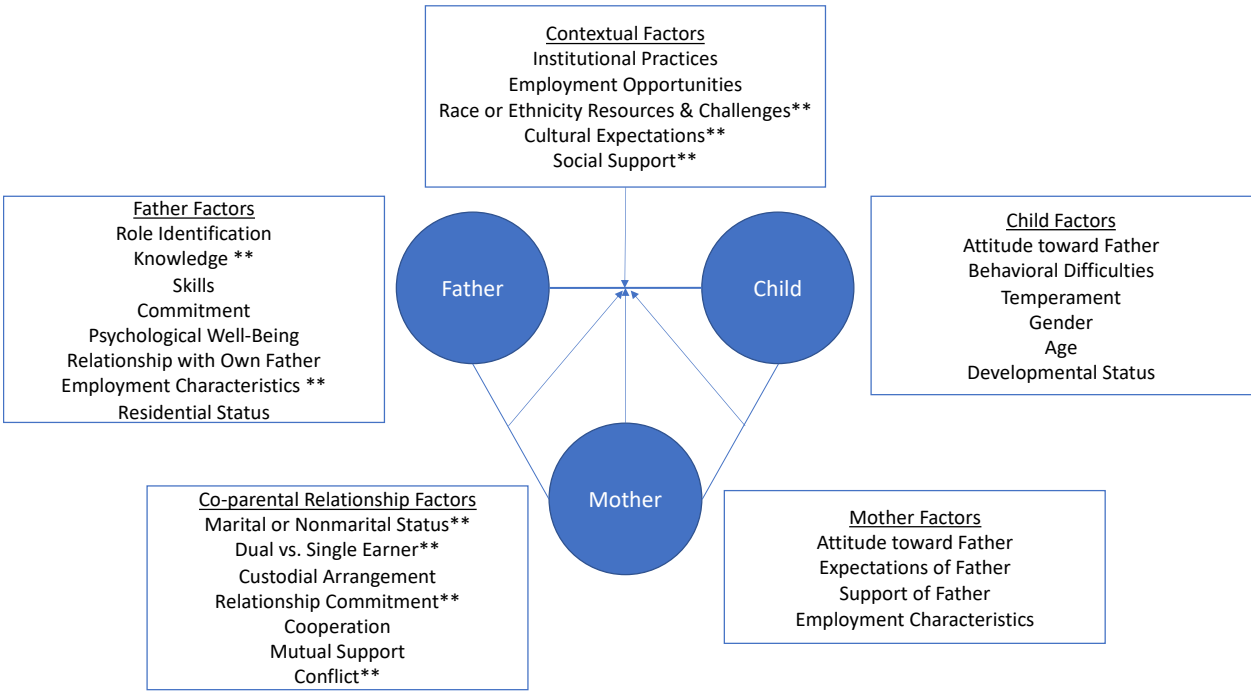

Figure 1: Influences on Responsible Fathering.[93]

Note: Items with two asterisks can be found in the baseline MOMENTUM questionnaire.

STUDY CONTEXT

The Democratic Republic of Congo (DRC) is in Central Africa and, as of 2020, was inhabited by over 89 million people.[95] Kinshasa, the capital of the DRC, is one of the largest urban areas in Africa. The country's social indicators are one of the poorest in the world. According to the United Nations Development Program's 2020 Human Development Index, the DRC ranked 175 out of 189 countries globally and its score (0.490) was below the average of 0.547 for sub-Saharan Africa.[96] This ranking is based on poor overall health, gender and overall poverty status in the country.

Statistics indicate that gender inequality in the DRC is high. The gender inequality index (0.617) is one of the worst among African countries.[96] So far, the DRC has closed 57.6% of the gender gap and ranks 151 out of 156 countries and last (35 out of 35) compared to the other sub-Saharan Africa countries included in the 2021 Global Gender Gap Report.[97] The gender gap measures the differences between men

and women across four dimensions (health, education, economy and politics).[97] The report also suggests that the country has closed 65.8% of the educational attainment gap.[97] Still, only 36.7% of women have reached at least a secondary level education compared to 65.8% of men.[98] There is also variation in participation in the labor market; female participation is 60.7% compared to 66.3% for men.[96]

Among women age 25-49, the median age at first birth is 19.9 years.[99] Half of the women in this age range initiate sexual intercourse by age 16.8 years compared to their male counterparts who begin at 17.6 years.[99] Women have an average of 6.6 children, and this is similar to their desired family size (women - 6 children; men- 7 children).[99] The adolescent birth rate is 124.2 births per 1,000 women of ages 15-19 and for every 100,000 live births, 693 women die from pregnancy-related causes.[98] In the DRC, for every 1,000 children born, 58 die before their first birthday and the under-five mortality is 104 deaths per 1,000 live births.[99]

PAPER 1: PATERNAL ENGAGEMENT DURING PREGNANCY AND BEYOND: A QUALITATIVE EXPLORATION OF THE ROLE OF FATHERS, BARRIERS, AND NORMATIVE DETERMINANTS

Abstract

Background: Involvement of men in the maternal health and childcare can play an important role in improving health outcomes. However, few studies have examined the role of men and the influence on norms on their participation in the Democratic Republic of Congo. Thus, the aim of this study was to identify roles of men during pregnancy and in childcare, explore normative factors influencing paternal involvement in childcare, and examine barriers to and enablers of male involvement during pregnancy and in childcare. The study also examined the similarities and differences in participants' perceptions.

Methods: This study involved secondary analysis of focus group discussions with first-time mothers aged 15-24 years and male partners of first-time mothers collected in 2017 during the formative stages of the Gates-funded Momentum Project. Discussions were audio-recorded and transcribed in French. Using thematic analysis, 12 focus group discussion transcripts were analyzed.

Results: Overall, there were more similarities than differences in participants' perceptions. Men played various roles during pregnancy and in childcare. Roles were categorized according to four domains (accessibility, engagement, responsibility, and other) and participants cited accessibility-related roles least and responsibility-related roles the most. In the exploration of perceived empirical and normative expectations, the most cited role for both expectations was the financial responsibility of fathers. Fathers typically provided financial support and the community expected fathers to have a financial role in childcare, in addition to other roles. Findings also indicated that fathers who chose to participate in "female" childcare roles faced sanctions such as verbal abuse, isolation, and ridicule. Despite these sanctions, most participants reported the fathers would continue to be involved. Lastly, the perception of

pregnancy as a woman's domain and the lack of financial resources were the most reported barriers. Factors that facilitated male involvement were also discussed.

Conclusion: Fathers played and were expected to play multiple roles during pregnancy and in childcare; however, many faced sanctions for their involvement in childcare roles perceived to be for women. There were also various factors influencing their involvement. Understanding these roles and factors is essential as programs aim to increase the participation of men in various aspects of childcare and maternal and child health.

Introduction

Fathers play a pivotal role in their children's lives, and this role has changed over time. They can be involved in many ways, including caring for the child's basic needs, playing, and providing financial support. Few studies have evaluated the prevalence of father involvement in sub-Saharan Africa. According to the 2018 Multiple Indicator Cluster Surveys (MICS) conducted in the Democratic Republic of Congo (DRC), only 6.7% of fathers engaged children aged 2-4 years in four or more learning and readiness activities.[57] Activities included reading books, telling stories, singing songs, playing, taking the child outside the home, and naming, counting or drawing things with the child.[57] In MICS studies in other sub-Saharan African countries, estimates of paternal engagement in learning and readiness activities were low, ranging from 2.6% to 10.8%.[50–56] Similarly, a low proportion of men are involved in pregnancy-related activities. One study in the Democratic Republic of Congo (DRC) found that after their intervention, only seven percent of male partners attended antenatal care with their partner and were tested for HIV.[60] Given this low prevalence of male involvement, it is important to gain a deeper understanding of the enablers of and barriers to male involvement.

Studies, mainly in developed countries, revealed that activities that fathers perform during pregnancy or childcare improve maternal health behaviors and outcomes.[6,16,78,100] For the child, paternal

engagement has been associated with a range of benefits such as the reduced risk of infant mortality[10] and the promotion of cognitive development.[101,102] For instance, an integrative review of 12 studies revealed that skin-to-skin contact between a father and infant had a positive impact on an infant's outcome, including bio-physiological outcomes such as regulation of blood glucose levels and stress hormones.[103] The study further suggested that this form of involvement had positive impacts on paternal stress and anxiety, paternal role attainment, and paternal interaction behaviors with the infants.[103] However, much of this supporting evidence on fathers' involvement in pregnancy and childcare primarily comes from developed countries. Moreover, paternal involvement varies across cultures and countries[78,104]; thus, there is a need to understand paternal involvement within the country of interest.

Multiple factors, such as relationship satisfaction, marital or relationship status, and self-efficacy, have been associated with male involvement.[68,69,72,105–107] Additionally, the low level or lack of male involvement has been attributed to the notion that pregnancy, childbearing and care are considered as female domains.[4,59,62,65,68,69,74] Given the importance of gender roles, understanding the perceived norms regarding gender roles and male involvement is vital. Furthermore, both quantitative and qualitative studies have explored the determinants of male involvement without providing an in-depth understanding of the role of norms in paternal involvement.[76,86,104,108,109]

The Theory of Social Norm by Bicchieri suggests that to predict behavior, we must understand the reasons for action.[110] Social norms can be defined as rules of behavior such that individuals prefer to conform to it on condition that they believe that (a) most people important to them conform to it, and (b) that most people important to them believe they ought to conform to it.[111] Individuals may personally disagree with a social norm, but they may eventually conform with the norm to avoid social backlash or for a desire to belong.[111] Therefore, a better understanding of the existing social norms about paternal involvement can inform our understanding of paternal involvement and the factors that influence a male partner's decision to be involved.

A recent meta-analysis by Shorey[104] called for more qualitative research on fathers across geographical contexts because of the low number of studies in Africa and Asia. Of the few studies conducted in sub-Saharan Africa, many have explored the barriers of male involvement in pregnancy[34,59,65,82,87] and only a few have explored barriers of involvement in childcare activities.[112–114] Moreover, to date, there has not been a study examining social norms regarding paternal engagement in childcare in the DRC. Studies exploring father's role in pregnancy in the DRC have been done as part of HIV programs, and these studies found that involvement was low even in the presence of an intervention.[58–60] Therefore, exploring paternal involvement in pregnancy and childcare in the DRC provides an opportunity to inform programs or interventions that seek to increase male involvement. This study (1) described the role of men in the family, specifically during pregnancy and childcare and (2) identified what motivates or deters men in engaging in childcare activities by identifying barriers to and enablers of involvement during pregnancy and in childcare. Lastly, the study identified empirical expectations, normative expectations, social sanctions, and sensitivity to these sanctions associated with paternal engagement in childcare.

Conceptual framework

Three frameworks were used to develop the initial codebook that guided the analysis of the role of fathers, barriers, and the normative factors that influence a father's decision to be involved.

I. Role of fathers

Lamb's definition of paternal involvement guided the exploration of the role of father in pregnancy and childcare. This definition has been used by several studies to guide research on the roles of fathers.[6,27,115] Lamb et al[32] identified three components – accessibility, engagement, and responsibility. The first component accessibility refers to the direct interaction and immediate access to the child. Engagement refers to the extent to which fathers interact with the child, and responsibility is the arrangement of resources for the child. Although this definition applies to involvement with children, it was adapted to

apply to involvement during pregnancy. Within the context of pregnancy, accessibility is being physically present, accessible and available; while, engagement refers to active participation in pregnancy-related activities with the mother such as attending and participating in prenatal care.[6] Responsibility refers to the arrangement of resources available for the mother and unborn child and involvement in household errands.

II. Normative factors

Social norms are constructed behavioral rules shared by a group of people. According to Bicchieri,[110] social norms depend on both empirical and normative expectations, and people tend to conform to these norms if both of these social expectations are in place. These expectations can exist simultaneously and can have independent and interactive influences on behavior.[110] Perceptions of these expectations may be inaccurate, such that prevalence and approval for risky behaviors are typically overestimated, but underestimated for protective behaviors.[116–120] Nevertheless, these misperceptions may influence behavior. Furthermore, social norms are maintained by social sanctions.[110] All these aspects of social norms can influence decision making and are critical in changing behaviors.

Empirical expectations

Empirical expectations refer to the belief about the behaviors of others or what others do.[110] Also known as descriptive norms,[121] they reveal which behaviors are likely given a situation. People who think that most people are performing the behavior may be more likely to perform the behavior and conforming to these expectations might occur under situations of uncertainty or ambiguity.[110] A meta-analysis on consumer decision-making suggest descriptive norms have a stronger impact on behavior compared to other norms and people's behavior tends to reflect the behaviors of others.[122]

Normative expectations

Normative expectations, also referred to as injunctive norms, are beliefs about what others think should be done and whether others might punish deviants of the behaviors.[110] This is important because it

highlights the expectations about others' personal normative beliefs and the sanctions that they may reinforce.

Sanctions and sensitivity to sanctions

The anticipation of social approval or disapproval of one's actions can maintain social norms.[110,123] These sanctions can be either positive or negative, and those who break the norm may face negative sanctions. Depending on the type and severity of the sanction, individuals may tend to conform to the norm. Additionally, the relevant people who matter to individuals (reference group) can play a part in a person's sensitivity to a sanction. Approval or disapproval from the reference group for that particular behavior can potentially influence the decision to perform it.

III. Barriers to and enablers of involvement

The social-ecological model (SEM) was used to guide the analysis of barriers to and enablers of male involvement during pregnancy and childbirth. SEM recognizes that there are multiple influences on behavior and that an intertwined relationship exists between an individual and their environment.[124] In doing so, the SEM highlights the complex interplay between the individual, interpersonal, community, and societal factors.

The first level, individual level, includes characteristics of an individual that can influence male involvement. These can include age, educational level, socio-economic status, knowledge, beliefs, and attitudes. The interpersonal level, the second level, explores the relationship with others and effects on social identity; while the third level, community level, examines settings in which social relationships occur and identifies the characteristics in these settings that are associated with male involvement. The societal level examines the societal factors, such as policies and laws, that help create a climate in which male involvement is encouraged or inhibited.

Research question and hypothesis

This research paper aimed to answer the following questions:

1. How are first-time mothers (FTMs) and male partners of FTMs different or similar in their perceptions about a father's role in pregnancy and routine childcare?
2. How are FTMs and male partners of FTMs different or similar in their perceptions about norms (empirical expectations, normative expectations, positive or negative sanctions, sensitivity to sanctions) affecting paternal involvement in routine childcare?
3. What are the perceived barriers to and enablers of male involvement during pregnancy and in routine childcare?

For each question, to the extent possible, the similarities and differences across age groups and marital statuses were analyzed.

Methods

Data and population

This qualitative study involved secondary analysis of focus group discussion transcripts from the formative evaluation of the Gates-funded MOMENTUM project, which was collected between November and December 2017. Male partners of FTMs and FTMs age 15-24 who lived in selected health zones (Lemba, Kingasani and Matete) of Kinshasa, the capital city of the DRC, were invited to discuss a variety of maternal and newborn health topics. Topics included the role of fathers in the family; decision making about maternal and newborn health and breastfeeding; forms of support that male partners provide during pregnancy; and barriers and enablers of gender-equitable behaviors after pregnancy.

Participants were purposively selected from the general population in the health zones. The research team collaborated with the Médecin Chef de Zone (Chief Medical Officer for the health zone), Tulane's network of collaborating nursing schools and community health workers who are in daily contact

with participant groups. Thereafter, a member of the research team contacted potential participants to invite them to participate in the focus group discussion and those who expressed interest were provided with an invitation coupon with the focus group's details, which they brought to the focus group discussion. Before they participated in any research activity, participants went through an informed consent process and provided written consent.

To be in included in the study, male partners had to be husbands or partners of 15 – 24-year-old FTMs and FTMs had to be between 15-24 years and with her first child. In addition, each participant had to meet the following inclusion criteria: (1) reside in Kinshasa for at least a year, (2) be fluent in Lingala, (3) be literate at the primary school level to be able to read the consent form, and (4) provide written consent to participate. Focus group participants in the formative evaluation were not part of the intervention and baseline survey.

Each focus group consisted of 10 - 12 participants, lasted 90 minutes and were disaggregated by age and relationship/marital status. Sessions took place in community-based locations in the health zones that were easily accessible, had no religious or government signage and did not indicate that women were participating in a research activity. They were led by trained moderators and note takers. All the sessions were conducted in French or Lingala, were audio-recorded, and transcribed in French. To assess the accuracy of the translations, the qualitative study director reviewed the transcripts several times and randomly selected sections of the transcripts to compare to the audio recordings.

This study used transcripts from 12 focus groups of which four were with male partners and eight were with FTMs. In a recent study, Guest et al.[125] proposed that saturation can be achieved within the first three focus groups. Therefore, it was expected that 12 focus groups would be sufficient for the analysis and adequate to identify the most prevalent themes within the dataset.

Ethical Approval

The formative evaluation was approved by the Tulane University Institutional Review Board (1112188) and the University of Kinshasa School of Public Health Ethics Committee (ESP/CE/060/2017).

Focus group discussion guide

As mentioned previously, the focus group discussion guide included questions on various issues related to gender and maternal and neonatal health. All the questions were developed using MOMENTUM's conceptual model. Additionally, the questions exploring perceived norms measured the constructs outlined in Bicchieri's Theory of Social Norms (previously defined in the conceptual model) and were adapted from questions[1] used by Bicchieri and other studies.[123,126]

To answer the research questions, this qualitative exploration focused on a subset of questions included in the guide and are outlined in Table 1. The guide did not include specific questions regarding the barriers to and enablers of male involvement. However, the selected subset of questions provided insight into the factors deterring and encouraging involvement.

Table 1: Description and details of the questions in the focus group guide that was analyzed

Topic of interest	Definition	Question in the focus group discussion guide
Role of fathers in the family		
Perceived role of fathers during pregnancy and childcare (Objective 1 and 5)	Participants' perception of a father's role in pregnancy and childcare	- What is the role of fathers in the family as perceived by men in your community? - What is the role of fathers in the family as perceived by women in your community? - What types of support does the community expect men to provide to their child's mother during pregnancy? The father can be the biological father of the baby, someone with whom the child's mother has a romantic relationship, or someone who is a father figure and is there for the mother and the baby.

[1] Example of questions used by other authors or suggested by Bicchieri [123,126]: (1) Empirical expectation: What would most other mothers do in this situation? or Do most people engage in the behavior? (2) Normative expectation: What would most other mothers advise Merima to do regarding her daughters' refusal? (3) Sanctions: What do you think would happen in your community if it was discovered that someone was engaging in open defecation? (4) Sensitivity to sanctions: Would the opinion of others make Merima change her mind about her daughters' marriage?

Topic of interest	Definition	Question in the focus group discussion guide
		- In real life, do an adolescent girl/young woman who is 15-24 years old and her husband/male partner discuss his involvement in care seeking for prenatal, delivery, and postpartum services? Why or why not? - In real life, do husbands/male partners of 15-24-year-old first time mothers accompany them for prenatal, delivery, and postpartum care? Why or why not?
Perceived norms		
Empirical expectation (Objective 6)	Participants' perception of what others think fathers do	What do husbands/male partners of 15-24-year-old first-time mothers (FTMs) typically do when it comes to caring of their newborns?
Normative expectations (Objective 6)	Participants' perception of what others expect fathers to do	What do people in the community expect fathers to do when it comes to taking care of their newborns?
Sanctions (Objective 6)	Participants' perception of the anticipated opinion or reaction of paternal involvement	How would his male peers react if the husband/partner of a 15-24-year-old FTM takes on roles that society expects women to perform, such as bathing the baby, changing the baby's diapers, and washing the baby's clothes?
Sensitivity to sanction (Objective 6)	Participants' perception of the importance of the sanction in determining behavior - Does the sanction matter for paternal involvement? - Would the behavior change with a negative sanction?	Would the reaction of his male peers cause the husband/partner of a 15-24-year-old FTM to stop performing tasks, such as bathing the baby, changing the baby's diapers, and washing the baby's clothes? Why or why not?

Several of the questions in the focus group guide were followed by probes that sought to understand if the opinions shared varied by relationship or marital status. For example, participants were asked if there were differences in paternal involvement when the husband/male partners were living together or married versus if they were not. Similarly, follow-up questions were asked to determine whether there were differences in opinions if the male partner was younger or older than the FTM. However, many of these follow-up questions did not have responses. These probes were not included in the analysis because there was not an adequate number of responses across all the participants.

The guide was pretested with FTMs, and male partners of FTMs who were not recruited to participate in the formative evaluation. Additionally, meetings were held with moderators and notetakers to agree on the Lingala translations of the questions in the guide.

Analytical strategy

The qualitative data analysis was guided by the principles of thematic content analysis. This method of analysis was chosen because it allowed for flexibility in analysis and provided structure for the organization of themes by providing a way of looking for patterns in data and trying to connect them together into meaningful groups and themes [127,128]. The process involved six steps. First, familiarizing oneself with the data by reading and re-reading the transcripts several times and looking for common concepts and coding them throughout the text (Step 1). Then, coding the transcripts in a systematic manner and collating data relevant to each code (Step 2). This was an iterative process.

The initial coding was somewhat deductive, whereby coding was informed by the conceptual framework and the questions in the interview guide. At the same time, additional codes were derived from the data and modified the initial coding frame. Next, the codes were grouped together into similar clusters to create a meaningful theme (Step 3). After several overarching and important themes were noted, the data was reread to determine whether the themes fit the coded data well (Step 4). In the fifth step, themes were defined and named. A few weeks after coding the transcripts, the transcripts were reviewed using the thematic analysis steps in their entirety. The last and sixth step was the final write-up.

To assess inter-rater reliability, a second person was recruited to code randomly selected sections of the transcript. Following a recent study on male involvement[129], selected sections were about 20% of the transcript. Discrepancies were discussed, and the codebook was revised to add new codes or reflect changes to code definitions. The inter-rater reliability coefficients were calculated on the sections with the two sets of codes and were greater than 80%. To improve the codes agreement, codes that did not have

an 80% level of agreement were excluded from the final write-up. To assess the validity of the findings, triangulation of the data using another data source (baseline survey) was conducted where possible. Not all the topics in this paper, such as the role of fathers, were explored in the baseline survey.

The write-up included the identified themes and topics with support from participant quotes. NVivo software (version 12) [130] was used to organize and analyze the data.

Results

Participant characteristics

There were 125 participants in the focus group discussions included in the analysis: 84 FTMs and 41 male partners (Table 2). On average, FTMs were 20 years old and male partners were 25 years old. Most FTMs (88%) and male partners (95%) had achieved a secondary or higher level of education. Over a quarter of the FTMs (27%) were married or in a union, while the remainder had never been married. Similarly, over half of the male partners (54%) had never been married. With regards to employment, unemployment was higher among FTMs (96%) compared to male partners (85%).

Table 2: Characteristics of focus group participants by participant group, Kinshasa 2017

	Focus Group Participants		
Characteristics	First-time Mother	Male partner	Total
Mean Age (SD)[a]	19.8 (2.2)	24.7 (5.3)	21.4 (4.2)
Level of education			
None	4.8	0.0	3.2
Primary	7.1	4.9	6.4
Secondary	51.2	78.0	60.0
Higher	36.9	17.1	30.4
Current relationship status			
Married or in union	27.4	46.3	33.6
Not married and in a relationship	41.7	53.7	45.6
Not married and not in a relationship	31.0	0.0	20.8
Health zone of residence			
Kingasani	0.0	51.2	16.8
Lemba	57.1	0.0	38.4
Matete	42.9	48.8	44.8
Employment status			
Unemployed	96.4	85.4	92.8
Unpaid worker	1.2	2.4	1.6

Characteristics	Focus Group Participants		
	First-time Mother	Male partner	Total
Salary only	2.4	12.2	5.6
Mean number of children (SD)[b]	1.0 (0.1)	1.2 (0.7)	1.1 (0.4)
N	84	41	125
Number of focus groups	8	4	12

SD – standard deviation

[a] Age range of participants: first-time mothers (16 - 24 years); male partners (18 - 38 years)

[b] Range for the number of children: first-time mother (1 - 2 children); male partners (1 - 5 children)

Male partner roles during pregnancy and in childcare

This section presents the focus group participants' responses to the first research question "how are FTMs and male partners of FTMs different or similar in their perceptions about a father's role in pregnancy and routine childcare?" The findings for male partner roles during pregnancy are presented first, followed by roles in childcare.

Perception of a man's role in pregnancy and childcare is presented in four domains, the first three are based on Lamb's definition of father involvement [(1) Accessibility, (2) Engagement, (3) Responsibility] and the last, (4) Other, is a summary of other roles participants shared. Although the roles are categorized in specific domains, many of them may overlap across domains and may belong to more than one domain.

Male roles during pregnancy

Accessibility

Accessibility – defined as being physically present, accessible, and available – was the least mentioned category by participants. A few male partners believed it was the man's role to be always near the FTM during the pregnancy to assist in any activities and this was mentioned only by those who were not married.

> For me, I provide support by being there with her all the time. I must know what she wants and what she doesn't want or if she asks for something or asks me to go buy something for her. For example something to eat….
>
> (R5, Male partner not married to FTM 15-19 years)

Some participants suggested accompanying the FTM to various hospital visits, including antenatal care (ANC), delivery, postpartum care, and preschool consultations (well-baby visits), were roles for men. However, the nature of their involvement was not clear for many participants. It was unknown if men went with FTMs and actively participated in hospital visits. As such, "accompany" was interpreted as going with pregnant women to the hospital visits mentioned.

> Personally, I have no choice and I can do anything. Accompanying a woman is the least thing to do… She is my wife and is carrying my future baby, so I have to accompany her.
>
> (R7, Male partner married to FTM 15-19 years)

Of the hospital visits, accompanying FTMs to well-baby visits was the least common role mentioned and most participants shared male partners accompanying FTMs to ANC was not a very common role for men in the community. Accompanying FTMs to delivery was a frequently cited role for men. That withstanding, participants, primarily male partners, emphasized that men should accompany FTMs to childbirth only and not the other hospital visits because of the consequences (such as shame and verbal abuse) of being involved in a "woman's domain." Additionally, one FTM age 15-19 shared that the man's role was to visit only after delivery.

> Yes, men accompany their wives. My partner accompanied me to ANC, delivery and all the time. For baby well-ness visits, he accompanies me if he is at home.
>
> (R2, unmarried FTM 15-19 years)

> …I must tell the truth, the husbands/male partners of new mothers aged 15-24 only accompany the mother for childbirth because the man is happy to see if the child looks like him. Men do not often accompany their wives to prenatal and postpartum consultations because of people's reactions …
>
> (R1, unmarried FTM 20-24 years)

> … I accompany my wife if she has labor pains. I can do it, but for prenatal consultation or preschool consultation, no, no. I am not motivated to accompany a woman who goes for prenatal consultation or preschool consultation because there are many women. How can I bear to stay there?
>
> (R2, Male partner married to FTM 15-19 years)

Engagement

Engagement referred to the active participation in pregnancy-related activities with the mother. Many participants described various engagement-related roles; however, the pregnancy-related roles were reported more often by the FTMs, with a few exceptions. Several FTMs and male partners voiced that spousal love and affection was a role for men, although this can be described as a motivation for involvement. Other roles reported by both groups included asking questions about pregnancy or hospital visits, following the pregnancy progress, learning more about ANC visits, and reminding FTMs about the upcoming appointments.

> First, I will follow up on her ANC, then give her love so that she (the woman) can see her husband loves her and so she protects the child and the pregnancy progress well. Pregnancy also requires that the man prove his love to his wife at any time ….
>
> (R3, Male partner not married to FTM 15-19 years)

> We talked, he asked me questions about the information the nurses shared with us and the baby's development. He was curious about the sex of the child and the delivery date.
>
> (R12, unmarried FTM 15-19 years)

> … even if she forgets the appointment, I will have to remind her …
>
> (R3, Male partner married to FTM 15-19 years)

Two participants reported that male partners were engaged during hospital visits in addition to accompanying their pregnant partners. These male partners differed from those described in the accessibility domain because they were present and actively participated in the visit.

> … that he starts going to the hospital to receive advice from doctors and information on the progress. He supports her by collecting ANC programs, and taking her to the hospital, ANC visits, and doctor consultations and all things.
>
> (R4, Male partner not married to FTM 15-19 years)

Some male partners and FTMs mentioned provision of spiritual and emotional support as roles for men. Spiritual support included praying for FTM, while emotional support included providing moral support and being aware, patient, and accommodating of the emotional demands, mood swings, and hormonal changes experienced during pregnancy.

> … he also provides spiritual and moral support by advising his wife or girlfriend.

(R2, married FTM 20-24 years)

> …. first of all, the woman has to be comfortable. Additionally, I must put up with her moods/whims because she is pregnant. Pregnant women have whims and so I must accept and put with them….
> (R5, Male partner married to FTM 20-24 years)

Several engagement-related roles were reported only by the FTMs. For these women, men involved during pregnancy participated in discussions initiated by the FTM about ANC visits, recommendations, or cost of services. In one case, the male partner was in touch with the doctor.

> Yes, I talked with my partner, and he was involved during pregnancy to avoid complications …. He also had the phone number of my doctor. He called him and talked a lot with him.
> (R2, unmarried FTM 20-24 years)

> We talked, my darling and I, when I came back from weigh-in. I told him everything about my health, that of the unborn baby and the progress of my pregnancy.
> (R10, unmarried FTM 15-19 years)

A few of the older FTMs suggested that the man's role was to give advice, although it is not clear which kind of advice was being provided for all participant except one. This older FTM mentioned men provided advice on avoiding extraneous activities such as lifting heavy things.

> The man must support his wife by advising her, especially during the first pregnancy. It is really difficult, so he must be very attentive and give advice to his wife. For example, his wife should not lift heavy things.
> (R6, married FTM 20-24 years)

> … they have to support their wives with advice, help them that's all.
> (R2, no longer in a union, FTM 20-24 years)

According to the FTMs, engaging with the baby before birth was part of the man's role. This included showing enthusiasm for the pregnancy, interacting with the mother's bump, or selecting baby names.

> …. when he had nothing to do or had some free time, he touched my belly and said nice things to the baby. He would say things like, I love you and I'm waiting for you, we'll live well together, etc.
> (R9, unmarried FTM 15-19 years)

> … when I was only 3 or 4 months pregnant, he had already made a list of first names for our child.
> (R10, unmarried FTM 15-19 years)

The FTMs were also the only participants to report that involvement included preparing for birth and reminding FTM of her medication if she forgot to take it.

> … mine was involved. He assisted by reminding me to take my medication to avoid complications and ensure delivery went well.
>
> (R3, no longer in a union, FTM 20-24 years)

Responsibility

Responsibility was defined as the arrangement of resources available for the mother and unborn child and involvement in household errands. Roles in this domain were the most reported types of roles and most of the roles were mentioned by both male partners and FTMs. An overwhelming number of participants suggested that during pregnancy, male partners were financially responsible for various costs associated with pregnancy. In order of importance (most reported), these expenses included the pregnant woman's food, maternity expenses (medication, ANC, delivery, postnatal costs), baby clothes, maternity clothes, well-baby visits, and bath basins for the baby. Some were not specific and reported that men had to pay for any needs that might arise. By assuming the financial responsibility, male partners ensured that FTMs had comfortable and healthy pregnancies.

> … during pregnancy, his role is to pay for the cost of the prenatal consultation and feed the mother of their child.
>
> (R4, unmarried FTM 20-24 years)

> The man must take care of his wife by feeding her. She must eat well for the good progression of her pregnancy. He must buy baby clothes and pay for the medical care of the pregnant woman.
>
> (R6, married FTM 15-19 years)

One participant suggested that the male partner's role was to purchase clay, although the purpose of its use was unclear.

> …. give money to buy clay, mango and everything the pregnant woman needs.
>
> (R12, unmarried FTM 15-19 years)

Aside from financial roles, both participants, primarily married male partners, shared that a man's role was to assist with household tasks including cooking, washing clothes, fetching water, and cleaning the house

during pregnancy. A few mentioned this role was necessary under certain conditions for instance, when the man was free or if the pregnant woman was not well or tired.

> I must support a pregnant woman with the housework. However, not too much because I must go out from time to time to get money. I will ask my little sister to help her during the time that I am away from home.
>
> (R11, Male partner married to FTM 15-19 years)

> First, I support my wife who is pregnant. I would not want her to do heavy work. She must stay home and do only small jobs. I will clean the house, do the laundry for her, and prepare the food. I will do everything for her.
>
> (R4, Male partner married to FTM 15-19 years)

Both male partners and FTMs shared that the man's role was to provide accommodation and this was mentioned primarily by older and unmarried FTMs.

> …taking care of the mother of their child. For example, housing (accommodation for) the mother…
>
> (R1, unmarried FTM 20-24 years)

Several participants reported that a man's role was to support and take care of the pregnant woman in order for her to maintain and improve her health and the health of her unborn baby. Many of these participants alluded to providing support or taking care of all the FTM's needs and requests.

> … You must take care of everything for her, all her needs. You have to solve them for her to stay calm.
>
> (R6, Male partner married to FTM 15-19 years)

A couple of the younger FTMs reported that carrying bags for the woman was one of the man's responsibilities during pregnancy.

> …they can even help them (pregnant women) by carrying their bags for them…
>
> (R6, married FTM 15-19 years)

Other

For some participants, recognizing and accepting responsibility for the pregnancy was a man's role and both groups of participants mentioned this. However, this role was one of the least mentioned. Both groups of participants also voiced the man's role was to provide regular sexual intercourse. One FTM and one male partner suggested that sex during pregnancy opened the vagina and facilitated delivery.

…he accepts responsibility for the pregnancy…

(R5, married FTM 20-24 years)

… he must have regular sexual relations with her. This enlarges the vagina and facilitates birth.

(R2, unmarried FTM 15-19 years)

Other roles reported only by FTMs included remaining faithful to the pregnant woman during pregnancy and paying the wife's family. Each of these roles was mentioned by one participant.

Normally the man must pay the almonds to the family of the girl….

(R8, married FTM 15-19 years)

Male roles in childcare

Accessibility

In childcare, accessibility was defined as the direct interaction and immediate access to the child. This was the least mentioned domain and only one participant, an unmarried FTM age 15-19, believed living with the child was part of a father's role.

… feed the children and live together with them…

(R8, unmarried FTM 15-19 years)

Engagement

Engagement referred to the interaction of the father with the child. Unlike in pregnancy, engagement-related roles in childcare were not frequently mentioned by participants and many of these roles pertained to children older than 12 months old. Men's roles included showing love and affection, encouraging dialogue, counseling, praying, and providing religious guidance. These roles were mentioned by both FTM of all ages and male partners with younger FTMs to a similar extent; however, character development, love and affection was reported more often by the FTMs.

…teaching his children about the life of prayer is what makes dad good at home…

(R3, Male partner not married to FTM 15-19 years)

… give the child advice, because advice is important, a little advice …

(R6, no longer in a union, FTM 20-24 years)

Responsibility

Participants most frequently mentioned roles within the responsibility domain. Responsibility was defined as the arrangement of resources for the child and participation in childcare and household tasks. Overall, participants identified twelve distinct roles and both male partners and FTMs reported all but four of these roles. Similar to the engagement domain, some of the roles mentioned pertained to children older than 12 months. Education was a major role and was reported in all focus groups. Participants expected fathers to pay for the tuition and materials needed, be exemplary figures for their children, and do everything possible to keep them out of mischief and ensure they had bright futures. For some, education was essential for the girl child to keep her occupied and avoid teenage pregnancy.

> The role of the father is to provide a good education to his offspring so he can guarantee their future. To assume his responsibility, he must educate his children in a good school and keep their home well.
>
> (R6, married FTM 20-24 years)

> … educate the children so they become helpful in the society in future. Many children become delinquents because they lack education. If children have a good education, they will have a good future…
>
> (R4, Male partner married to FTM 15-19 years)

> The father must play a role by participating in the education of his children. He should pay for their school and involve himself in his children's education. He must show them the right ways to follow, especially for girls. This will help the girls avoid early teenage pregnancy.
>
> (R1, married FTM 20-24 years)

Both groups of participants shared fathers were responsible for their child's health, food, and clothing. Many provided vague descriptions about this role, however, a few specified that fathers were financiers of childcare needs. Fathers were also expected to provide general financial support for all the child's needs.

> A father's role in his home is to know how to look for money to meet the needs of his children...
>
> (R7, Male partner not married to FTM 15-19 years)

> …a father must take very good care of his children, feed them, clothe them, and pay for their school fees. If the child is sick, the father must bring the child to the hospital…
>
> (R7, married FTM 15-19 years)

A few participants suggested that the man's role in childcare was to find a job to get money and meet the family's needs. It was also a way for the father to take responsibility for his children.

> The role of the man is to work and provide money ….
>
> (R7, Male partner not married to FTM 20-24 years)

Some, mainly unmarried male partners, shared a father's role was to supervise and watch over the child. Taking care of the all the child's needs was another general role cited.

> … a father's job in the family is to take care of his children…
>
> (R11, Male partner not married to FTM 20-24 years)

> The father should be authoritative with regards to his children. This will allow him to properly supervise them, educate them and help them find a profession.
>
> (R7, married FTM 20-24 years)

> …secondly, the father must take care of the children in his house…
>
> (R4, Male partner married to FTM 20-24 years)

A number of roles were reported only by FTMs or male partners. FTMs shared that men were involved in taking the child to school, helping the children and purchasing toiletries for children. Some mentioned that the toiletries included cosmetic and sanitary supplies for girls, while for babies, toiletries included bathing soap and body lotion.

> … if the mother does not have time to accompany the children to school, the father can help before going to work. His wife prepares the children and he, the father, accompanies the children to school.
>
> (R12, no longer in a union, FTM 20-24 years)

One participant mentioned that bathing the child was also a role for fathers.

> …to help your family if you have something, bath the children in the morning…
>
> (R11, Male partner not married to FTM 15-19 years)

Other

Although not directly related to childcare, many participants voiced that a father was the head of the household and as such his role in childcare was to accept this responsibility for the child. Others shared that the man's role was to protect children and ensure they slept well.

> The father is the head of the family. He is responsible for the family. He is number one in the family…. according to the mothers, the father must assume his responsibility.
>
> (R6, Male partner married to FTM 20-24 years)

> In our neighborhood, men think and say the role of a father is to ensure the protection of his children….
>
> (R5, married FTM 20-24 years)

Normative factors of involvement in childcare

How are FTMs and male partners of FTMs different or similar in their perceptions about norms affecting paternal involvement in routine childcare?

In this section, the findings of the second research question on perceptions about norms are presented. The norms explored include empirical expectations, normative expectations, positive or negative sanctions, and sensitivity to sanctions.

Empirical expectations

Empirical expectations are participants' perceptions of what others think fathers do and to assess this normative factor, male partners were asked, "what do husbands/male partners of 15–24-year-old FTMs typically do when it comes to care of their newborns?" Most FTMs and male partners agreed that the fathers typically provided financial support and the most common were for clothing, food, and hygiene products including soap, body lotion, powder, and diapers. Some participants noted that fathers typically provided funding for anything necessary for the newborn, without being specific.

> Typically, fathers are expected to bring a big box of milk, talcum powder, soap, and all the necessities for the child….
>
> (R1, Male partner married to FTM 15-19 years)

> He is expected to give money, so all the baby's needs are covered.
>
> (R2, unmarried FTM 15-19 years)

Others explained that fathers typically provided money to cover expenses for the newborn's health and any expenses in the event of illness. Married FTMs age 15-19 also shared that fathers bought presents and toys for the child.

> First, he is to ensure health and take care of medical care…
>
> (R8, Male partner not married to FTM 15-19 years)

> He is expected to take care of the newborn with gifts… gifts that he can give to the newborn because it is his first baby and the fruit of his womb. He will take care of him with presents.
>
> (R2, married FTM 15-19 years)

Another typical task was taking care of the newborn's needs, and this was shared by FTMs and male partners in several focus groups. Both groups also mentioned that fathers typically showed affection and love to their newborn. For one father, this was manifested by being physically present to dote on the child. One FTM and one male partner also noted that fathers accepted responsibility for the child.

> … he is expected to be next to the child, so he (the baby) gets used to it. The father is to create a bond between him and his child or baby.
>
> (R11, Male partner married to FTM 15-19 years)

> … he is to take care of his responsibilities regarding the newborn …
>
> (R12, married FTM 15-19 years)

Several male partners reported that fathers typically assisted with various childcare activities, including carrying or cuddling the baby, helping when the baby cries, putting the baby to sleep, changing the baby's diapers, and taking the child on a walk or drive.

> … when I come from work, I try to carry my baby… if he pees or poops, I must take care of it myself. I must give my attention to the child because they are my blood.
>
> (R4, Male partner married to FTM 15-19 years)

> He is to walk him throughout the neighborhood, and he will buy him the clothes. He will take the child, cover him with a sheet, go for a walk, and then take him back to his mum.
>
> (R1, Male partner not married to FTM 20-24 years)

A few male partners married to a young FTM shared fathers typically asked questions about their child to follow the child's growth and determine the child's needs.

> He is to follow the health of the newborn, the child's development. If he travels and returns, he has to ask the mother about the child, how the child is doing, what the child needs. The woman will inform the man what the child needs and ultimately, the man provides everything for the child to grow normally.
>
> (R2, Male partner married to FTM 15-19 years)

Some married FTMs mentioned that fathers typically protected and named the child. One also mentioned that fathers typically organized parties for the newborn.

> I think that in this case, the man will come to give a name to his son…
>
> (R5, married FTM 20-24 years)

> …the others will even throw a party for the new baby….
>
> (R12, married FTM 15-19 years)

Normative expectations

Participants' normative expectations about paternal involvement were assessed by asking the question, "what do people in the community expect fathers to do when it comes to taking care of their newborns?" Overall, the majority of FTMs and male partners believed the community expected fathers to have a financial role in the childcare of their newborns. This was common across all focus groups. They shared fathers were financially responsible for food, clothing, hygiene products, toys, and all the needs of the newborn.

> The community expects fathers to do everything the mothers ask them to do for the newborn. As a newborn, the child needs a lot of powder, ointment and lotion so the child has good skin …
>
> (R9, no longer in a union, FTM 20-24 years)

Although not directly related to newborns, some FTMs and male partners believed the community expected fathers to ensure the child was educated.

> The members of the community want the father to… educate the child and send him to school when he is of school age.
>
> (R4, Male partner married to FTM 15-19 years)

Participants believed community members expected fathers to take care of their newborn and all their needs. These notions were often vague but reported frequently by male partners and FTMs.

> I think the people of the Banza Lemba community, my community, will expect the man to take care of his child and successfully provide for all his needs.
>
> (R3, married FTM 20-24 years)

Both groups of participants also voiced that the community expected fathers to accept responsibility for the newborn. For male partners, this perception was shared by only those married to FTMs age 20-24.

> The community will expect the father of the newborn to assume his responsibilities and present himself as a responsible father …
>
> (R9, married FTM 15-19 years)

Fathers were expected by the community to show affection and love to their newborn, according to a few male partners and married FTMs.

> The community expects affection and love, and the father gives the newborn special attention …
>
> (R5, married FTM 15-19 years)

Several male partners shared that fathers were expected to organize an event for the community to celebrate the birth of the newborn and a few mentioned organizing birthday parties for the newborn.

> In my opinion, the community expects fathers to organize an event and invite close members of the community. This is to celebrate the birth of the new baby and shows the father received his baby with joy.
>
> (R8, Male partner not married to FTM 15-19 years)

Among male partners of older FTMs, a few shared that the community expected the father to live with the newborn and be present. One of them emphasized fathers were expected to visit occasionally.

> The community will expect to see how the child was born, how we live with, take care of the child, and if we stay in the home….
>
> (R4, Male partner married to FTM 20-24 years)

> … secondly, he is expected to visit from time to time …
>
> (R4, Male partner not married to FTM 20-24 years)

One male partner shared that community expectations included registering the newborn's birth.

> The community will ask the father of the new baby if he has gone to register the child at the Civil Registry and if he has been to the district office …
>
> (R9, Male partner married to FTM 15-19 years)

Several unmarried and older FTMs believed that the community expected fathers to present drinks to her family and the community. Other FTMs noted community expectations included providing accommodation for the child, protecting the child, and naming the child.

> … and then offer drinks, as a gesture to acknowledge that he is the father of the child.
>
> (R8, married FTM 20-24 years)

> The community expects the father of the newborn … to prove his affection to the child and protect the child.
>
> (R2, married FTM 15-19 years)

Sanctions

Most participants reported that men faced positive and negative sanctions from their male peers and the community when performing childcare roles that society expected women to perform. The sanctions described by participants tended to be negative sanctions or punishments.

Negative sanctions

Several roles were perceived as unacceptable by participants. Washing the baby's clothes or diapers was the most reported role that was unacceptable for a father, followed by bathing the baby. Other inappropriate roles included changing the baby, washing dishes, cleaning the house, cooking, carrying the FTM's bag, and staying with the child. According to a few participants, these roles were unacceptable even if the FTM was sick. Participants shared that husbands, male partners or fathers who performed these childcare roles ascribed to women faced several negative sanctions or punishments.

Most often the masculinity of fathers performing these roles was questioned. Those fathers were perceived to fear their wives, described as "not a man," and labeled as weak or dominated by their wives or partners. This was common and mentioned by several FTMs and male partners.

> Often people will react by saying that you are trapped in "Zakala haaa." This means that you are dominated by your wife.
>
> (R1, Male partner married to FTM 20-24 years)

> …how can the man wash the baby's clothes instead of his wife? People will insult him, they will say that he is effeminate, he is fearful, he is stupid, his wife dominates him...
>
> (R6, married FTM 15-19 years)

Verbal abuse was the second most common form of negative sanction and was cited across all focus groups. Fathers were insulted, slandered, and called names (such as “idiot,” “dumb,” “stupid,” “naïve”) for their participation in roles expected of women. Some shared the father was talked about in the community and his actions were shared.

> … it's the man's family who will talk a lot. They will tell the man that he is stupid and tell him “how can your wife cross her hands and let you wash the baby’s clothes?” They will insult and call him “dumb/stupid.”
>
> (R6, no longer in a union, FTM 20-24 years)

> His friends will say that our friend is “Niama” (‘stupid,’ he is naive) …
>
> (R2, Male partner married to FTM 15-19 years)

Some participants, mainly the FTMs, shared that fathers were ridiculed and mocked by their peers. Others suggested that peers would be unhappy and discourage the father from performing these roles.

> They will bother him and make fun of him because you don’t see a man washing the baby…
>
> (R3, unmarried FTM 15-19 years)

One young FTM reported that fathers who performed “female” roles faced isolation because his family members would stop visiting him.

> There are husbands who help their wives by washing the baby's diapers. Their families refuse to come to their house….
>
> (R7, married FTM 15-19 years)

Wives or partners of these fathers were also targets of verbal abuse and punishments. However, much of the verbal abuse was directed at the husband and not the FTM. Both male partners and FTMs suggested that peers accused FTMs of using traditional medicine or witchcraft to bewitch her husband/partner to perform roles expected of women. This was reported predominantly by the FTMs. A couple of FTMs also mentioned that fathers were told that his wife/partner lacked respect.

> If some friends find him working, they won't be happy, they'll say to themselves that the woman consulted the witch doctors to dominate him.

(R6, unmarried FTM 15-19 years)

> His friends will say that this woman is bad. She does not respect her husband because she asks him to wash the baby and change the baby's diapers.
>
> (R7, unmarried FTM 20-24 years)

Positive sanctions or rewards

Rewards for paternal involvement in childcare was rare and participants did not mention any rewards for fathers who performed roles expected of women. For other roles, only one participant mentioned a reward. According to this participant, fathers who fulfilled their financial responsibilities were praised.

> … moms will say, "ah this father really fights for his children, and we see that ourselves." In my case, even if my husband he has nothing, he will do his best, to look for money take care of my children. When women in the neighborhood see this, they say that this man is fighting for his wife and child….
>
> (R4, married FTM 15-19 years)

Although several participants did not report rewards for the behavior, they described father participation in childcare roles expected of women as normal. A few of these participants shared it was normal for fathers to bath the baby, carry the baby, dress the baby, change the baby, cook, wash dishes and fetch water. Both FTMs and male partners considered it normal because the father loved his wife and child, this was the father's first child, or the wife was recovering from childbirth. Additionally, a few male partners shared that the roles were performed to give the FTM a break. Other male partners suggested that performing childcare roles was not a sign of weakness and it was normal because the man is the biological father and the "author of the pregnancy."

> It is only normal. Personally, I find it normal because he loves the baby. When the baby is crying and she (the mother) does not know, he will help her.
>
> (R10, Male partner not married to FTM 20-24 years)

> Taking care of the child is not a task exclusive to the man or woman. If the man wants to help the woman, he will do it. He helps his wife/partner reduce the workload she has …
>
> (R2, unmarried FTM 20-24 years)

> Helping the woman is not a sign of weakness because there is a point when the woman also gets tired since she has been working. There are jobs that require her husband's support ...

(R6, Male partner married to FTM 20-24 years)

A few participants who considered these activities normal placed conditions on their acceptability. FTMs and male partners explained childcare roles were acceptable if the FTM lacked external support, was sick or was busy. One male partner also shared it was normal if no one was around to see him.

> It is normal if you want to help her and there is no one who can help her …
>
> (R7, Male partner married to FTM 15-19 years)

> It is normal. I can help but I have to hide to do it ("female" childcare roles). If my friends see me, they will laugh at me…
>
> (R12, Male partner married to FTM 20-24 years)

Sensitivity to sanctions

This section investigated whether the perceived the importance or severity of the sanction determined fathers' performance of childcare tasks such as bathing the baby, changing the baby's diapers, and washing the baby's clothes. Participant responses varied, however the predominant viewpoint among FTMs and male partners was that the father would continue performing childcare tasks.

Continue performing childcare role

Majority of the participants shared that fathers would continue to be involved regardless of the reaction of their peers for a myriad of reasons. FTMs and male partners reported the love and affection fathers had for the FTM and their child would cause him to ignore his peers and continue various childcare tasks. This rationale was common as it was mentioned by several participants in each focus group.

> I think he won't stop helping his wife if he really loves her and really cares about her. I don't think he would listen to them or heed what people's criticisms if he really loved his wife.
>
> (R2, married FTM 20-24 years)

> He will not stop. He will continue to wash the baby, especially because I find that the father can do it more easily than washing clothes. But despite that, it's if he loves his wife.
>
> (R9, unmarried FTM 20-24 years)

> In this case where love exists, I will tell them that I am doing it for love but in this case where love does not exist, I will tell them that I am doing it for the love of my child.

(R3, Male partner not married to FTM 15-19 years)

A few male participants not married to FTMs age 20-24 noted that the FTM needed to rest, deserved help from her partner and was "human." Moreover, the father fathered the child and would do anything for the child's wellbeing. Other reasons provided by FTMs and male partners for the continuation of involvement included the recent delivery by the FTM, residence in the same house, lack of support from others and the notion that childcare is not only a woman's domain.

> Personally, even if my comrades laugh at me, I will always want to continue because I am the author of the pregnancy (biological father), and when she has difficulties, I am obliged to help her.
>
> (R3, Male partner married to FTM 20-24 years)

> … I have to tell friends that they have to understand the situation because madam just gave birth. I have no choice and I must continue to help her. My friends will forgive me. I tell them these excuses because I can't stop helping my wife. My wife is alone, and she has no one else who can help her.
>
> (R7, Male partner married to FTM 15-19 years)

> He will not stop because his wife doesn't have anyone to help her. He will keep on doing it.
>
> (R2, unmarried FTM 15-19 years)

One male partner explained that fathers would continue because of the double standard of sanctions. If he stopped and it negatively impacted the FTM or child, his peers or community would still ridicule and make fun of him.

> … when my wife just gave birth, and I was helping her, I didn't leave. Even if they talk, I won't stop, because if I stop helping, and my child won't grow well too. If I stop, I may make my wife suffer and my child may not be as healthy, and his/her growth will be bad. When my child's growth is bad, these same people will start laughing at me, since I stopped helping my wife.
>
> (R2, Male partner married to FTM 20-24 years)

In addition to being involved, male partners mentioned that fathers may go a step further by advocating for their involvement and requesting those opposing their decision to leave.

> People will always say that the woman has dominated you and she made you work. Personally, if people say that I will chase them out of my home (ask them to leave).
>
> (R5, Male partner married to FTM 20-24 years)

For a few male partners, fathers would continue to be involved if none of their peers were around.

> That is my blood, so I am going to do it. However, I will not do it in front of everyone so they don't see that I'm washing the clothes.
>
> (R5, Male partner not married to FTM 20-24 years)

Cease performing childcare role

While most indicated that fathers would continue be involved, several participants across focus groups mentioned that the father would stop performing tasks. The most frequently reported reason, only by FTMs, was that the fathers were influenced by their peers and others. Some would stop because of the incessant repercussions or sanctions faced as a result of being involved.

> There are some men who are sensitive to the reaction of their friends, and as a result of their influence, he may stop helping his wife with these kinds of chores …
>
> (R5, married FTM 20-24 years)

> Yes, I will stop …. My peers will tell me that what I am doing is not good. They will point out people are criticizing me for that. So in this case, I will not accept that people will always make fun of me, and there I can decide to stop.
>
> (R1, Male partner married to FTM 20-24 years)

> People's words can change the partner's opinion, because people talk a lot, and they always repeat the same thing. They will say things like 'he's stupid,' 'he washes the baby's clothes instead of his wife', 'it is the work of women, you are an effeminate.' He can change when they say all these sayings.
>
> (R5, no longer in a union, FTM 20-24 years)

A few FTMs and male partners shared fathers would stop because male participation in childcare was not normal and it was considered a woman's domain. Fathers may be embarrassed because of their participation.

> On the other hand, it can change his opinion because he will be embarrassed when people call him out and tell him that what he is doing is not good,
>
> (R12, married FTM 15-19 years)

> I'm going to change my mind because what I am doing is not my job.
>
> (R4, Male partner not married to FTM 15-19 years)

Several male partners married to FTMs age 20-24 shared that fathers would stop if FTMs lived with their parents and had the necessary support.

> … if she is with her parents, then it is really impossible. There are people there, her sisters are there, her dad is there, her mom is also there, and therefore I cannot do it
>
> (R12, Male partner married to FTM 20-24 years)

Conditional performance of childcare roles

A few FTMs and male partners also shared that the father's decision was dependent on the situation and whether others were present. For some FTMs, the decision was dependent on the level of affection the partner had for the FTM and his motivation to help the FTM. While for a couple of male partners, the decision depended on the type of childcare activity and another mentioned it depended on his consideration of the benefits and disadvantages of being involved.

> Helping the woman is not bad. I can help her, but I can't wash the diapers. I can't do it. To carry the child or change diapers, that I can do it. I can even do some small jobs and I can prepare Foufou (cassava flour) for my wife.
>
> (R4, Male partner married to FTM 20-24 years)

> …. I cannot immediately continue or stop based on what my friends have said. I analyze the situation to see the pros and cons. I am going to do an in-depth analysis to decide what I can do, or the way forward.
>
> (R6, Male partner married to FTM 15-19 years)

Barriers and enablers of involvement during pregnancy and in childcare

This section presents the findings of the third research question, "what are the perceived barriers to and enablers of male involvement during pregnancy and in routine childcare?" Factors influencing involvement were categorized into four themes based on the socio-ecological framework: (1) individual factors, (2) interpersonal factors, and (3) community and societal factors. After which, each theme was divided into sub-themes for further exploration.

Male roles during pregnancy

Barriers

Individual factors

Time constraints. Focus group participants often highlighted the unavailability of male partners during the pregnancy period because of work and other commitments. This was mentioned across most focus groups. For some male partners and FTMs, work or long working hours prevented men from accompanying the pregnant woman during hospital visits or engaging in pregnancy-related discussions.

> My partner did not accompany me because of his work. He went out every day in the morning and did not come back until late at night at 11 pm ….
>
> (R1, unmarried FTM 20-24 years)

> … it is absolutely necessary that I accompany her to the hospital but, if it happened during the day when I wasn't there. Maybe I went to work. Our neighbors in the community accompanied her to the hospital for her prenatal consultation and the preschool consultation.
>
> (R4, Male partner married to FTM 15-19 years)

Some also explained that the times of the hospital visits were inconvenient, or did not correspond with the man's free time. Therefore, some male partners of pregnant women could not accompany them to antenatal care visits and other visits.

> I went to the weigh-in alone because he had a schedule that did not allow him to accompany me. My ANC appointment hours did not coincide with his free hours.
>
> (R4, unmarried FTM 15-19 years)

Financial difficulty. Several FTMs and male partners cited the lack of funds or jobs as a barrier to involvement. Men were not able to assume the financial responsibilities associated with pregnancy, which many believed was a man's role during pregnancy.

> No, the male partners of new mothers aged 15-24 do not accompany the mother to prenatal care, childbirth, and postpartum because the male partner is often afraid to assume his responsibilities because he does not have the money to accompany his wife.
>
> (R9, unmarried FTM 20-24 years)

Attitudes and beliefs. Men's beliefs about and attitudes towards pregnancy or roles associated with pregnancy appeared to influence his involvement and this was common among both FTMs and male

partners. Several explained that the belief that certain roles were reserved for women caused men to feel shame and thus prevented their involvement.

> It's a little rare because many are ashamed and afraid to walk around with a pregnant woman. They find it a burden and they feel ashamed when they are seen with a pregnant woman.
>
> (R5, Male partner not married to FTM 15-19 years)

Some FTMs and male partners indicated that male partners, especially younger males, had negative perceptions towards pre-marital pregnancy or pregnancy out of wedlock; thus, it prevented them from being involved. This negative attitude resulted in men feeling shame and at times, they avoided being seen with the pregnant FTM in public.

> In my experience and in general, men do not accompany their wives or girlfriends to the hospital. Very often they are ashamed especially if they are still young, he is ashamed ….
>
> (R1, unmarried FTM 20-24 years)

Interest. Several unmarried FTMs age 20-24 shared that men who denied the pregnancy or lacked interest in the pregnancy process were often not involved. Participants explained that these men did not want the baby or be fathers; thus, they were not involved and left the responsibility to the mother, her family, or others.

> No, the male partners of new mothers aged 15-24 do not accompany her to prenatal care, childbirth and postpartum because often these pregnancies are unwanted, and the male partner denied the pregnancy or has left.
>
> (R2, unmarried FTM 20-24 years)

Knowledge. One participant mentioned that lack of knowledge was a barrier. Men who were not aware they could accompany a woman to hospital visits did not perform their duties and thus were not involved in this aspect of pregnancy.

> No, because men don't know that they have to accompany their wife to ANC and other consultations…
>
> (R1, married FTM 20-24 years)

Interpersonal factors

Couple relationship. Couple relationship was a common barrier mentioned by both FTMs and male partners. Participants indicated that men who were not in relationship or married to the pregnant women were less likely to be involved, forcing the pregnant woman to rely on others. Some explained that men were not involved because the couple was no longer together, or the man no longer loved or had affection for the pregnant woman. Consequently, his commitment to the woman changed.

> …. Unfortunately, personally, I didn't experience this because my baby's dad dumped me when I told him of my pregnancy and it was with my mom that I had this experience.
>
> (R9, married FTM 20-24 years)

A couple of male partners and FTMs shared that male partners were not involved if the pregnant woman lived in another household or was not in close proximity to the FTM. It would be difficult because he was not physically present to assume his responsibilities and know her needs or requests.

> In my experience, my mother accompanied me. I did not live with my man, but he would have accompanied me without the slightest problem if I lived with him.
>
> (R3, married FTM 20-24 years)

Partner opposition. Some FTMs and one male partner reported that the pregnant woman deterred her partner from being involved especially at hospital visits for a myriad of reasons. Many of these participants shared that pregnant women often inflate the cost of services or provide inaccurate prices to their male partners. As a result, the women did not want their male partners to accompany them to the health facility. The excess funds obtained from inflating the costs of items/services were used to purchase items needed for the pregnant woman or unborn child.

> I always went alone from the beginning of my ANC consultations until the end of my pregnancy. But at least on the day of the birth, he was with my mother, aunts, and sisters who accompanied me. I did not like him accompanying me during prenatal consultations because the consultation form cost 4000 Congolese Francs and on appointment days I only paid 2000 Congolese Francs. I told him that at each session, I had to pay $15 (equivalent to 16,000 Congolese Francs). I did this because I needed to purchase maternity clothes, baby kits and items for the child. He promised to buy all that but it took time, so my consultations took priority, I took advantage of it!
>
> (R7, unmarried FTM 15-19 years)

For a couple of FTMs and male partners, the male partner may not be involved because the FTM was ashamed to be seen with the him. One FTM shared that she discouraged her male partner from being involved during childbirth = because she believed his presence would affect the delivery process.

> …. even though her husband is the author of the pregnancy, sometimes some women find it shameful to go with the man to the hospital or to walk together with him to the hospital. There are women who do not like to be accompanied and who are ashamed. They prefer to be accompanied by their friends, rather than their husbands.
>
> (R5, Male partner married to FTM 20-24 years)

> … but during childbirth I have never seen a man accompany his wife to the hospital. If the man accompanies his wife to childbirth, the woman will have difficulty giving birth. The woman will hang around with the pain …
>
> (R9, no longer in a union, FTM 20-24 years)

Influences of peers and family. FTMs and male partners reported that peers and family members were barriers to involvement especially if they disapproved of male involvement. The reaction of peers and family and the stigma and sanctions that men faced because of their involvement ultimately deterred involvement.

> He accompanied me once. It was beautiful, but he did not continue because of the reaction of his brothers and his friends. They said that I made fetishes for him to get there and since that time, he had never done it again. Even on the day of my delivery, I went with my mother and my sisters. He wasn't here.
>
> (R6, unmarried FTM 15-19 years)

> ….when family members talk, the man will listen to his family. He will no longer accompany his wife to the hospital.
>
> (R2, unmarried FTM 20-24 years)

Community and societal factors

Woman's domain. Perception of gender roles appeared to influence male partners involvement during pregnancy and was a recurrent theme. This perception not only existed at the individual level but at the societal level. Many participants, especially male participants, reported not being involved because it was considered a norm for a man to avoid participating in certain activities or being seen in spaces described as women-only spaces. Those who went against this norm faced sanctions and shame as a result.

> Accompanying the woman to her prenatal consultation or the preschool consultation, I cannot do that. I can rather accompany her when she has labor pains because at the prenatal consultation or the preschool consultation, there are many women who will start to look at me and probably criticize me.
>
> (R8, Male partner married to FTM 15-19 years)

Health provider. Two older FTMs reported that health providers were barriers to involvement. Providers did not allow men to participate in facility-related activities during pregnancy. One explanation was because the man's presence could have a negative impact on the birthing process, while the other was to prevent men from discussing women's health issues.

> It is relative. There are some who do it and others do not. At some health centers men are prohibited from participating in their wife's delivery because their presence delays the birth. Hence some do not accompany their wives to the hospital and she goes there alone.
>
> (R3, married FTM 20-24 years)

> …but men do not accompany their wives to prenatal and postpartum visits because often, there is a risk they will be sent away by providers because they (providers) are talking about women's things.
>
> (R4, unmarried FTM 20-24 years)

Enablers

Individual factors

Obligation. Several male partners and a few younger FTMs mentioned that a man's attitude towards men's role during pregnancy was an enabler. Future fathers who believed it was their duty to be involved during the pregnancy period were perceived to be more involved in various activities. These men accepted responsibility for the pregnancy and fulfilled their obligation.

> Yes, there are some who accompany their wives. Those who accompany their wives feel they have a duty to do so, to assist their wives, so that they do not feel alone.
>
> (R2, married FTM 15-19 years)

Interpersonal factors

Couple relationship. The nature of the relationship between the couple enabled some men to be involved during pregnancy. Several FTMs and male partners shared that those in a relationship loved and had affection for the pregnant woman and therefore were willing to participate in pregnancy-related activities.

> Yes, they are there, the man who loves his wife very much, can sacrifice a whole day of work to accompany his wife….
>
> (R9, no longer in a union, FTM 20-24 years)

Community and societal factors

Health provider. Health provider invitations were identified as an enabler of involvement by a few FTMs. They explained that doctors requested the man's presence to educate him about the pregnant woman's medication so he can ensure the necessary medication is taken.

> There are, because the woman is prescribed medication, she will not take and she will hide, and when the doctor notices that, he will ask her to come and seek care with her partner so that he is aware of her medication and everything going on...
>
> (R4, married FTM 15-19 years)

Male roles in childcare

Barriers

Individual factors

Financial difficulties. The first individual level factor focused on fathers' ability to provide and pay for the needs of the child. Majority of FTMs and a few male partners in a relationship with a younger FTM reported that the lack of income or financial means prevented fathers from being involved in childcare. The fathers without employment or adequate pay were unable to take care of the needed resources.

> Fathers no longer play their role because there is no work here in Congo. Fathers are unpaid, life has become very difficult and the dollar is only increasing every day. Dads don't know where to begin. They don't know where to knock. That's why they rely on their wives as woman are morally strong.
>
> (R8, unmarried FTM 20-24 years)

> …he must secure his family by having the financial resources so that his children don't go to the street…
>
> (R2, Male partner not married to FTM 15-19 years)

A couple of married FTMs age 20-24 indicated that the competing needs of the father's financial resources was a barrier to involvement. Some fathers had to take care of their extended family in addition to their immediate families.

> What prevents men from playing their role is his own family, his father, his mother and the whole family. There are some dads who have the money but the whole family depends on him. His family is creating plans for his salaries. His whole family depends on him. If he has the money today, he thinks about how to help his own family first. There are some parents who are just waiting for the salary of their children….
>
> (R6, married FTM 20-24 years)

In addition, some older FTMs mentioned that spending habits of fathers were barriers to their involvement. Fathers spent a substantial amount of money on non-childcare items including alcoholic beverages and cigarettes. Thus, they are unable to take care of their child-care financial responsibilities.

> Dads no longer play their role as fathers in the family, they do things voluntarily. Even if he has the money to take care of his family, he hides this money and he doesn't even tell his wife that he has the money. He uses the money on other women and to drink alcohol. The mother has to suffer to take care of the children and pay the children's school fees ….
>
> (R9, unmarried FTM 20-24 years)

Availability. A father's availability and priorities appeared to affect his involvement. Some FTMs, mainly older unmarried FTMs, suggested those who spent a lot of time participating in other recreational activities such as watching football and drinking with friends were not involved. These fathers were unavailable and spent most of their time engaged in other non-childcare activities.

> Out of 100% men, there are only 30% who play the role of father in the family. The other 70% of men are irresponsible and they leave all the responsibility of the family to the woman. When they wake up in the morning, they play their game of checkers with their friends, or they start talking about politics or football. They let the day go by because they know that their wife will manage to take care of the children.
>
> (R5, unmarried FTM 20-24 years)

Attitudes and beliefs. A few male partners shared that a father's attitude towards childcare roles was a barrier to involvement. They explained that fathers who perceived that certain roles were reserved for women chose which role to perform, if they participated in any at all. Some participants also suggested that fathers with this perception often modified the roles they were willing to perform depending on the location, especially If they were in public.

> …I can do it. No, I will carry the child and she will clean it herself because I am the man.
>
> (R7, Male partner not married to FTM 20-24 years)

A few participants including one male partner mentioned that a father's perception of external support reduced their involvement. These fathers believed mothers had adequate support and their participation was not necessary.

> For me, regarding the child's care, I cannot clean the diapers and clothes of the child because the family members are there either on my side or on the beside my wife, there is always someone who comes to help the woman who has given birth.
>
> (R5, Male partner married to FTM 15-19 years)

Interpersonal factors

Couple relationship. Various relationship characteristics including the nature of the relationship between the couple were cited as barriers of paternal involvement by both FTMs and male partners. Participants shared that men who were married or in a relationship participated in childcare more compared to those who were unmarried or no longer in a relationship. The reduction or lack of involvement was a consequence of the breakdown of the relationship between the couple.

> … in instances I am aware of, a man who is separated from his wife no longer takes care of his children. However, if the relationship continues, things are usually not a problem.
>
> (R12, unmarried FTM 15-19 years)

Some FTMs shared that the mother's behavior towards the father of her child affected the relationship and inevitability influenced paternal involvement. They explained that fathers who believed their partners were speaking out of turn, not "behaving well" or not giving them adequate respect in the relationship were not

involved. A few FTMs also suggested that the breakdown of couple communication and lack of sexual relations between the couple deterred involvement.

> …and the secondly, the behavior of the wife. If the wife does not respect her husband, and in this case the man may say to himself that I no longer want to leave the money like that, that will teach this woman to change her behavior.
>
> (R9, married FTM 15-19 years)

> What prevents a man from being a good father is the lack of mutual understanding, dialogue and behavior of the woman that the man does not support...
>
> (R9, married FTM 20-24 years)

Both FTMs and male partners shared that fathers who did not live with the child were less involved compared to those that lived with the child.

> … a girl who lives with her husband, the husband will take care of the child and do what is necessary for the child's wellbeing. However, a single man does not live with the child and provide for the child as he should.
>
> (R7, married FTM 20-24 years)

Influence of peers and family. Many FTMs voiced that the peers and family members deterred involvement primarily by expectations of and reactions to paternal involvement. Men were stigmatized by their peers and family for their participation. Some also suggested that peers were negative influences, gave bad advice and encouraged fathers to engage in other activities that reduced paternal involvement.

> On the other hand, this situation can make the members of the man's family react much more (than peers). If for example the sister of the husband found her brother washing the diapers of his baby, she would most certainly say at home that his brother is dominated by his wife.
>
> (R1, married FTM 20-24 years)

> …. having unemployed friends give him bad advice, he doesn't know how to play his role.
>
> (R10, unmarried FTM 15-19 years)

Partner opposition. The mother of the child can act as a barrier to involvement according to young unmarried FTMs. At times, mothers refused paternal involvement depending on the type of paternal role and the location the role was performed. For involvement in roles perceived to be reserved for females, a few mentioned the only exception to the opposition was when the mother was sick, while others shared

they opposed involvement regardless of the circumstance and would request assistance from other female relatives if necessary.

> … the man's duty is to get the money and I take care of all the household chores. Unless (when) I'm sick, he can help me. Even when I'm not sick, he can't do it…
>
> (R6, unmarried FTM 15-19 years)

> I will not allow him to do it because it is my job! and if I am sick, I will ask one of my sisters to come and help me. I really wouldn't want him to do that.
>
> (R8, unmarried FTM 15-19 years)

Community and societal factors

Woman's domain. The social expectations of gender roles often acted as a barrier to paternal involvement. Several FTMs and male partners shared that these expectations resulted in fathers not performing "female-assigned" childcare roles such as washing the baby's clothes, bathing the baby, and cooking. Fathers performing these roles faced sanctions from their peers, family, and community.

> it's not normal, people will react badly, because it's the woman's job. People will say that the man can carry the baby, but washing clothes and others is the work of the woman.
>
> (R11, married FTM 15-19 years)

> … For the child what I can do is to buy whatever is missing or whatever the child needs. I cannot start doing laundry for the child. No and no …
>
> (R5, Male partner not married to FTM 15-19 years)

Matrilineal family. One mentioned that kinship deterred paternal involvement. The participant, an FTM, shared that fathers from matriarchal societies were less involved because children were considered to belong to the kin group of the woman. Thus, fathers allotted childcare responsibilities to the woman and her family.

> In any case, I must tell the truth. The dads in our neighborhood do not play their role of father in the family because they rely on their wife, especially if the man is in the matrilineal family. He leaves all the responsibility to the woman because for him the children do not belong to him. The children belong to the woman's family. She and her brothers must do everything, take care of the children, and ensure the children get an education. It is the responsibility of the woman's family. The man takes care of the children of his sisters and his family.
>
> (R8, unmarried FTM 20-24 years)

Enablers

Individual factors

Acknowledgement of paternity. Acknowledgement of paternity was frequently cited as an enabler of involvement. Male partners who acknowledged the child as their own and took responsibility participated in various childcare tasks, according to several FTMs and male partners.

> …there are some men even if they are married or unmarried they will always take care of their child because it is his child. He cannot abandon the child.
>
> (R5, unmarried FTM 20-24 years)

> For me, I have to follow up on my baby. When I come back from work, I have to look for my baby to carry. I ask his/her mother what he/she needs. If the baby pees or poops, I must clean him/her myself. I have to fix my attention on this child because he/she is my blood.
>
> (R4, Male partner married to FTM 15-19 years)

Financial stability. For older FTMs and a few male partners, the financial stability of a father enabled participation in routine childcare. Fathers had to work very hard or have a good job and their financial resources were used to purchase items needed for the child's upkeep.

> They work a lot to earn money to buy porridge for their newborns, diapers, and powders …
>
> (R1, no longer in a union, FTM 20-24 years)

Joy and excitement. Several male partners, predominantly the married ones, explained that the excitement, joy, and happiness felt from having a child encouraged them to participate in childcare. These positive emotions enabled them to stay with the child, provide financially, and participate in some childcare activities such as carrying the baby.

> For me, if a baby is born in the family, I would be very happy. I have to carry him until he goes to sleep. He must be in my hands.
>
> (R10, Male partner married to FTM 15-19 years)

Interpersonal factors

Couple relationship. Participants, primarily married FTMs age 20-24, suggested that male partners who loved their partner would be involved regardless of their marital or relationship status. These fathers took care of their children and were engaged in various childcare activities.

> I think that if the man really loves his partner, whether he is married or not, there will be no difference on the way he will take care of his child at birth.
>
> (R1, married FTM 20-24 years)

Discussion

The study highlighted the various roles men play during pregnancy and in childcare, normative factors (empirical expectations, normative expectations, sanctions, and sensitivity to sanctions) influencing paternal involvement in childcare, and barriers to and enablers of male involvement during pregnancy and in childcare (see Appendix II for tables summarizing the study findings). The study also showed there were more similarities than differences between FTMs and male partners perceptions and views on the topics explored.

Roles during pregnancy and in childcare

In this study, participants agreed that male partners had various roles during pregnancy and childcare. Overall, 12 of the 23 pregnancy roles and 11 of the 16 childcare roles were mentioned by both FTMs and male partners. Male partners' roles were described for all four domains. Accessibility-related roles were the least cited and responsibility-related roles were the most noted for both aspects of male involvement explored. Findings indicated that providing financial support and educational opportunities were the most predominant roles of men during pregnancy and in childcare, respectively. Other roles during pregnancy reported by both groups included: assisting with household tasks, providing accommodation, attending and following up on hospital visits, providing spiritual and moral support, showing love and affection, recognizing the pregnancy, and supporting and taking care of the pregnant

woman. In childcare, both groups mentioned that a father's role is to provide financial resources, show love and affection, encourage dialogue, counsel, take care of the child and provide religious guidance, supervision and protection.

Previous studies did not examine the differences or similarities in men's and women's perceptions about male involvement during pregnancy; however, they identified roles of fathers during pregnancy and in childcare. Roles identified in this study were consistent with findings of previous research,[6,131–133] which suggested male partners were involved in a variety of roles. For instance, Alio and colleagues[6] identified male roles during pregnancy and childcare that fell within the accessibility, engagement, and responsibility domains, much of which were reported in this study. They found that men were present at prenatal visits and delivery, asked questions about the pregnancy and child, were eager to learn more about the process and requirements for a healthy pregnancy, provided emotional and physical support, and chose the name for the child.[6] Financial support was a major role in this study, however in Alio's study,[6] this role was mentioned only after participants were prompted by the interviewer. Consistent with other studies,[6,133,134] this study's findings also indicated that male partner attendance at the facility was low, although it was one of the roles mentioned by participants. Also similar to this study, previous research found that male involvement in certain roles such as bathing the child was not common.[6,135] Lewis[135] suggested that pregnancy and childcare were gendered processes and there was often stigma associated with performing these roles.

Normative factors regarding paternal involvement in childcare

Participants described several empirical and normative expectations of fathers' roles in childcare and many were roles that fathers in this study and other studies participated in.[6,133,135] Most often, fathers typically provided financial support and the community also expected the father to have a financial role in childcare, in addition to other roles. Many of the expected roles were roles that fathers actually performed. For normative and empirical expectations, fathers were expected to take care of the child's needs, show

love and affection, and accept responsibility. In addition to the above expectations, each participant group identified other roles. Male partners believed fathers typically assisted with childcare and asked questions about the child and believed the community expected fathers to organize events and birthday parties, be accessible to the newborn and be part of the birth registration. FTMs, on the other hand, believed that fathers typically provided protection, named the child, and organized parties. They also believed the community expected fathers to make presentations, provide accommodation and protection, and name the child. It is important to note that none of the community expectations included roles that involved men's assistance with physical tasks such as bathing or cleaning the baby, further emphasizing the perception that childcare is a "female" domain may exist at the community and societal level of the socio-ecological model. This is consistent with other studies. [86,135,136]

The study findings confirm that fathers faced sanctions for their participation in "female" childcare roles, which is evident in the literature.[62,63,68,69,72] Fathers encountered more sanctions than rewards, with only one participant mentioning a reward. Sanctions included verbal abuse of the mother and father, isolation, and ridicule. Previous research has identified similar sanctions for men who do not conform to gender roles and participate in "female" childcare roles. Fathers were stigmatized, ridiculed, and perceived to be dominated by their partners or wives.[62,63,69] In Uganda,[72] men involved in such activities were labeled as weak and idle, while in Malawi,[68] these men were perceived to have been poisoned or given traditional herbs. Despite the numerous sanctions, majority of FTMs and male partners reported the fathers would continue to be involved and fewer mentioned fathers would stop because of the stigma and sanction. The finding that most men would continue to be involved was surprising and this possibly reflects changing attitudes towards male involvement in "female" childcare roles. While there may be some acceptance of the importance and benefits of male involvement in "female" childcare roles, however, further research is needed to truly ascertain the existence of this gradual shift.

Barriers and enablers of involvement during pregnancy and in childcare

Several determinants at various levels of the socio-ecological framework were found to influence male involvement during pregnancy and in childcare and previous studies[6,66,86,132,133,135,136] have highlighted many. Consistent with previous research,[6,86,135] the findings suggested the perception of pregnancy and childcare as women's realm or domain was a barrier frequently mentioned by both FTMs and male partners. The perception existed both at the individual and societal level and often men faced social stigma that caused shame and hesitancy. Another frequently reported barrier by both groups was lack of financial resources and has been documented previously.[86,132,136,137] Focus group participants suggested that a role of a man was to provide financial resources, and therefore inadequate financial resources meant the man was not able to fulfil this role. Other barriers to involvement in pregnancy and childcare included: negative influence of peers, marital and relationship status, and accessibility to the pregnant woman or child. These were mentioned by both groups.

Partner opposition of male partner participation during pregnancy was cited as a barrier to involvement by male partners and FTMs, and only by FTMs for childcare roles. This barrier has been reported in a study in Malawi. Researchers found women prevented men from performing tasks that they perceived as female assigned tasks.[66] Findings also suggested that matrilineal kinship deterred male involvement in childcare. Kinship systems not only dictate lineage and inheritance, but also determine a member's obligation to the group. Studies focused on kinship systems found that matrilineal kinships can result in split responsibilities and allegiances between couples and each person in the relationship maintains strong ties to their respective kinship groups.[138–140] Thus, within matrilineal kindships, fathers may not be as involved in their own children's childcare but may be more engaged in the childcare of children in their own kindship group.

Compared to barriers, participants identified a smaller number of enablers of involvement Regardless of the number, these findings are consistent with previous studies.[6,86,133] The perception that

involvement during pregnancy was an obligation and good couple relationships enabled male involvement during pregnancy, while for childcare, acknowledgement of paternity, financial stability, and good couple relationships were common enablers reported by FTMs and male partners. This study and other studies found that health providers can be an obstacle and an enabler of male involvement during pregnancy.[62,68]

Program implications

The study's findings may provide some insight for programs focused on improving male involvement. Although participants reported various roles performed and empirical and normative expectations about male involvement, many of the roles were not engagement-related roles or accessibility-related roles. This suggests that the participants may be limited in their knowledge of the types of roles men can perform or are expected to perform. There is a need to increase male involvement in other domains. Thus, programs should incorporate educational strategies to increase knowledge on various ways in which men can be involved in pregnancy and childcare. Observational learning strategies such a peer modeling that showcase influential male community members' participation in various pregnancy and childcare roles can increase men's exposure to and knowledge of roles in other domains. These strategies should incorporate roles that actively involve men in childcare and pregnancy to reduce some of the burdens that these activities may place on women.

Program implementers should assess the gender role attitudes and normative factors within the program's context. Understanding these factors, is important because educational programs may also need to target the community members, peers, and family members. As shown in this study, male partners who performed certain gendered roles faced sanctions and some participants reported low prevalence of male involvement in some roles ascribed to women, such as accompanying the pregnant woman to the hospital or bathing the baby. The expectations against male participation in specific aspects of pregnancy and childcare also existed at several levels of the socio-ecological model. Therefore, it is equally crucial for

programs to address individuals other than men and their partner. Programs should consider targeting the community, peers of male partners and family members with strategies designed to change their attitudes, perceptions, and values about gendered roles. This can potentially reduce the sanctions men face and change the types of activities that men are expected to participate in. Seeing influential fathers in the community modeling male participation in roles defined as being in the female domain, these strategies may help normalize male involvement during pregnancy and in childcare and reduce the sanctions and stigma that men face.

Aside from gender roles and norms, programs should also consider the other factors that influence involvement and select appropriate strategies. For instance, findings suggest that in matrilineal families, the expectations of fathers are different and thus fathers tend to be less involved. Therefore, strategies may need to be adapted for programs implemented in areas with various to the kinship system. Lastly, in advocating for male involvement, programs should not disempower or adversely affect women whose partners refuse to participate, are abusive or are unable to. To do this, programs should follow the set of guidelines developed by the World Health Organizations when implementing male involvement strategies in maternal and newborn health.[2]

Strengths and limitations

This study has several strengths and limitations. To the best of my knowledge, prior qualitative work on the role of fathers in childcare has not been conducted in the DRC and those focusing on pregnancy have been done within the realm of HIV. Studies on male involvement in sub-Saharan Africa have not taken an in-depth approach to understand the role of social norms. This current study expanded on this work by exploring the normative factors that influence a man's decision to be involved and the different roles that men can play in the family.

The sampling of participants was purposive, so the findings did not represent the wider population within and outside of the health zones of interest. Secondly, the study used secondary data. The questions asked and the data collected were not for the purpose of the study, thus there are limitations in using data collected for another purpose. For instance, this study sought to understand male involvement for children under 12 months old, however some of the questions did not specific this age range and were asked about all children. Thirdly, participants often did not respond to the questions asked and parts of the transcripts were missing participants responses. This limited the amount of data included in the analysis. The limited amount of data affected the ability to analyze responses by marital status and age group. In some instances, participants used vague phrases such as "take care of" and were not probed to attain a deeper insight into the meaning of these phrases. This limited the ability to ascertain distinct roles, normative factors, barriers, and enablers. There were twice as many FTM participants than male partners because more focus groups were conducted with FTMs. Therefore, there should be caution in interpreting findings that highlight the prevalence of responses by FTM participants. Most of the focus group participants were unemployed, which could lead to selection bias if those who are employed perceive different norms. Lastly, the validity or truthfulness were enhanced by triangulation with findings from interviews conducted in the formative evaluation (not included in the dissertation) and dissertation papers 2 and 3. Identified themes and portions of the transcripts that were difficult to interpret were discussed with colleagues in the DRC. Prior to analysis, the study director enhanced the data's credibility by audio-recording focus groups discussions to reduce information loss and reviewing transcripts for accuracy.

Conclusion

The study highlighted the roles of men during pregnancy and in childcare, normative factors influencing paternal involvement in childcare, and barriers and facilitators of involvement during pregnancy and in childcare. This information is useful for programs that aim to increase male participation in various

aspects of maternal and child health. Programs should strive to improve knowledge about the multiple ways men can be involved, change the perception that certain roles are reserved for men, and implement strategies that address the barriers of male participation during pregnancy and in childcare .

PAPER 2: MEN'S KNOWLEDGE OF PREGNANCY, GENDER-EQUITABLE ATTITUDES AND INVOLVEMENT DURING PREGNANCY

Abstract

Background: Male participation in maternal health has gained increasing recognition and support over the years. Despite this, little is known about male involvement during pregnancy in the Democratic Republic of Congo. This paper identified male involvement patterns during pregnancy and evaluated the association between knowledge of pregnancy and birth preparedness (BP), gender-equitable attitudes, self-efficacy, co-parental relationship factors and involvement. Lastly, it explored the moderating effect of gender-equitable attitudes and violence on the association between relationship satisfaction and involvement.

Methods: Secondary analysis of male partners' data from the Gate-funded MOMENTUM baseline study was conducted. The analysis consisted of 1,674 male partners of first-time mothers who were 6-months pregnant at baseline. Factor analysis was used to create male involvement indices ([1] antenatal care (ANC) and BP and [2] shared decisions). Linear regression models were used to determine the predictors of involvement and interaction terms to explore moderating effects.

Results: Male involvement in pregnancy-related activities was low, ranging from 11% (finding a blood donor) to 49% (saving money during emergencies). Knowledge of the correct number of ANC visits (b=0.52), more than one BP step (1: b=0.74; 2: b=1.96; 3+: b=2.50), and one newborn danger sign (b=0.46) were associated with involvement in ANC and BP while knowledge of two or more ANC benefits was associated with involvement in shared decisions (2: b=0.20; 3: b=0.22). Increasing relationship satisfaction and self-efficacy were associated with ANC and BP involvement (b=0.04 and 0.09, respectively) and for shared decisions, a positive relationship with gender-equitable attitude (b=0.03) and a negative relationship with self-efficacy (b=-0.02) were observed. Gender-equitable attitude had moderating effects for both forms of involvement while sexual violence was a moderator for shared decisions.

Conclusion: There are various dimensions of male involvement and findings suggests that the factors influencing involvement varies depending on the type of involvement. Addressing these determinants can improve male participation in maternal health.

Introduction

In many sub-Saharan African countries, men are usually key decision-makers, controlling and deciding on resources in the household such as financial support.[78] Given their influential role, male involvement in pregnancy, delivery and the post-delivery period can help in reducing maternal and neonatal mortality.[16] There is growing evidence that male involvement increases access to and use of maternal services and contraceptives, discourages unhealthy maternal health practices and encourages more equitable couple communication and decision making.[11–14,16–18] Male involvement in maternal health care brings benefits to men themselves: they are healthier, more connected socially and have improved relationship with their partners.[22] In countries, such as the Democratic Republic of Congo (DRC), increasing involvement of male partners could potentially reduce maternal mortality that occurs during pregnancy among other potential benefits.

Involving men in maternal, neonatal and child health has received increased recognition over the years.[1,2] Despite the increased focus on male involvement, there is no accepted standard definition of the concept, and studies have defined male involvement in a variety of ways depending on the stage of pregnancy, relationship with the pregnant woman and context within which male involvement is being measured. The most common measure has focused only on attendance at facility-based maternal health services.[14,76,77,82] These studies acknowledge the inadequacy of using a single indicator, such as ANC attendance, as a measure of male involvement.

To improve on the measure, some studies have utilized scales and indices to gauge male involvement at different stages of pregnancy.[11,47,141–143] In Kenya, for example, Mangeni et al[13] used two

measures to define male involvement: attendance to antenatal care visit and positive male perception of women's health. In Tanzania, a composite score was used to measure male involvement.[141] Men were given a score ranging from one to five, with five being the highest involvement, based on whether or not they escorted their wives to antenatal care, escorted their wives to delivery, had shared decision-making on where to deliver, had knowledge of at least three danger signs of pregnancy, childbirth and postpartum, and had taken at least three birth preparedness and complication readiness actions.[141] More recently in Kenya, a two-factor structure (male encouragement/reminders and active participation) scale was used to measure male involvement.[143]

Notwithstanding the lack of uniformity in the measurement of involvement, the prevalence of male involvement is low in the DRC as well as other sub-Saharan African countries. A review of the literature found two studies in the DRC that measured the prevalence of male involvement in pregnancy-related activities.[58,60] In a randomized control trial by Ditekemena et al.[58], one in five men attended HIV counselling and testing during the pregnancy period. An even lower prevalence (7%) was measured in the Malamu project where male partners were invited to clinics using invitation letters given to women attending antenatal care (ANC) services. Male partners who attended ANC with their partner were also tested for HIV; testing of male partners increased from four percent to seven percent over the course of the project.[60] Studies in other sub-Sahara African countries also found low rates of male involvement ranging from 11% to 60% in various pregnancy-related activities (see Appendix I for a summary of studies measuring prevalence of male involvement in pregnancy).

The low to moderate levels of Involvement are shaped by many factors including education, relationship status, social and gender norms, and the lack of attention to men in maternal, neonatal and child health policies.[4,38,144] Each factor influences the involvement of the male partner differently. For instance, social expectations of gender roles influence men's participation in pregnancy-related activities [4,59,62,65,68,69,74], whereby men who did not perceive antenatal care as a woman's domain were more likely to

be involved.[64] The DRC is a populous and highly diverse country with many ethnic groups and kinships, and the diversity can lead to various perceptions of gender norms and roles.[145] Recent work suggests that matrilineal kinship undermines spousal cooperation where matrilineal individuals tend to cooperate less with their spouses,[138] resulting in greater inefficiencies in the household. Studies have also found that good couple communication was associated with support between couples[69,72] and weaker relationships deterred involvement.[65,68] Ultimately, the kinship could influence the opportunity and desire of the male partner to be involved in pregnancy.

Given the importance of male involvement and the dearth of literature on male involvement in pregnancy in the DRC, there is a need for further research on this topic. In addition, most relevant studies in the DRC and sub-Saharan Africa have been conducted as part of HIV/AIDS interventions.[11,36,82] An improved understanding of the determinants of male involvement in pregnancy-related activities outside the realm of HIV programming could potentially inform intervention strategies. Furthermore, it can aid in the development of programs and policies that encourage male participation in maternal health and guide future research. Although the recent body of research has used more comprehensive measures of male involvement, prior studies conducted in the DRC explored the behavior as a binary measure that focused primarily on attendance at antenatal care visits. The binary nature does not capture the multidimensionality of the behavior and does not focus on involvement outside of the health facility. This study proposes to use multiple indicators to define male involvement during the first-six months of pregnancy in the DRC and determine the determinants associated with male involvement.

Conceptual framework

The conceptual framework (Figure 2) was developed based on father and co-parental relationship factors identified in the responsible fatherhood framework (Figure 1). Many factors affect male involvement; thus, the framework has been expanded to include factors identified in the literature and

available in the dataset such as attitudes towards gender norms and self-efficacy. Self-efficacy and a person's attitude to gender norms have been shown to be associated to involvement in various maternal and child health activities. [4,59,62,68,106]

This framework was used to guide the analysis of the impact of attitude towards gender-equitable norms, knowledge, co-parental relationship factors, and self-efficacy on male involvement in pregnancy.

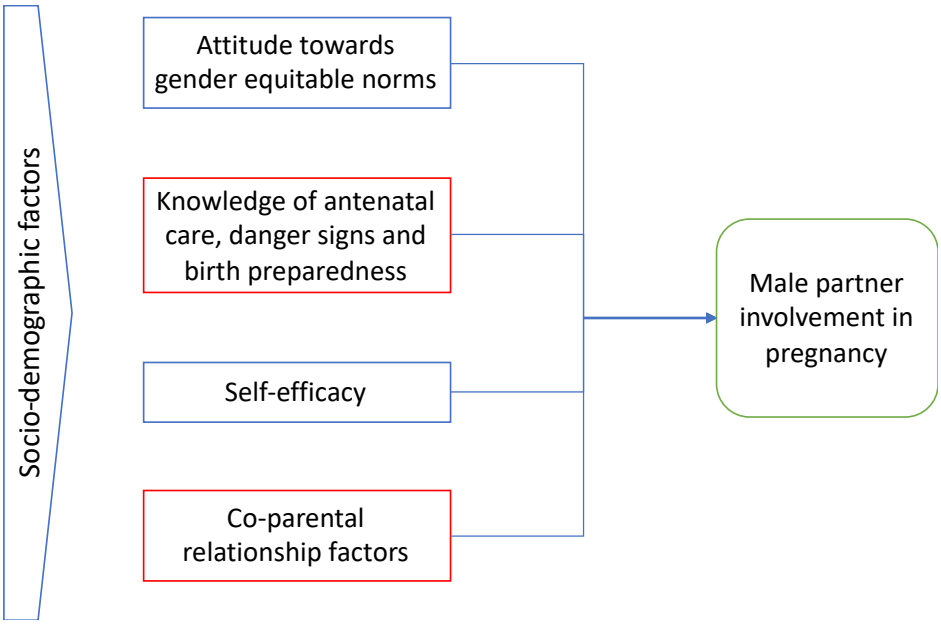

Figure 2: Conceptual model of the predictors of male partner involvement in pregnancy-related activities during the first six-months of pregnancy.

Note: The red boxes show the primary factors of interest informed by the responsible fatherhood framework. Some of the factors informed by the responsible fatherhood framework are included in the socio-demographic characteristics.

Research question and hypothesis

This paper answered the following research questions:

1. What are the patterns of male involvement in specific activities during pregnancy?
2. To what extent are knowledge of pregnancy and birth preparedness, gender-equitable attitudes, self-efficacy, co-parental relationship factors, and socio-demographic characteristics associated with male partner involvement during pregnancy?

3. To what extent do gender equitable attitudes or violence moderate the association between variable relationship satisfaction and male involvement during pregnancy?

The hypotheses tested were as follows:

Hypothesis A. Male partners who hold gender-equitable attitudes will be significantly more involved in the first-time mother's pregnancy.

Rationale. Pregnancy, and most related care are perceived as a woman's domain and this perception limits male involvement.[4,59,62,65,68,69,74] In Ethiopia, a study reported that men who did not perceive that ANC was a woman's responsibility had twice the odds of being involved.[64]

Hypothesis B. Knowledge of maternal health (that is, knowledge of antenatal care [perceived benefits, timing, and number of visits], birth preparedness, and danger signs for the mother and newborn) will be positively associated with male involvement in pregnancy.

Rationale. Studies have identified that the lack of knowledge is a barrier to male involvement. In Ethiopia, Tilahun et al[146] conducted a quasi-experimental study focused on measuring the effect of family planning education on male involvement in family planning. The study found men with knowledge of ANC and prevention of mother to child transition (PMTCT) services and their benefits were six times and twice as likely to be involved in the respective services.[64] Qualitative studies support this and suggest that low male partner involvement is due to the lack of adequate knowledge about pregnancy, maternal and neonatal health services and its benefits.[65–68]

Hypothesis C. Relationship satisfaction will be positively associated with male partner involvement in pregnancy.

Hypothesis D. Occurrence of intimate partner violence will be associated with reduced involvement in the first-time mother's pregnancy.

Rationale (for C & D). The relationship dynamics between men and women have been found to influence male involvement. Weaker relationships and constant fights with a partner over issues will act as barriers to male partners.[65,68] In Kenya and Uganda, good couple communication was associated with high HIV disclosure and support between husband and wife.[69,72]

Hypothesis E. The association between relationship satisfaction and male partner involvement will be augmented by gender equitable attitudes.

Hypothesis F. The association between relationship satisfaction and male partner involvement will be reduced by IPV perpetration by male partners.

Rationale (for E & F). The relationship between relationship satisfaction and involvement may be moderated by a male partner's gender-equitable attitude and his perpetration of violence. As mentioned previously, studies suggest that violence and perceiving pregnancy-related activities as a women's domain are barriers to involvement.[4,59,62,65,68,69,74] Thus, male partners who are satisfied with their relationship and do not commit acts of violence or do not have unfavorable gender-equitable attitudes will be more involved.

Methods

Data and population

The analysis is based on cross-sectional secondary data from the Gates-funded MOMENTUM Project baseline survey conducted by Tulane University School of Public Health and Tropical Medicine from September to November 2018. MOMENTUM is a three-year gender-transformative integrated family planning, maternal and newborn health, and nutrition intervention in Kinshasa. The intervention used home visits, community dialogue, and support group education sessions to improve care-seeking and maternal and neonatal health (MNH) and nutrition practices, increase the use of postpartum family planning methods, and increase gender-equitable attitudes and behaviors. The project's survey sample was

drawn from a purposive sample of first-time mothers (FTMs) aged 15 to 24 who were approximately six-months pregnant at the time of the baseline survey and their male partners residing within intervention (Kingasani, Lemba and Matete) and comparison (Bumbu, Ndjili and Masina 1) health zones in Kinshasa, the capital city of the DRC.

Study participants were recruited at the health facility level and the community level by local organizations in Kinshasa. In both strategies, FTMs who expressed interest were told about the program, and those who were willing to be contacted at home were assigned a recruitment ID and her information was collected. Women who consented to have their male partners involved in the study were given invitation coupons to give to their male partner. In addition, trained interviewers contacted male partners via telephone with the consent of the woman.

In order to be enrolled in the study, FTMs and their male partners had to meet the following inclusion criteria: (1) willing and mentally competent to provide consent; (b) able to speak Lingala or French; and (3) reside permanently (i.e., not visiting) in the study health zones. In addition to the above, FTMs had to be approximately six-months pregnant with their first child at baseline and male partners had to be the husband or partner of a recruited FTM who was approximately six-months pregnant with her first child at baseline. Participants who met these criteria and enrolled in the study consented to the following: (1) complete the baseline evaluation survey; (2) recontact for the endline survey; and (3) participate in the intervention activities if they resided within the intervention areas. Out of 2,703 FTMs and 2,088 male partners identified, 2,431 and 1,766 were eligible, provided written consent and were interviewed in the baseline survey, respectively. The response rates were 89.9% and 84.6% for FTMs and their male partners.

The interviews were conducted using a smart phone. Interviewers asked the male partners about their background characteristics, contraceptive knowledge, norms, attitudes, and practices; fertility desires; attitude and behaviors in various aspects of pregnancy and newborn health; gender equitable attitudes and behaviors; relationship satisfaction with the FTM; perceived social norms regarding

participation in childcare; and intimate partner violence perpetration. The questionnaire was pretested, and many of the questions were informed by the findings from the formative research.

Ethical Approval

The study was approved by the Tulane University Institutional Review Board (2018-1028) and the University of Kinshasa School of Public Health Ethics Committee (ESP/CE/066/2018).

Measures

Outcome variable

The outcome variable was male involvement during pregnancy, specifically during the first six-months of pregnancy. A number of studies have used scales and indices to gauge male involvement at different stages of pregnancy.[11,47,141–143] The definition of the outcome variable as a scale was guided by previous studies and the variables present in the MOMENTUM baseline survey.

Male involvement during pregnancy before childbirth was measured by collecting information on the male partner's active participation in ANC-related activities (Table 3). Following previous studies using a composite score to measure male involvement in pregnancy, [38,39,141,143,144] the outcome variable was categorized by level – low, medium and high. The categorization was based on the distribution of the number of activities in which male partners participated. In addition, male partner involvement was explored as a continuous variable, focusing on the number of activities in which men participate. From a programmatic standpoint, analyzing involvement by exploring the effect of each additional pregnancy-related activity may be more informative and meaningful compared to analyzing involvement as levels.

Table 3: Description of items measured in the male involvement composite score

	Survey Question	Response option	Definition of involvement [a]
Participation in antenatal care-related activities	Please tell me If you [male partner] have participated in the following things for their first-time mother's pregnancy 1) finding information about the pregnancy 2) making decisions about antenatal care 3) making a birth plan	No/Yes	Yes

	Survey Question	Response option	Definition of involvement [a]
	4) saving money for emergencies 5) arranging transport for delivery 6) deciding on skilled attendance at delivery 7) arranging for a blood donor		
	Were you present during any of those antenatal check-ups?	Present/Not present	Present
Participation in decision making	Would you say that the following are mainly your decision, mainly [name of first-time mother (FTM)]'s decision, someone else's decision or did you and [name of FTM] decide together? 1. where to deliver the baby 2. when to seek care and treatment for danger signs of the mother and newborn 3. where to seek care and treatment for danger signs of the mother and newborn	respondent alone, first-time mother, respondent and first-time mother jointly, someone else	Respondent and first-time mother jointly

[a] NB: all other response categories not indicated were categorized as no involvement.

Prior to the formation of the composite score, exploratory factor analysis (EFA) was used to examine and identify the structure and dimensions in the score. The Kaiser-Meyer-Olkin test and the Bartlett Test of Sphericity were calculated before conducting the EFA to assure the appropriateness of EFA and the internal consistency of the items was assessed using Cronbach's alpha. The KMO results (0.858) indicated that the variation in the data was well suited to EFA and the correlations among the variables were significant (Bartlett test p value =0.000). The factor analysis with rotation yielded two unique factors with eigenvalues of 3.54 and 1.41 and explained 79.5% and 30.4% of the variance, respectively (For more information, see Appendix III- Table A7). On both factors, all items, except one, had factor loading greater than 0.3. CFA was used to examine the construct validity of the male involvement scale and the results support a two-factor model as suggested in the EFA. See Appendix III for the detailed EFA and CFA procedures.

Based on the findings of the factor analysis, two domains were identified and constructed by summing all the items identified in each factor. The first, involvement in ANC and birth preparedness, ranged from 0 – 7 (α=0.8602) and the second, participation in shared decision making ranged from 0 -3 (α=0.7272). The scores were also divided into terciles and categorized as low, medium, high. The low category consisted of zero shared decisions and zero ANC and birth preparedness activities, medium of 1-

2 shared decisions and 1-3 ANC and birth preparedness activities, and high of 3 shared decisions and 4-7 ANC and birth preparedness activities.

Exploratory variables

Gender equitable attitude

This variable was assessed using the gender equitable men (GEM) scale. The GEM scale measures attitudes towards gender norms in intimate relationships or differing social expectations for men and women. Originally developed by Promundo and Program for Appropriate Technology in Health (PATH) for use with young Brazilian men,[147] the scale has been adapted in different settings worldwide, including Ethiopia, China, India, Kenya, Tanzania, Uganda and the DRC.[148,149] Although the number of items included varies in different country applications, the GEM scale is a sensitive and cross-culturally relevant scale with a good predictive validity and Cronbach alphas range from 0.72 to 0.83.[148]

The survey included 17 items on violence, sexual relationship, masculinity, and gender norms and relationships (see Table 4 for the complete list of items included in the scale) that were scored on a 3-point scale (totally agree, partially agree, and disagree). To construct the GEM score, several steps were taken. The first step was to ensure that all the items were coded in the appropriate direction. High scores represented high support for gender-equitable norms and some items were reverse coded if a high score reflects low support for gender equity. Secondly, item analysis and factor analysis were conducted. An oblique rotation was used in the factor analysis to allow some correlation among the factors.[150] Items that had a loading of less than 0.30 were removed from the scale, and items with a negative correlation coefficient were dropped from the analysis.[150] For detailed information on the factor analysis, see Appendix III. Using the final items selected in the factor analysis, the GEM score was created as an additive scale[75] where higher scores indicated more equitable attitudes towards gender norms (α = 0.7221; range 11 – 33).

Table 4: Description of items measured in the Gender Equitable Men (GEM) Scale

GEM Sub-scales	Sub-scale items
Violence	1. A woman should tolerate violence in order to keep her family together. 2. There are times when a woman deserves to be beaten.
Sexual relationship	3. Men are always ready to have sex. 4. Men need sex more than women do. 5. You don't talk about sex; you just do it. 6. I would never have a gay friend. 7. I would be outraged if my wife asked me to use a condom. 8. A man should know what his partner likes during sex.
Masculinity	9. To be a man, you need to be tough. 10. If someone insults me, I will defend my reputation, with force if I have to. 11. Men should be embarrassed if they are unable to get an erection during sex.
Gender norms & relationships	12. Changing diapers, giving a bath, and feeding kids is the mother's responsibility. 13. A woman's most important role is to take care of her home and cook for her family. 14. A man should have the final word about decisions in his home 15. It is a woman's responsibility to avoid getting pregnant. 16. A couple should decide together if they want to have children. 17. A man and a woman should decide together what type of contraceptive to use.

Knowledge of ANC, birth preparedness and danger signs

Male partners were asked a series of questions to measure their knowledge of antenatal, danger signs, and birth preparedness. These variables did not have a bidirectional relationship with both forms of involvement (see Appendix V).

ANC benefits. To measure knowledge of the benefits of ANC, they were asked to mention three important benefits of a woman seeing someone for ANC when she is pregnant. The benefits were not read out loud; instead, all responses provided were recorded either by selecting options provided in the survey or entering the response if it was not listed. A summative score was constructed and categorized as knowledge of 0-1 benefits, 2 benefits and 3 or more benefits.

Timing of ANC visit. Knowledge of the timing of ANC visits was measured by asking male partners, "in what month of pregnancy should a woman start attending antenatal care visits?" Responses were coded as (1) during the first trimester and (2) after first trimester

Number of ANC visits. Male partners were asked "how many times should a pregnant woman go for antenatal care?" The responses were categorized into two groups: less than 4 times (< 4 times) and 4 or more times ≥ 4 times).

Danger signs and birth preparedness. Knowledge of danger signs for mother and newborn were assessed by asking male partners, "what danger signs during pregnancy, delivery or soon thereafter do you know that need immediate medical attention?" and "what signs tell you that your newborn is in danger and needs healthcare right away?" To measure their knowledge of birth preparedness, male partners were asked, "how can you and [name of first-time mother] prepare for a possible maternal emergency?" Three summative scores were created to measure a male partner's knowledge of (a) danger signs for mother, (b) newborn danger signs and (c) birth preparedness steps. A higher score indicated greater knowledge of each construct being measured.

Self-efficacy

The generalized self-efficacy scale was used to measure a male partner's self-efficacy. Male partners were asked their level of agreement (not at all true, hardly true, moderately true, or exactly true) with the 10 items in the scale (Table 5). Items in the scale were summed up such that the higher values of the scale signified greater self-efficacy and capacity to execute behavior (α= 0.7573; range 0 – 40).

Table 5: Description of items measured in the generalized self-efficacy scale

Generalized self-efficacy scale items
1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

Co-parental relationship factors

The relationship dynamics between men and women have been found to influence male involvement. Questions on relationship satisfaction, perceived power and intimate partner violence were used to measure the co-parental relationship factors between FTM and their male partners.

Relationship satisfaction. Male partners assessed their relationship with their FTM using the Relationship Assessment Scale (RAS). The 7-item scale was designed to measure an individual's satisfaction with their relationship.[151] Items were scored on a 5-point Likert scale, ranging from 1 (low satisfaction) to 5 (high satisfaction). Men were asked the following questions: 1) how well does the FTM meet your needs; 2) in general, how satisfied are you with your relationship; 3) how good is your relationship compared to most; 4) how often do you wish you had not gotten into this relationship; 5) to what extent has your relationship met your original expectations; 6) how much do you love [name of FTM]; 7) how many problems are there in your relationship. Prior the creation of the total score, the scores for items 4 and 7 were reversed and the items on the scale were summed (range 7 – 35) after conducting factor analysis (For detailed information on the factor analysis, see Appendix III). Higher scores on the scale signified better relationship satisfaction. The reliability of the RAS in this study, α= 0. 7992, is comparable to previous studies which have reported Cronbach alpha scores ranging from 0.80 – 0.91.[5,151–153]

Intimate partner violence (IPV). IPV against women takes many forms and is defined as any behavior within an intimate relationship that causes physical, sexual or psychological (emotional harm), including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviors. [154] It is one of the most common forms of violence against women, and male partners are often perpetrators of this. This study assessed the impact of IPV (physical, sexual, and emotional violence) on male partner involvement in pregnancy. The study adapted the domestic violence module used in the DHS to ask male partners questions about IPV perpetration. To measure emotional, physical, and sexual IPV, the DHS and this study used an abbreviated version of the conflict tactics scales (CPSs).[155–157] Male partners with adequate privacy during the interview were asked whether they had ever perpetrated a series of violent acts against the FTM. Those who responded in the affirmative to a particular item were then asked about the frequency with which they have perpetrated the violent behavior (often, sometimes, or not at all) in the 12 months

preceding the interview. See Table 6 for the list of items included in the CPSs. Male partners who answered "yes" to any of the items under the emotional, physical, or sexual violence subscale were considered as perpetrators of each type of violence.

Table 6: Description of the three violence categories used to describe patterns of intimate partner violence

Type of violence perpetrated	Indicator
Emotional violence (*Have you ever….)*	1. Said or done something to humiliate her in front of others? 2. Threatened to hurt or harm her or someone she cares about? 3. Insulted her or made her feel bad about herself?
Physical violence *(Have you ever done any of the following things to (name of first-time mother)….)*	1. Push her, shake her, or throw something at her? 2. Slap her? 3. Twist her arm or pull her hair? 4. Punch her with your fist or with something that could hurt her? 5. Kick her, drag her, or beat her up? 6. Try to choke her or burn her on purpose? 7. Threaten or attack her with a knife, gun, or other weapon?
Sexual violence *(Have you ever done any of the following things to (name of first-time mother)….)*	1. Physically force her to have sexual intercourse with you when she did not want to? 2. Physically force her to perform any other sexual acts she did not want to? 3. Forced her with threats or in any other way to perform sexual acts she did not want to?

Socio-demographic variables

Socio-demographic variables were identified based on existing literature and the responsible fatherhood framework. They include male partner's age, marital status, education level, ethnicity, health zone of residence, duration of residence in the health zone, household wealth, number of children, employment, duration of employment, employment by both the male partner and FTM, and relative age difference between the male partner and FTM. The household wealth index, an asset index score, was constructed using principal component analysis. (α=0.6884) Households were ranked according to asset ownership and then divided into quintiles. Table 7 presents a complete description of the variables that were used in the analysis.

Table 7: Description of socio-demographic variables used as control variables

Variable name	Categories	Values/Range
Age of the male partner	15-24 years	0 (reference group)
	25+ years	1
Level of education of the male partner	Lower than secondary	0 (reference group)
	Secondary complete	1
	Higher	2
Marital status of the male partner	Never married/Ever married	0 (reference group)/1
Ethnicity of the male partner	Bakongo	1 (reference group)
	Bas Kasai & Kwilu-Kwango	2
	Kasai/Katana/Tanganyika	3
	Other	4
Health zone of residence of the male partner	Bumbu	1 (reference group)
	Kingasani	2
	Lemba	3
	Masina 1	4
	Matete	5
	Ndjili	6
Duration of residence in health zone of the male partner	< 5 years	1 (reference group)
	5+ years	2
	Always	3
	Visitor	4
Household wealth of the male partner	Low	0 (reference group)
	Medium	1
	High	2
Number of children of the male partner	0	0 (reference group)
	1	1
	2+	2
Employment (in past 12 months) of the male partner	Unemployed	0 (reference group)
	Employed with cash earnings	1
	Employed without cash earnings	2
Duration of employment (in past 12 months) of the male partner	Unemployed	0 (reference group)
	Throughout	1
	Seasonally	2
	Occasionally	3
Both partners worked for cash	No/Yes	0 (reference group)/1
Relative age difference between FTM and male partner	MP younger/<5 years older	0 (reference group)
	5 - 9 years older	1
	10+ years older	2

Analytical strategy

Frequencies, percentages, and means were presented to summarize the data. Bivariate analysis was used to describe the socio-demographic composition of the different levels of involvement. For this analysis, the significance between male involvement and independent variables were determined using Pearson's chi square test, Fischer's exact test, Pearson's correlation, and one-way ANOVA depending on the nature of the variables.

Linear regression (ordinary least squares [OLS]) was used to explore male involvement as a continuous variable. For each outcome, regression models were conducted for all the exploratory variables of interest while controlling for socio-demographic characteristics. Parameter estimates were used to evaluate the association between the outcome and exploratory variables. The second linear regression model was used to explore moderating effects where appropriate. Four two-way interaction terms were included between relationship satisfaction and the following a) gender equitable attitude, b) physical violence, c) emotional violence, and d) sexual violence. The potential moderating effect of age was explored by performing a stratified analysis (15 – 24 years and 25+ years) on the first model (see Appendix VI). A three-way interaction term with age group would be included in a third model if the estimates obtained were significant and in opposite directions. However, none of the estimates in the stratified had this issue, therefore a third model was not included in the final analysis.

For each interaction term, graphical plots were created using the "*marginsplot*" command and "*margins*, *dydx()*" was used to obtain the marginal effect of the moderator. Additionally, the significance of the interaction terms was confirmed using the "*testparm*" command (test of joint significance). Multicollinearity among explanatory variables was detected using the variance inflation factor (VIF). The presence of multicollinearity could possibly lead to the inflation of the variance of parameter estimates. VIF less than four was used to demonstrate the absence of multicollinearity in the model.[158] For the ordinal measure of involvement, ordered logistic regression was not conducted because of the failure to meet the proportional odds assumption. All statistical analyses were carried out using STATA v.15 software,[159] with statistical significance indicated by a p-value less than 0.05.

The final sample consisted of male partners who were interviewed at baseline and the analysis was restricted to those with no missing data on any of the variables included in the analysis (Figure 3). Out of the 1,769 male partners interviewed, 92 did not have data on specific characteristics of FTMs used for the analysis and of the 1,674 male partners with complete data, 213 did not have adequate privacy and were

not asked the questions about intimate partner violence perpetration (see Appendix IV for tabulation of the analysis on missing data).

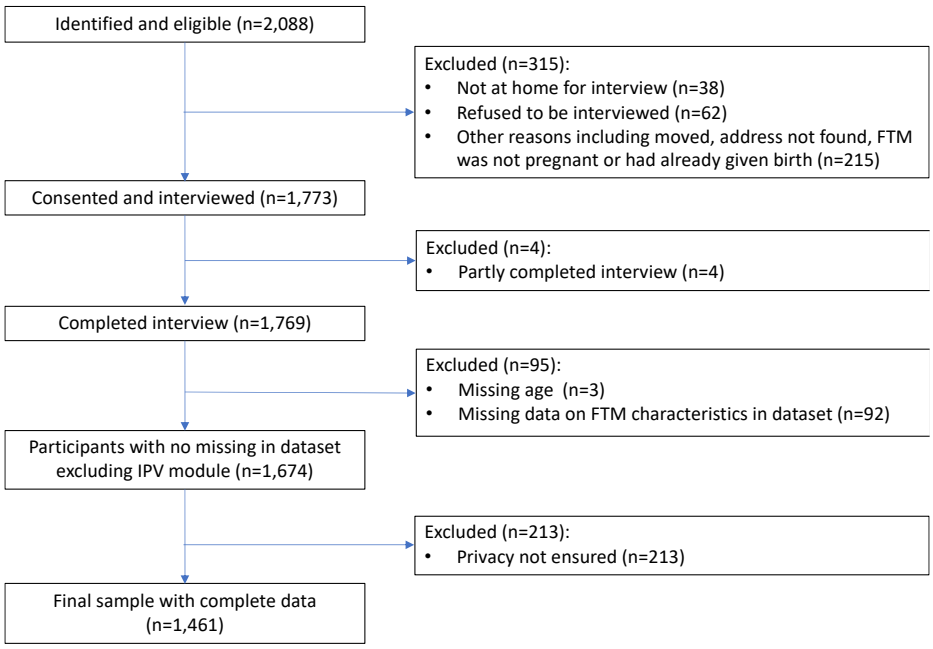

Figure 3: Participant flow chart

Comparison of participants with missing data

More male partners with missing data were slightly older (28 years) than those without missing data (27 years), but the difference was not statistically significant (Table A11, Appendix IV). For the remaining background characteristics, significant differentials were observed for three characteristics. Significantly more male partners with missing data were ever married, lived in Bumbu and Masina 1, and lived in the health zone of residence for less than 5 years.

Results

Participant characteristics

Overall, most respondents were 25 years and older (68%), ever married (86%), worked for cash only (80%), and did not have children (73%; Table 8). Over two in five had completed secondary education (46%), lived continuously in the health zone for less than five years (43%), were 5-9 years older than the

FTM (44%) and reported either Bas Kasai or Kwilu-Kwango as their ethnicity (42%). Half of the respondents worked throughout the year (52%) and only nine percent male partners and FTMs received cash earnings. Two in five had perpetrated any form of IPV in the past 12 months (40%) and of the various forms of IPV, physical IPV perpetration was the most prevalent. Physical, emotional, and sexual IPV perpetration were 33%, 17% and 9% respectively. Respondents had moderate levels of self-efficacy (mean- 34.3; SD- 4.6), high levels of relationship satisfaction (mean- 29.6; SD- 5.1) and moderate equitable attitudes towards gender roles (GEM scale: mean- 21.6; SD- 4.8).

Table 8: Characteristics of study sample by age group, Kinshasa 2018

	Age distribution			
	Age 15-24	Age 25+	Total	
Level of education				***
Lower than secondary	44.0	27.9	33.1	
Secondary complete	46.6	45.6	45.9	
Higher	9.4	26.5	21.0	
Marital Status				***
Never married	19.0	11.9	14.2	
Ever married	81.0	88.1	85.8	
Ethnicity				
Bakongo	31.1	29.0	29.7	
Bas Kasai & Kwilu-Kwango	42.5	41.4	41.8	
Kasai/Katana/Tanganyika	12.2	13.7	13.2	
Other	14.2	15.9	15.4	
Health zone of residence				***
Bumbu	14.0	11.5	12.3	
Kingasani	25.7	21.9	23.1	
Lemba	16.5	12.1	13.5	
Masina1	16.5	25.1	22.3	
Matete	9.4	11.4	10.8	
Ndjili	17.9	18.1	18.0	
Duration of residence in the health zone				***
<5 years	35.1	47.0	43.1	
5+ years	20.3	17.0	18.1	
Always	42.0	32.5	35.5	
Visitor †	2.6	3.5	3.2	
Number of children ever fathered				***
0	89.5	65.7	73.4	
1	9.2	21.4	17.4	
2+ †	1.3	13.0	9.2	
Household wealth				**
Low	40.1	31.1	34.0	
Middle	31.2	33.8	33.0	
High	28.7	35.1	33.0	
Employment in the past 12 months				***
No Work	17.0	7.6	10.6	
Work for cash only	72.1	83.9	80.1	
Work but not paid, worked for kind or cash and kind	10.9	8.5	9.3	
Duration of employment				***
Unemployed	21.4	12.1	15.1	
Throughout the year	39.2	58.3	52.1	

	Age distribution			
	Age 15-24	Age 25+	Total	
Seasonally	16.6	13.3	14.4	
Occasionally	22.7	16.3	18.4	
Dual employment				**
No	88.6	92.8	91.4	
Yes	11.4	7.2	8.6	
Relative age difference				***
MP younger/<5 years older	65.4	12.4	29.5	
5 - 9 years older	34.4	47.9	43.5	
10+ years older	0.2	39.7	26.9	
Knowledge of ANC benefits				***
0 - 1	23.5	15.1	17.8	
2	31.8	33.7	33.1	
3+	44.7	51.2	49.1	
Knowledge of the number of ANC visits				**
<4 times	41.0	32.4	35.2	
≥ 4 times	59.0	67.6	64.8	
Knowledge of the start of ANC				
After first trimester	55.3	50.3	51.9	
During first trimester	44.7	49.7	48.1	
Knowledge about danger signs for mother				**
0	9.2	4.7	6.2	
1	24.0	22.0	22.6	
2	37.3	37.7	37.6	
3+	29.4	35.7	33.6	
Knowledge about danger signs for newborns				**
0	10.4	5.9	7.3	
1	32.3	30.0	30.8	
2	32.0	32.0	32.0	
3+	25.3	32.0	29.9	
Knowledge of birth preparedness steps				***
0	7.9	4.3	5.5	
1	59.9	54.7	56.4	
2	26.6	33.5	31.2	
3+	5.5	7.5	6.9	
Any act of violence perpetuated in the past 12 months ‡				***
No	51.4	63.8	59.7	
Yes	48.6	36.2	40.3	
Any form of emotional violence perpetuated in past 12 months ‡				*
No	80.4	85.0	83.4	
Yes	19.6	15.0	16.6	
Any form of physical violence perpetuated in past 12 months ‡				***
No	57.4	71.2	66.7	
Yes	42.6	28.8	33.3	
Any form of sexual violence perpetuated in past 12 months ‡				**
No	88.6	92.8	91.4	
Yes	11.4	7.2	8.6	
Total	100.0	100.0	100.0	
Mean (SD)				
Past-year IPV perpetration index (max = 13) ‡	1.22 (1.78)	0.85 (1.59)	0.97 (1.67)	***
Relationship satisfaction (max = 35)	28.83 (5.71)	30.00 (4.68)	29.62 (5.06)	***
Gender-equitable attitude (max = 33)	20.96 (4.65)	21.96 (4.88)	21.63 (4.83)	***
Perceived self-efficacy (max = 40)	33.42 (4.86)	34.51 (4.45)	34.16 (4.61)	***
N	541	1,133	1,674	

Note: ANC - antenatal care; IPV: intimate partner violence; max – maximum value; SD - Standard deviation

† The number of partners age 15-24 in the categories was less than 25.

‡ Only men who had privacy during the interview were asked IPV questions (15-24 years (N = 484); 25+ years (N=977); 15+ years (N=1,461)

***<0.001; ** <0.01; *<0.05

Compared to male partners age 15-24, a higher percentage of older male partners had worked for cash, were employed throughout the year, and had higher average scores for relationship satisfaction, gender equitable attitudes, and self-efficacy. Significantly more young male partners were first time fathers, were employed together with the FTM, and had perpetrated any form, physical and sexual forms of IPV compared to their older counterparts. These age differentials observed for the socio-demographic characteristics were statistically significant, except for ethnicity.

Knowledge of danger signs and birth preparedness was low. About a third of male partners knew three or more danger signs for the mother during pregnancy, delivery or soon thereafter that need immediate medical emergency (34%), three in ten knew three or more danger signs for newborns (30%) and under one in ten knew three or more ways to prepare for a possible maternal emergency (7%). Male partner's knowledge of ANC was slightly higher compared to their knowledge of danger signs and birth preparedness. Over three in five reported that FTMs must have four or more ANC visits (65%) and about half knew three or more ANC benefits (49%) and reported FTMs must start ANC in the first trimester (48%). Overall, older men were more knowledgeable than younger men, and the difference by age group was statistically significant except their knowledge of the start of ANC.

Participation in pregnancy-related activities

To answer the first research question, "what are the patterns of male involvement in specific activities during pregnancy?", the percentage of male partners who participated in the specific pregnancy related activities was calculated. Table 8 presents the findings disaggregated by age.

Overall, male involvement in individual pregnancy-related activities during the first six months of pregnancy was relatively low. Less than half of male partners reported participating in saving for medical emergencies (49%), making decisions about ANC (43%), making a birth plan (40%), and arranging transportation for delivery (36%; Table 9). Only a third made decisions with the FTM about when and where to seek care and treatment for danger signs (33% and 29% respectively), and about 21% made shared

decisions about where to deliver the baby. About a quarter participated in finding information about pregnancy (26%) and under one in five were present at an ANC visit (19%) and participated in deciding on skilled attendance at delivery (19%). Participation in finding a blood donor had the lowest participation, only one in ten participated in this activity (11%). With regards to age group differences, significantly more male partners age 25 years and older were present at ANC, shared decisions with the FTM about where to deliver the baby, and participated in making decisions about ANC, making a birth plan, and saving money for emergencies. About half of male partners participated in at least one ANC and birth preparedness activity and less than five percent participated in all seven activities included in the male involvement score. Participation in shared decisions followed a similar pattern, with 44% participating in at least one decision and 12% participating in all three decisions.

Table 9: Percentage of male partners who were participated in pregnancy related activities, by age group, Kinshasa 2018

	Age distribution (years)			
Pregnancy-related activities	Age 15-24	Age 25+	Total	
Antenatal care & birth preparedness				
Present at antenatal care visit	14.8	21.0	19.1	**
Participated in finding information about the pregnancy	23.5	27.4	26.1	
Participated in making decisions about antenatal care	38.4	44.8	42.8	*
Participated in making a birth plan	35.7	42.5	40.3	**
Participated in saving money for emergencies	45.8	50.8	49.0	
Participated in arranging transport for delivery	32.3	37.1	35.5	
Participated in deciding on skilled attendance at delivery	15.7	20.2	18.8	*
Participated in finding a blood donor	10.2	10.9	10.7	
Participation in one ANC & birth preparedness activity†	54.0	58.9	57.3	
Participation in all ANC & birth preparedness activities†	3.1	3.4	3.3	
Shared decisions				
Joint participation in deciding where to deliver the baby	15.3	24.1	21.3	***
Joint participation in deciding when to seek care and treatment for danger signs	30.5	32.3	32.7	
Joint participation in deciding where to seek care and treatment for danger signs	26.6	29.7	28.7	
Participation in one shared decision	40.5	45.4	43.8	
Participation in all shared decisions	8.1	13.4	11.7	**
N	541	1,133	1,674	

† Excludes male partners' presence at antenatal care visits because it was not included in the overall male involvement score.
***<0.001; ** <0.01; *<0.05

Bivariate results

Tables 10 provides the bivariate relationships between each predictor variable and male involvement in ANC and birth preparedness, and shared decisions. Male involvement is presented as a score and an ordered variable (low, medium, and high), as described in the methods.

Involvement in ANC and birth preparedness

As shown in Table 10, male involvement in ANC and birth preparedness activities was low. On average, male partners participated in two activities (mean– 2.2; SD– 2.3). Over two in five had low levels of involvement (43%), about a quarter had medium level of involvement (24%, participation in one to three activities) and a third had high level of involvement (33%, participation in 4 to 7 activities).

Male partner's education, age, health zone of residence, duration of residence in the health zone, household wealth, and duration of employment varied significantly for both measures of involvement. For example, male partners with a higher education participated in slightly more activities compared to those with lower than secondary education (3 versus 2 activities). More male partners who worked throughout the year were highly involved (36%) than who were employed seasonally, occasionally, and unemployed (26%, 31% and 30%, respectively). While duration of employment was significantly associated with both measures of involvement, earnings during employment was significant with only the level of involvement and employment of both partners was not significant.

Significant variation was also seen between both measures of involvement and perpetration of physical IPV, and knowledge of ANC benefits, number of ANC visits, birth preparedness steps and danger signs for mother and newborns. Male partners who mentioned that FTMs should have four or more ANC visits participated in significantly more activities than those who reported less than four visits (3 versus 2 activities). Significantly more male partners who had not perpetrated physical IPV had high involvement compared to those who had perpetrated physical IPV (35% versus 29%).

Involvement was positively correlated with relationship satisfaction (r – 0.07) and perceived self-efficacy (r– 0.20). These correlations were statistically significant and similar associations were seen for the level of involvement. For instance, male partners with high involvement had better relationship satisfaction (mean– 30.2; SD– 5.1) and self-efficacy (mean– 35.5; SD– 3.7) compared to those with low or medium levels of involvement.

Involvement in shared decisions

Involvement in shared decisions was also low (Table 10). Over half of the male partners (56%) had low involvement, followed by high involvement (27%) and medium involvement (18%). There was significant variation by educational level, employment of both partners, and health zone of residence in involvement in shared decisions. These differentials were also present in both forms of the outcome. In relationships where both partners were employed, more male partners were highly involved in shared decisions compared to relationships where both partners were not employed (30% versus 25%). Although the absolute difference was small, male partners who did not perpetrate any form of IPV participated in significantly more shared decisions (mean– 0.9, SD– 1.1) than those who did (mean– 0.7, SD– 1.1). For the individual types of violence, sexual and emotional IPV perpetration had significant variation for both forms of the outcome and the difference was largest for those who had perpetrated sexual IPV. High involvement in shared decisions was lower among sexual IPV perpetrators than those who had not perpetrated sexual IPV (18% versus 28%).

Knowledge of ANC benefits, danger signs, and birth preparedness were positively associated with the high involvement. For instance, a higher proportion of male partners who knew three or more danger signs for newborns were highly involved in shared decisions compared to those who knew one danger sign (31% versus 22%). Contrary to involvement in ANC and birth preparedness, self-efficacy was negatively correlated with involvement in shared decisions (r– -0.06, $p<0.01$) and was highest among male partners

Table 10: Bivariate analysis for associations between level of involvement, background and independent variables, Kinshasa 2018

	Involvement in ANC and birth preparedness					Involvement in shared decisions				
	Level of involvement				# of activities	Level of involvement				# of activities
	Low	Medium	High	Total	Mean (SD)	Low	Medium	High	Total	Mean (SD)
Age distribution				**	**					*
15-24	46.0	26.2	27.7	100.0	2.02 (2.26)	59.5	16.6	23.8	100.0	0.72 (1.00)
25+	41.1	23.5	35.4	100.0	2.34 (2.33)	54.6	18.1	27.3	100.0	0.86 (1.10)
Level of education				***	***				**	**
Lower than secondary	45.5	25.1	29.4	100.0	2.04 (2.23)	58.3	16.6	25.1	100.0	0.78 (1.05)
Secondary complete	43.7	26.9	29.4	100.0	2.10 (2.25)	58.4	17.9	23.7	100.0	0.76 (1.04)
Higher	36.2	17.7	46.2	100.0	2.83 (2.48)	48.1	18.5	33.3	100.0	1.01 (1.14)
Marital Status										
Never married	42.0	24.8	33.2	100.0	2.23 (2.30)	60.9	16.8	22.3	100.0	0.70 (1.00)
Ever married	42.8	24.3	32.9	100.0	2.23 (2.31)	55.4	17.8	26.8	100.0	0.84 (1.08)
Ethnicity										
Bakongo	38.4	25.4	36.2	100.0	2.44 (2.33)	54.9	18.1	27.0	100.0	0.85 (1.09)
Bas Kasai & Kwilu-Kwango	44.9	25.6	29.5	100.0	2.10 (2.29)	57.1	18.0	24.9	100.0	0.80 (1.07)
Kasai/Katana/Tanganyika	44.3	22.2	33.5	100.0	2.25 (2.35)	53.4	22.2	24.4	100.0	0.81 (1.01)
Other	43.6	21.0	35.4	100.0	2.19 (2.29)	58.8	11.7	29.6	100.0	0.81 (1.07)
Health zone of residence				***	***				*	**
Bumbu †	57.8	4.9	37.4	100.0	2.28 (2.83)	48.5	20.4	31.1	100.0	1.00 (1.13)
Kingasani	63.6	18.1	18.3	100.0	1.41 (2.23)	58.4	14.7	26.9	100.0	0.81 (1.10)
Lemba	27.9	32.7	39.4	100.0	2.63 (2.08)	65.0	13.7	21.2	100.0	0.65 (1.01)
Masina1	42.4	27.1	30.6	100.0	2.13 (2.20)	54.7	20.4	24.9	100.0	0.80 (1.02)
Matete	41.7	21.7	36.7	100.0	2.31 (2.29)	50.0	18.9	31.1	100.0	1.00 (1.16)
Ndjili	17.9	37.7	44.4	100.0	3.04 (1.97)	57.6	18.2	24.2	100.0	0.75 (1.00)
Duration of residence in the health zone				***	***					
<5 years	40.7	23.4	35.9	100.0	2.38 (2.35)	55.1	17.5	27.4	100.0	0.86 (1.11)
5+ years	35.6	25.4	38.9	100.0	2.59 (2.34)	60.1	18.5	21.5	100.0	0.69 (0.97)
Always	49.4	24.5	26.1	100.0	1.86 (2.21)	55.3	17.5	27.2	100.0	0.83 (1.06)
Visitor †	35.2	29.6	35.2	100.0	2.35 (2.26)	59.3	16.7	24.1	100.0	0.83 (1.78)
No of children ever fathered				*						
0	41.6	25.4	33.0	100.0	2.26 (2.31)	56.1	17.1	26.8	100.0	0.83 (1.08)
1	46.6	17.8	35.6	100.0	2.20 (2.36)	57.5	20.5	21.9	100.0	0.73 (0.98)
2+	44.2	28.6	27.3	100.0	2.08 (2.27)	54.5	16.2	29.2	100.0	0.88 (1.10)
Household wealth				***	***				**	
Low	47.5	26.7	25.8	100.0	1.92 (2.22)	60.5	15.1	24.4	100.0	0.75 (1.05)
Middle	44.2	25.2	30.6	100.0	2.13 (2.27)	52.2	22.1	25.7	100.0	0.85 (1.05)
High	36.3	21.2	42.5	100.0	2.66 (2.38)	55.9	15.7	28.4	100.0	0.86 (1.10)
Employment in the past 12 months				**						
No Work	39.3	33.7	27.0	100.0	2.15 (2.21)	57.3	18.5	24.2	100.0	0.75 (1.00)
Work for cash only	42.4	23.0	34.5	100.0	2.28 (2.34)	56.2	17.4	26.5	100.0	0.82 (1.08)
Work but not paid, worked for kind or cash and kind	49.0	25.2	25.8	100.0	1.88 (2.18)	55.5	18.7	25.8	100.0	0.83 (1.09)
Duration of employment				**	*					
Unemployed	37.9	32.0	30.0	100.0	2.28 (2.25)	56.5	19.8	23.7	100.0	0.75 (1.00)
Throughout the year	43.0	20.6	36.4	100.0	2.35 (2.41)	56.8	18.1	25.1	100.0	0.80 (1.06)
Seasonally	48.1	25.7	26.1	100.0	1.83 (2.11)	57.3	13.3	29.5	100.0	0.86 (1.13)
Occasionally	41.6	27.6	30.8	100.0	2.17 (2.20)	53.6	17.9	28.6	100.0	0.89 (1.11)
Dual employment									*	**
No	41.5	25.6	32.9	100.0	2.25 (2.29)	58.2	16.9	24.9	100.0	0.77 (1.05)
Yes	46.0	21.0	33.0	100.0	2.19 (2.36)	50.8	19.6	29.6	100.0	0.93 (1.11)

	Involvement in ANC and birth preparedness							Involvement in shared decisions						
	Level of involvement				# of activities			Level of involvement				# of activities		
	Low	Medium	High	Total	Mean (SD)			Low	Medium	High	Total	Mean (SD)		
Relative age difference														*
MP younger/<5 years older	42.9	25.9	31.2	100.0	2.16 (2.27)			60.3	16.2	23.5	100.0	0.71 (1.00)		
5 – 9 years older	43.2	24.4	32.4	100.0	2.21 (2.32)			55.6	18.1	26.3	100.0	0.83 (1.08)		
10+ years older	41.7	22.6	35.7	100.0	2.35 (2.35)			52.8	18.4	28.8	100.0	0.90 (1.11)		
Knowledge of ANC benefits						**	***						**	***
0 – 1	51.3	22.5	26.2	100.0	1.72 (2.09)			64.8	17.4	17.8	100.0	0.57 (0.88)		
2	37.0	28.2	34.8	100.0	2.39 (2.23)			56.9	16.6	26.5	100.0	0.81 (1.06)		
3+	43.4	22.5	34.1	100.0	2.31 (2.42)			52.7	18.4	29.0	100.0	0.91 (1.12)		
Knowledge of the number of ANC visits						***	***							*
<4 times	50.6	25.6	23.8	100.0	1.73 (2.10)			58.4	18.5	23.1	100.0	0.73 (0.99)		
≥ 4 times	38.4	23.7	37.9	100.0	2.50 (2.38)			55.0	17.1	27.8	100.0	0.86 (1.10)		
Knowledge of the start of ANC														
After first trimester	41.8	25.9	32.3	100.0	2.22 (2.27)			57.2	17.8	25.0	100.0	0.78 (1.05)		
During first trimester	43.7	22.7	33.5	100.0	2.25 (2.36)			55.2	17.4	27.5	100.0	0.85 (1.09)		
Knowledge about danger signs for mother						***	***						***	***
0 †	70.9	13.6	15.5	100.0	1.17 (2.01)			68.0	13.6	18.4	100.0	0.57 (0.95)		
1	38.0	26.9	35.1	100.0	2.35 (2.23)			61.7	19.8	18.5	100.0	0.63 (0.92)		
2	44.8	23.2	32.0	100.0	2.16 (2.31)			56.1	17.2	26.7	100.0	0.82 (1.06)		
3+	38.4	25.9	35.7	100.0	2.44 (2.37)			50.4	17.4	32.1	100.0	0.98 (1.15)		
Knowledge about danger signs for newborns						***	***						**	***
0 †	64.2	14.6	21.1	100.0	1.37 (2.09)			61.8	21.1	17.1	100.0	0.59 (0.85)		
1	43.1	23.5	33.4	100.0	2.23 (2.30)			62.3	15.5	22.1	100.0	0.70 (1.04)		
2	37.5	26.7	35.8	100.0	2.40 (2.28)			53.9	18.3	27.8	100.0	0.86 (1.08)		
3+	42.6	25.2	32.2	100.0	2.28 (2.37)			51.0	18.2	30.8	100.0	0.94 (1.12)		
Knowledge of birth preparedness steps						***	***						***	***
0 †	71.7	21.7	6.5	100.0	0.73 (1.47)			67.4	16.3	16.3	100.0	0.55 (0.92)		
1	48.6	26.1	25.3	100.0	1.83 (2.12)			59.1	17.3	23.6	100.0	0.73 (1.01)		
2	30.2	22.4	47.4	100.0	3.01 (2.41)			52.8	17.0	30.2	100.0	0.94 (1.15)		
3+	27.8	21.7	50.4	100.0	3.19 (2.42)			39.1	24.3	36.5	100.0	1.16 (1.14)		
Any act of violence perpetuated in the past 12 months ‡						*								**
No	40.9	24.9	34.2	100.0	2.32 (2.34)			53.3	17.5	29.1	100.0	0.91 (1.12)		
Yes	48.0	20.7	31.2	100.0	2.08 (2.35)			58.4	17.3	24.3	100.0	0.74 (1.00)		
Any form of emotional violence perpetuated in past 12 months ‡													**	***
No	44.2	23.6	32.2	100.0	2.20 (2.33)			53.5	17.9	28.6	100.0	0.89 (1.10)		
Yes	41.7	21.1	37.2	100.0	2.37 (2.40)			64.9	15.3	19.8	100.0	0.60 (0.92)		
Any form of physical violence perpetuated in past 12 months ‡						*	*							**
No	41.4	23.9	34.7	100.0	2.33 (2.35)			53.7	17.1	29.2	100.0	0.90 (1.12)		
Yes	48.7	21.8	29.6	100.0	2.02 (2.32)			58.7	18.1	23.2	100.0	0.72 (0.98)		
Any form of sexual violence perpetuated in past 12 months ‡													*	*
No	43.4	23.3	33.3	100.0	2.25 (2.35)			54.7	17.2	28.1	100.0	0.86 (1.09)		
Yes	48.0	22.4	29.6	100.0	2.01 (2.25)			62.4	20.0	17.6	100.0	0.63 (0.95)		
.														
Total	42.7	24.4	32.9	100.0	2.23 (2.34)			55.7	17.5	26.8	100.0	0.84 (1.08)		
.														
Mean (SD)					*Rho (p)*							*Rho (p)*		
Relationship satisfaction (max = 35)	29.62 (5.49)	28.86 (4.87)	30.19 (4.87)	29.62 (5.06)	0.07	**		29.34 (5.23)	30.33 (4.38)	29.73 (5.09)	29.62 (5.09)	0.0463		
Gender-equitable attitude (max = 33)	21.86 (4.97)	21.70 (4.60)	21.26 (4.79)	21.64 (4.83)	-0.04			21.08 (4.76)	21.83 (4.45)	22.70 (5.03)	21.64 (4.83)	0.1604		
Perceived self-efficacy (max = 40)	33.64 (5.22)	33.22 (4.20)	35.53 (3.67)	34.16 (4.61)	0.20	***		34.59 (4.54)	33.25 (4.71)	33.85 (4.60)	34.16 (4.61)	-0.0623		
N	715	408	551	1,674	1,674			941	295	438	1,674	1,674		

Note: ANC – antenatal care; IPV: intimate partner violence; max – maximum value; SD – Standard deviation

† The number of partners with low, medium, and high involvement in at least one cell in the category was less than 25;

‡ Only men who had privacy during the interview were asked IPV questions (N=1,461); ANC & Birth preparedness (Low (N=640); Medium (N=339); High (N=482)); Decisions (Low (N=809); Medium (N=225); High (N=397)); ***<0.001; ** <0.01; *<0.05

with low involvement (mean– 34.5; SD– 4.5). Gender-equitable attitude was positively correlated with involvement (r– 0.16, p<0.001) and highest among those with high level of involvement in shared decisions (mean– 22.7; SD– 5.0).

Multivariate analysis results

Predictors of male partner involvement

The first model of the multivariate analysis answers the second research question, "to what extent are knowledge of pregnancy and birth preparedness, gender-equitable attitudes, self-efficacy, co-parental relationship factors, and socio-demographic characteristics associated with male partner involvement during pregnancy?" The findings presented in Table 11, show the multiple linear regression predicting involvement in ANC and birth preparedness, and shared decisions. It shows the regression results for the total sample and the models adjusts for socio-demographic characteristics and included the exploratory variables of interest, knowledge of ANC, danger signs and birth preparedness, co-parental relationship factors, self-efficacy, and gender-equitable attitude.

The findings suggest that different factors influence participation in ANC and birth preparedness and shared decisions (see Appendix VI for the full regression results including the socio-demographic characteristics and regression models disaggregated by age).

<u>Involvement in ANC and birth preparedness</u>

After controlling for socio-demographic characteristics, the analysis revealed that knowledge of the needed number of ANC sessions (β=0.52, p<0.01), knowledge of one or more birth preparedness steps (1: [β=0.74, p < 0.01]; 2: [β=1.96, p < 0.001]; 3+: [β=2.50, p<0.001]), and knowledge of one newborn danger sign (β=0.46, p<0.05) were significant factors influencing male involvement in ANC and birth preparedness. For co-parental relationship factors, relationship satisfaction was the only significant predictor for the total population and both age groups. With each unit increase in a male partner's relationship satisfaction, his

involvement increased (15-24 years: [β=0.05, p<0.05]; 25+ years: [β=0.04, p<0.05]; Total: [β=0.04, p<0.01]). Emotional IPV perpetration was a significant positive predictor of involvement for only older male partners (β=0.64, p<0.01).

Self-efficacy was a significant predictor of involvement for the overall sample (β=0.09, p<0.001), as well as both age groups (15-24 years: [β=0.10, p<0.001]; 25+ years: [β=0.09, p<0.001]). Interestingly, gender equitable attitudes had a negative association with involvement, however it was not statistically significant (β=-0.02, p>0.05). For older male partners, this negative association was significant (β=-0.04, p<0.05) such that as a male partner's gender equitable attitude increases, their involvement decreases.

Regarding the effects of the other variables included in the model, Appendix VI shows that living in certain health zones (Lemba and Ndjili) were predictors of involvement. Male partners who always lived in the health zone of residence (β=-0.29, p<0.05) participated in less activities than male partners who lived in the health zone for less than five years. Compared to unemployed male partners, those working throughout the year (β=-0.90, p<0.05), seasonally (β=-1.33, p<0.001), and occasionally (β=-1.08, p<0.01) were less involved. The duration of employment, specifically working seasonally and occasionally, was also significant for younger male partners.

Involvement in shared decisions

For shared decision making, knowledge of two or more ANC benefits, gender-equitable attitude and self-efficacy were significant factors. Male partners who knew two or more ANC benefits participated in more activities than their counterparts who knew no benefits (2: [β=0.20, p<0.05]; 3+: [β=0.22, p<0.05]). Converse to involvement in ANC and birth preparedness, gender equitable attitudes (β=0.03, p<0.001) was a positive predictor and self-efficacy (β=-0.02, p<0.05) was a negative predictor such that more gender-equitable attitudes were associated with more shared decisions and greater self-efficacy was associated with fewer shared decisions. When disaggregated by age, gender-equitable attitudes were significant for

Table 11: Results of regression models of male involvement in shared decision making and antenatal care and birth preparedness, Kinshasa 2018

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Knowledge of ANC benefits												
0 – 1	[REF]			[REF]			[REF]			[REF]		
2	0.912	0.170	[-0.142, 0.526]	0.187	0.170	[-0.147, 0.521]	0.195*	0.085	[0.028, 0.363]	0.200*	0.085	[0.032, 0.367]
3+	0.040	0.176	[-0.306, 0.385]	0.052	0.176	[-0.294, 0.399]	0.218*	0.088	[0.045, 0.391]	0.231**	0.088	[0.058, 0.405]
Knowledge of the number of ANC visits												
<4 times	[REF]			[REF]			[REF]			[REF]		
≥ 4 times	0.5212**	0.125	[0.277, 0.767]	0.523***	0.125	[0.278, 0.768]	0.097	0.063	[-0.026, 0.219]	0.094	0.063	[-0.029, 0.217]
Knowledge of the start of ANC												
After first trimester	[REF]			[REF]			[REF]			[REF]		
During first trimester	-0.077	0.113	[-0.298, 0.144]	-0.081	0.113	[-0.302, 0.140]	-0.013	0.056	[-0.124, 0.098]	-0.014	0.056	[-0.125, 0.097]
Knowledge about danger signs for mother												
0	[REF]			[REF]			[REF]			[REF]		
1	0.490	0.262	[-0.023, 1.003]	0.467	0.261	[-0.046, 0.980]	-0.017	0.131	[-0.274, 0.240]	-0.016	0.131	[-0.273, 0.241]
2	0.101	0.258	[-0.405, 0.606]	0.092	0.258	[-0.413, 0.597]	0.127	0.129	[-0.126, 0.381]	0.132	0.129	[-0.121, 0.385]
3+	0.220	0.276	[-0.319, 0.760]	0.226	0.275	[-0.314, 0.765]	0.227	0.138	[-0.043, 0.497]	0.238	0.138	[-0.033, 0.508]
Knowledge about danger signs for newborns												
0	[REF]			[REF]			[REF]			[REF]		
1	0.462*	0.233	[0.004, 0.919]	0.469	0.235	[0.009, 0.929]	0.089	0.117	[-0.140, 0.318]	0.072	0.118	[-0.159, 0.303]
2	0.415	0.243	[-0.063, 0.892]	0.436	0.244	[-0.042, 0.914]	0.099	0.122	[-0.140, 0.338]	0.089	0.122	[-0.151, 0.329]
3+	0.159	0.264	[-0.359, 0.678]	0.191	0.265	[-0.328, 0.710]	0.010	0.132	[-0.250, 0.269]	0.006	0.133	[-0.255, 0.266]
Knowledge of birth preparedness steps												
0	[REF]			[REF]			[REF]			[REF]		
1	0.737**	0.266	[0.215, 1.260]	0.732**	0.266	[0.210, 1.254]	0.040	0.133	[-0.221, 0.302]	0.032	0.133	[-0.229, 0.294]
2	1.964***	0.283	[1.408, 2.520]	1.957***	0.283	[1.402, 2.513]	0.165	0.142	[-0.113, 0.444]	0.159	0.142	[-0.119, 0.438]
3+	2.495***	0.348	[1.812, 3.179]	2.464***	0.349	[1.779, 3.149]	0.275	0.175	[-0.067, 0.618]	0.253	0.175	[-0.091, 0.596]
Any form of emotional violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.322	0.179	[-0.029, 0.673]	-0.643	0.931	[-2.469, 1.183]	-0.148	0.090	[-0.324, 0.028]	0.104	0.466	[-0.811, 1.019]
Any form of physical violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.195	0.140	[-0.471, 0.080]	-0.391	0.856	[-2.071, 1.288]	-0.044	0.070	[-0.182, 0.094]	-0.175	0.429	[-1.017, 0.667]
Any form of sexual violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.133	0.211	[-0.546, 0.281]	-0.295	1.084	[-2.421, 1.831]	0.025	0.106	[-0.182, 0.232]	-1.023	0.543	[-2.089, 0.042]
Relationship satisfaction (max = 35)	0.036**	0.012	[0.012, 0.059]	-0.110*	0.054	[-0.215, -0.004]	0.001	0.006	[-0.011, 0.012]	-0.054*	0.027	[-0.107, -0.001]
Gender-equitable attitude (max = 33)	-0.023	0.013	[-0.049, 0.002]	-0.222**	0.075	[-0.368, -0.075]	0.034***	0.007	[0.021, 0.047]	-0.041	0.037	[-0.115, 0.032]
Perceived self-efficacy (max = 40)	0.092***	0.013	[0.066, 0.118]	0.093***	0.013	[0.066, 0.119]	-0.016*	0.007	[-0.029, -0.002]	-0.016*	0.007	[-0.029, -0.003]
Interaction terms												
Relationship satisfaction x gender-equitable attitude				0.007**	0.002	[0.002, 0.011]				0.002*	0.001	[0.000, 0.005]
Relationship satisfaction x emotional IPV perpetration				0.034	0.032	[-0.028, 0.097]				-0.009	0.016	[-0.040, 0.023]
Relationship satisfaction x physical IPV perpetration				0.006	0.028	[-0.049, 0.061]				0.004	0.014	[-0.023, 0.032]
Relationship satisfaction x sexual IPV perpetration				0.006	0.038	[-0.069, 0.080]				0.037*	0.019	[0.000, 0.075]
Constant	-3.543***	0.785	[-5.083, -2.004]	0.078	1.762	[-2.675, 4.238]	0.113	0.393	[-0.658, 0.885]	1.777*	0.883	[0.045, 3.509]
Observations	1,461			1,461			1,461			1,461		
adjusted R-squared	0.240			0.245			0.100			0.11		
VIF	1.26						1.26					

Note: ANC – antenatal care; Beta – Unstandardized adjusted coefficient; SE- Standard Error; CI – confidence interval; IPV – intimate partner violence; max – maximum; ref – reference
Regression models control for background variables including age, level of education, marital status, ethnicity, health zone of residence, duration of residence in the health zone, number of children fathered, household wealth, employment in the past 12 months, duration of employment, employment by both partners, and the relative age difference between the male partner and the first-time mother. ***<0.001; ** <0.01; *<0.05

both age groups (15-24 years: [β=0.04, p<0.01]; 25+ years: [β=0.03, p<0.001]) and self-efficacy was significant for the older male partners (25+ years: β=-0.02, p<0.05).

The regression results for the socio-demographic characteristics presented in Appendix VI shows that male partners in a relationship with an employed FTM participated in more activities than to their counterparts with unemployed FTM (β=0.14, p<0.05). This was also observed for older male partners (β=0.19, p<0.05). Although health zone of residence was not a significant predictor for the total population, the age stratification analysis also revealed that always living in the health zone of residence (β=0.23, p<0.05) was a positive predictor for the involvement of younger male partners. The association between the involvement and the remaining socio-demographic characteristics (age group, level of education, marital status, ethnicity, duration of residence in the health zone, number of children fathered, household wealth, employment history, duration of employment, and relative age difference between male partner and FTM) were not statistically significant (p>0.05)

Moderation analysis results

To answer the third research question, "to what extent do gender equitable attitudes or violence moderate the association between variable relationship satisfaction and male involvement during pregnancy?", interaction terms were introduced into the regression model for each outcome. This analysis also tested the following hypothesis:

- Hypothesis E: The association between relationship satisfaction and male partner involvement will be augmented by gender equitable attitudes.
- Hypothesis F: The association between relationship satisfaction and male partner involvement will be reduced by IPV perpetration by male partners.

During the preliminary analysis, each interaction term was added to the first model prior to the inclusion of all terms in the final model presented and the tests of joint significance of the interaction terms in the final model (including all the terms) were significant (p=0.008 for ANC and birth planning and p=0.000 for

shared decisions). The regression results of the moderation analysis are presented in Table 11, and the average marginal effects of the moderators as are presented in Table 12. The average marginal effect is the predicted change in one group compared to the reference group, assuming all other covariates are constant.

Involvement in ANC and birth preparedness

Gender-equitable attitude was a significant moderator in the relationship between relationship satisfaction and involvement in ANC and birth preparedness (β=0.01, p<0.01). Examination of the marginal plot (shown in Figure 4A) and the average marginal effect in Table 10 confirms hypothesis E; as gender-equitable attitudes increased, the positive effect of relationship satisfaction on involvement in ANC and birth preparedness increased. Relationship satisfaction had the highest positive effect for male partners with the highest gender equitable attitude (GEM scale=High). For these men, the probability of participation increased by seven percentage points for each unit increase in relationship satisfaction (average marginal effect=0.07, p<0.001). This was followed by those with medium/moderate gender-equitable attitudes (average marginal effect=0.04, p<0.01).

Table 12: Average marginal effects of the moderators in the relationship between relationship satisfaction and male involvement in shared decision making and antenatal care and birth preparedness, Kinshasa 2018

	Male involvement in ANC and birth preparedness				Male involvement in shared decisions			
	Average Marginal Effect				Average Marginal Effect			
Moderators	Each Level	p-value	Relative to Reference	p-value	Each Level	p-value	Relative to Reference	p-value
RS x Emotional IPV								
No	0.032	0.023	[REF]		0.003	0.631	[REF]	
Yes	0.066	0.018	0.034	0.284	-0.005	0.700	-0.009	0.560
RS x Physical IPV								
No	0.036	0.022	[REF]		0.001	0.946	[REF]	
Yes	0.042	0.063	0.006	0.825	0.005	0.671	0.004	0.763
RS x Sexual IPV								
No	0.037	0.004	[REF]		-0.001	0.846	[REF]	
Yes	0.043	0.242	0.006	0.881	0.036	0.049	0.037	0.049
RS x Gender-equitable attitude								
Low	0.009	0.577	[REF]		-0.009	0.241	[REF]	
Medium	0.040	0.001	0.031	0.007	0.003	0.649	0.012	0.043
High	0.072	0.000	0.064	0.007	0.015	0.113	0.024	0.043

Note: ANC – antenatal care; IPV: intimate partner violence; REF: reference group; RS – relationship satisfaction

Figures 4B, 4C, 4D show the plots of predicted margins of the emotional, physical, and sexual IPV, respectively. The regression results indicated that none of these moderators were significant, although figure (4B) suggested that emotional violence could moderate the relationship of relationship satisfaction with involvement.

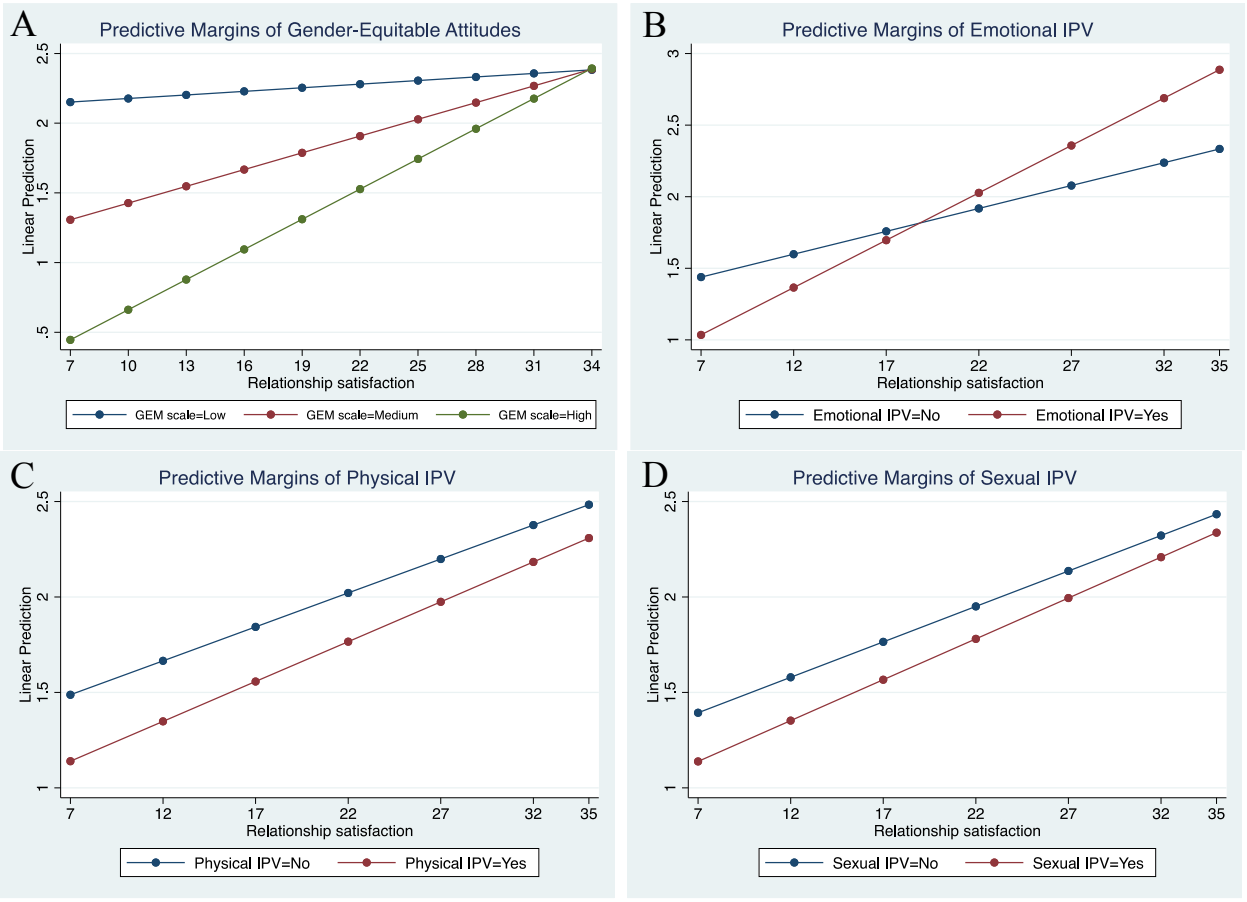

Figure 4: Plots of the predicted margins of the moderators (A: gender-equitable attitude; B: emotional IPV; C: physical IPV; D: sexual IPV) in the relationship between relationship satisfaction and involvement in ANC and birth preparedness activities.

Involvement in shared decisions

As shown in Table 11, emotional violence and physical violence were not significant moderators in the relationship between relationship satisfaction and participation in shared decisions ($p>0.05$). However, gender-equitable attitudes and sexual IPV perpetration were significant moderators in this relationship because their interaction terms with relationship satisfaction were significant ($\beta=0.002$, $p<0.05$; $\beta=0.04$,

p<0.05, respectively). Contrary to the hypothesis (F), sexual IPV perpetration had a positive effect and increased involvement in shared decisions. As relationship satisfaction increased, shared decision making among male partners who perpetrated sexual IPV increased by 3.7 percentage points compared to those who did not (average marginal effect=0.037, p=0.04, Table 10). Results further suggest that increasing relationship satisfaction had a greater impact for male partners who perpetrate sexual IPV (Figure 5D). For gender-equitable attitudes, the results supported the hypothesis (E) and similar to involvement in ANC and birth preparedness, having medium and high gender-equitable attitudes increased the probability of shared decisions compared to those with low gender equitable attitudes (average marginal effect=0.012 and 0.024, respectively). Also, the positive effect of relationship satisfaction on involvement in shared decisions was greatest for male partners with the highest gender equitable attitudes.

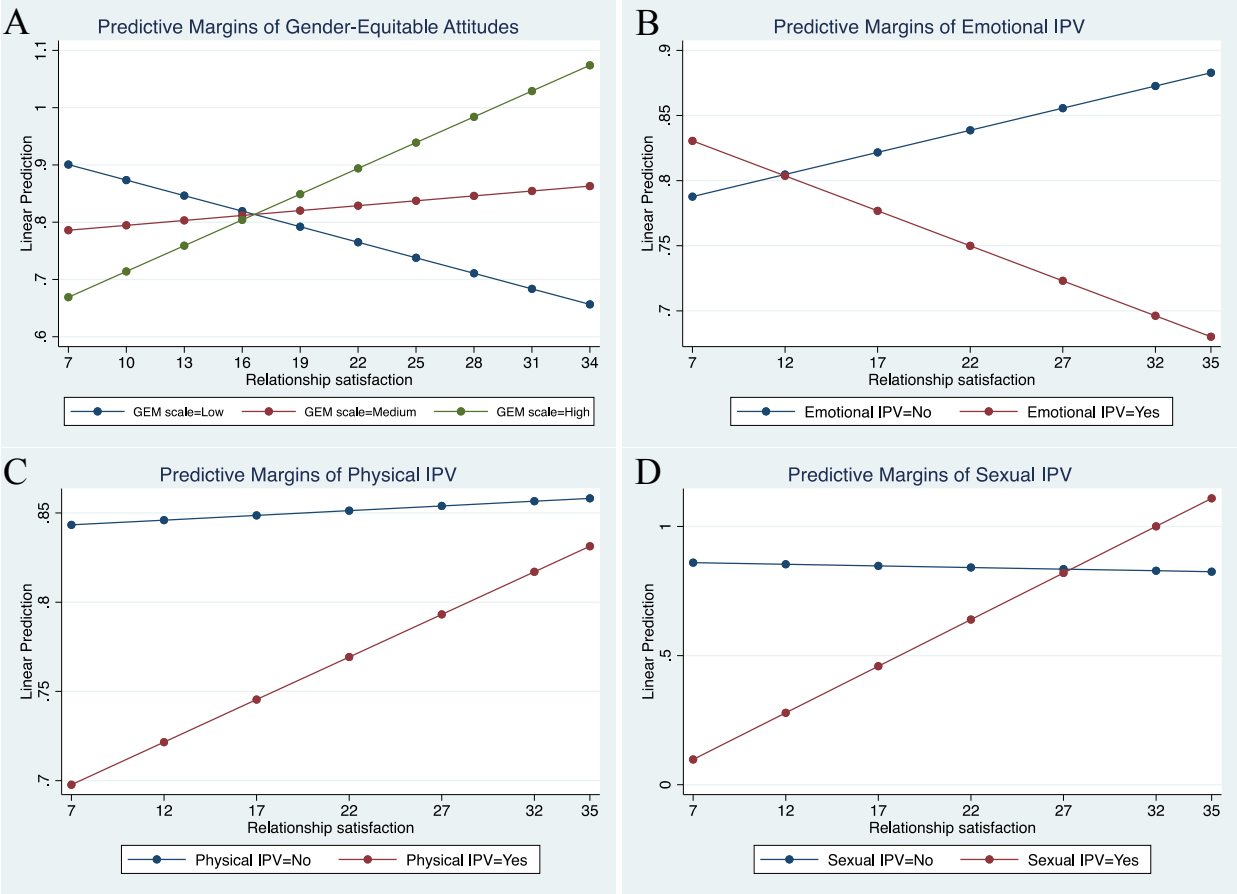

Figure 5: Plots of the predicted margins of the moderators (A: gender-equitable attitude; B: emotional IPV; C: physical IPV; D: sexual IPV) in the relationship between relationship satisfaction and involvement in shared decisions.

Discussion

This analysis examined the patterns of male involvement during pregnancy and identified the factors that influence involvement. Male partner involvement in ANC and birth preparedness, and shared decision making was low, with male partners participating in an average of two ANC and birth preparedness activities (out of 7) and one pregnancy-related decision (out of 3). Only a third had high levels of involvement in ANC and birth preparedness activities and 27% had high levels of shared decisions. For the specific activities, saving for a medical emergency had the highest level of involvement (49%) while finding a blood donor was the lowest (11%). As expected, knowledge was positively associated with involvement. Male partners who knew that a woman should attend four or more ANC visits, knew one newborn danger sign, and knew more than one birth preparedness step were more involved in ANC and birth preparedness, while for shared decisions, male partners who knew two or more ANC benefits were more involved than those who knew one or no benefits. Relationship satisfaction was positively associated with involvement in ANC and birth preparedness and male partners with higher gender-equitable attitudes were more involved in shared decisions. Self-efficacy was a positive predictor for involvement in ANC and birth preparedness but negative for shared decisions.

These findings contribute to the male involvement literature and although the approaches measuring involvement varied, the low levels of involvement are consistent with previous findings from other sub-Saharan countries.[38,39,143] In Kenya, 19% of men had high male involvement (participation in 3-5 activities)[39], 20% who participated in three to four maternity care activities in Tanzania had high involvement[40], and in Uganda, 26% of men whose wives attended ANC had high involvement scores (participation in 4-6 activities).[38] Also in Kenya, Hampanda et al[143] found that men activiitly participated in 1.4 activiites. However, a few studies have found higher estimates of male invovlement. A quasi-experimental study in Tanzania found that about two in five men participated in at least three ANC and birth preparedness at baseline and this increased to 81% at endline and similarly shared decision making

increased from 47% to 87%.[141] Another study in Ethiopia found that three in five men saved money for emergencies (63%), and a lower percentage participated in identifying a blood donor (12%).[43] It's worth noting that the low prevalence of involvement is consistent with studies in the DRC, even though these studies used binary measures.[58]

In line with the findings, studies in the DRC and sub-Saharan Africa found that gender-equitable attitudes,[4,6–9] strong relationships between the couple,[6,65,68] and maternal and child health knowledge were positive predictors of involvement. Studies exploring the association of involvement with knowledge used various indicators to measure knowledge, regardless their findings were similar to the findings of this study.[39,64,65,67,68,160] For instance, in Ethiopia men with knowledge of ANC services were five times as likely to be involved,[64] and male partners who had read the mother-child booklet after ANC visit are twice as likely to be involved.[39] Emotional, sexual, and physical IPV perpetration did not significantly hinder any form involvement. However, among the older male partners involvement, perpetrators of emotional violence were more involved in ANC and birth preparedness than non-perpetrators. This is not consistent with findings that suggest that IPV hinders involvement.[65,68] Often a precursor to physical IPV, emotional IPV includes verbal abuse, dominance, isolation, ridicule and targets the victim's phycological well-being. Thus, older male partners could potentially use their involvement as a way to further isolate the FTM and perpetrate emotional IPV, although this cannot be ascertained because of the cross-sectional nature of the study.

Interestingly, self-efficacy did not uniformly influence involvement and the association differed depending on the outcome. Its positive association with ANC and birth preparedness was consistent with other findings[161] while the inverse relationship was observed for shared decisions. The latter diverges from previous findings and implies that increasing a person's belief in their ability to execute a behavior does not always lead to them performing the behavior. In organizational research, researchers argue that perceptions of self-efficacy are not formed in a vacuum but are influenced by contextual factors and the

characteristics of the activity.[162–164] Within the context of this study, it suggests that the male partner's perception of the complexity of the task as well as the significance of the task could influence their self-efficacy and thereby their involvement. To better understand the lack of uniformity, qualitative research should be conducted to understand the contextual factors at play that may influence self-efficacy and future research should use a scale that specifically measures parental self-efficacy. The study revealed that socio-demographic factors including health zone of residence, duration of residence in the health zone, and duration of employment are important for male involvement in ANC and birth preparedness, supporting the findings from previous studies.[42,44,165–167] Employment of both partners encouraged male involvement in shared decisions.[42,137]

The findings also suggested that gender-equitable attitudes and sexual IPV were significant moderators, but the latter was not in the expected direction. For both forms of involvement, having higher gender-equitable attitudes increased the association between relationship satisfaction and involvement, while involvement in shared decisions increased with each unit increase in relationship satisfaction for sexual IPV perpetrators. This unexpected finding highlights that in the midst of sexual IPV perpetration, the male partner can be involved if he is satisfied with his relationship. However, in doing so, it could further promote IPV and thus unequal gender power relations.

These findings have implications for programs that seek to improve male involvement to ultimately address gender-based health inequities. The moderating effect of gender-equitable attitudes emphasizes the need for programs to be intentional about sensitizing male partners, especially older male partners, to dispel attitudes that promote unequal gender power relations and inequities. Programs should take into account the context and the strategies used to improve male involvement should not be done at the expense of the woman. Programs should also embed activities that address multiple determinants of male involvement in shared decisions, and ANC and birth preparedness. For instance, given that relationships with the FTM matters in his decision to be involved, there is the need to promote activities that promote

couple communication, reduce intimate partner violence, and consequently improve relationships.[168] The interventions should also increase knowledge of various aspects of maternal and child health as knowledge was an important predictor. Although this study did not assess the impact of multiple approaches, interventions should follow the WHO recommendation and consider how to incorporate multiple approaches that address the above mentioned factors to increase its effectiveness.[168] Lastly, programs should use more comprehensive measures to assess male involvement during monitoring and evaluation as the concept is nuanced and cannot be fully captured with a single indicator. This is important from a monitoring and evaluation standpoint but also involvement varies depending on the aspect of male involvement, thus it is important to acknowledge and incorporate into the program's approach.

Strengths and limitations

Most studies within sub-Saharan Africa have studied male involvement in the various stages of pregnancy individually and have conceptualized the term as a binary variable. This study provides a more comprehensive definition by including several pregnancy-related activities in one measure. Secondly, most studies in the DRC have studied male involvement as part of a larger study focused on HIV, and this study focuses on male involvement in pregnancy outside the realm of HIV. Furthermore, this study sheds light on the association between attitude towards gender norms, knowledge of antenatal care and birth preparedness, intimate partner violence, mass media, socio-demographic factors, and male involvement in pregnancy.

Several limitations are also recognized. Since this is cross-sectional data, it is difficult to establish causality or temporal sequence of events. Studying male involvement with longitudinal data observing men's behavior during multiple births may give us a better insight into the factors that encourage male involvement. Secondly, the measures of male involvement and possible predictors are based on self-report, which could be affected by social desirability bias or recall bias. Related to the recruitment of study

participants, not all male partners of FTMs were recruited and enrolled in the study. FTMs consented to male partner participation before their male partners were contacted, not all male partners consented to be in the study. There were also 305 male partners of FTMs (17%) who were interviewed but were not included in the sample analyzed in the regression models. Male partners included and those not included in the analysis were not statistically different for most variables, thus are comparable on observed factors. Although many predictors of male involvement were measured in the baseline survey, it did not include measures that previous research found to be associated with male involvement (e.g., number of wives, health facility factors, social support, gender of the child (the baby was not yet born, except if they did an ultrasound to find out the baby's sex), wantedness of pregnancy, and previous involvement of male partner's own father).

Additionally, the baseline study was conducted when the FTM was approximately six months pregnant; therefore, the measure of male partner involvement represents a truncated experience. This could bias the estimate obtained for male involvement because male partners could have become involved in the remaining three to four months left in the pregnancy. Finally, decision making in large household purchases and the male partner's health care was excluded from the analysis due to small sample size. The questions were only asked to men who were in a relationship (married or living together) and earned cash for employment in the last 12 months of the baseline survey. Also, the survey did not measure emotional support provided to the FTM by the male partner during pregnancy (help without being asked, tell her she is attractive, give her massages (rub her back or massage her feet), touch her belly, etc.). Using a comprehensive measure of involvement, further research needs to explore the effect of potential factors not included in this study (such as social norms, the provision emotional support, and previous experience with own father) that can encourage or deter male involvement during pregnancy.

Conclusion

Male partner participation during pregnancy is critical and affected by a myriad of factors. Knowledge that a woman needs four or more ANC visits, knowledge of one newborn danger sign, knowledge of one or more birth preparedness step, relationship satisfaction, self-efficacy, and living in Lemba or Ndjili were positive correlates of involvement in ANC and birth preparedness, while always living in the health zone of residence and working throughout the year, seasonally, and occasionally were negative correlates. For shared decision making, knowledge of two and three or more ANC benefits, gender-equitable attitudes, and the employment of both partners were positive correlates of involvement. Self-efficacy was a negative predictor of involvement in shared decisions. Addressing these determinants may improve male participation in maternal health. Using comprehensive approaches that improve men's knowledge of maternal health, provide skills to strengthen their relationships with their partners, and improve couple communication is necessary to improve participation. Approaches focusing on encouraging male partner involvement should also include activities that build men's self-efficacy and sensitization activities to reduce negative attitudes towards gender-equality.

PAPER 3: SELF-EFFICACY, GENDER-EQUITABLE ATTITUDES, PERCEIVED NORMS, AND WILLINGNESS TO BE INVOLVED IN ROUTINE CHILDCARE

Abstract

Background: Fathers' involvement in childcare has a positive impact on a child's development and wellbeing, However, due to perceptions about gender roles and social norms about paternal involvement, very few fathers are involved in childcare. Additionally, few studies have investigated father's roles in childcare in the Democratic Republic of Congo. To this end, this study identified patterns and predictors of male partner's willingness to be involved in childcare including gender-equitable attitudes, co-parenting factors, personal agency, and beliefs and perceived norms about parental involvement. Finally, the analysis explored the moderating effect of age and the mediating effect of self-efficacy and gender-equitable attitude on the association between education and willingness to be involved in childcare.

Methods: Secondary data available from the Gates-funded Momentum baseline survey were analyzed. Using the sample of 1,674 male partners of first-time mothers, multivariable linear regression models were used to examine the factors associated with male partner's willingness to be involved in two forms of childcare (interactive activities and caregiving responsibilities). Path analysis models were used to estimate the potential mediating effect of self-efficacy and gender-equitable attitude.

Results: Results indicate that willingness to participate in all activities was higher for interactive activities than caregiving responsibilities, with half of men being extremely willing to participate in all interactive activities and only 17% were extremely willing to participate in caregiving. Regarding the individual activities, male partners were most willing to take the baby to the doctor (73%) and least willing to "clean the house (33%). Normative expectations, descriptive norms, and beliefs supporting involvement were positively associated with willingness in both forms of childcare. Perpetration of intimate partner violence, involvement in shared decisions about pregnancy, relationship satisfaction and perceived self-efficacy

positively predicted willingness, while involvement in antenatal care/birth planning was a negative predictor. Finally, self-efficacy and gender-equitable attitude were significant mediators and as expected age was a significant moderator for gender-equitable attitude and self-efficacy.

Conclusion: Many of the findings are consistent with the multidimensional nature of father involvement and existing literature demonstrating that willingness to be involved in childcare is influenced by multiple factors. Interventions that integrate strategies addressing these factors can positively impact male partner's willingness to be involved in childcare.

Introduction

Father involvement is important in contributing to a child's development and wellbeing. Previous studies found that paternal involvement was positively associated with reducing behavioral and psychological problems, better academic performance, and personal development. Many of these positive and protective effects of father involvement throughout infancy, childhood, adolescence and adulthood have also been found in cohort studies.[19,21,101,169,170] Paternal involvement has been found to improve maternal health outcomes. For example, mothers with support from partners experienced lower levels of depressive symptoms and levels of anxiety.[171] A meta-analysis of studies in low- and middle-income countries found that involving fathers in antenatal care was associated with a three-fold increase in the utilization of skilled birth attendants at delivery, institutional delivery and a two-fold increase in post-partum visits.[80] Positive father involvement has even been found to improve outcomes for father themselves.[172–174] For example, fathers who are more engaged are more satisfied with their lives[172] and those who contribute more to housework and childcare have a lower risk of divorce.[173] Given the potential benefits of male involvement, it is critical to involve men.

Paternal involvement in childcare, as with male involvement in pregnancy, is multifaceted and many approaches have been used to conceptualize a father's involvement in childcare. One of the main

approaches by Lamb et al.[32] suggests that involvement is made up of three dimensions: accessibility, availability, and responsibility. Accessibility refers to the actual presence and access to the child. This can include activities that require supervisory care or less intensive degree of interaction. The second dimension, engagement also referred to as interaction, represents the interaction with the child in the context of caretaking. It is considered to be the most intensive component and is centered around the child. This component can involve feeding the child and playing interactively. Responsibility is defined as the shared accountability in parenthood and includes making arrangements for resources, making plans, and household errands. Norman[175] further argues that responsibility can be expressed directly and indirectly whereby direct responsibility involves the day-to-day planning of the child's life and indirect responsibility involves support activities that improve the environment for the child or the child's wellbeing.

In recent years, other researchers have built on Lamb's definition and expanded the ways fathers can be involved.[176–178] However, these measurements focus on specific age groups of children and do not apply to all fathers. For instance, Dermott[178] measures "going out for a meal" under the "family time" component. This measure is not as applicable to children under 12 months of age. Although Lamb's definition was developed three decades ago, it can be applied to all fathers, all ages of children, and it has been used in several studies over the years.[19,175,179] In this paper, paternal engagement or involvement was used to broadly refer to male participation involvement in childcare activities according to Lamb's definition of involvement.

Although there is extensive research on paternal involvement in the early years of a child's life, much of the research has been conducted in developed countries.[22,48] A few studies in sub-Saharan countries and other developing countries have measured the prevalence of paternal involvement; however, most of these have focused on involvement in child health. For instance, in Kenya, a cross-sectional study found that 54% of participants accompanied their partner for child immunization.[45] Another study in Uganda using an index measure found that about three in ten fathers (29%) were highly involved

in routine childhood immunization because they participated in four to five activities.[46] These activities include accompanying partner to routine child immunization, taking the child alone, discussing immunization schedule, providing financial support and participation in decision making.[46] In Salvador, one study found that 61% of men were present at any well-baby care visit.[180] One of the few surveys measuring involvement in childcare is the Multiple Indicator Cluster Surveys (MICS). According to the MICS in eight sub-Saharan African countries, father engagement in four or more learning and readiness activities ranged from 2.6% to 10.8%.[50–57] In the Democratic Republic of Congo (DRC), about seven percent of fathers were involved in in learning and readiness activities. [57]

Studies have shown that the fathering role is shaped and influenced by multiple determinants. However, few of these studies have been conducted in sub-Saharan Africa.[81] The lack of male involvement is attributable to an array of factors, including culture and patriarchy. Patriarchy results in men wielding decision-making power and can influence men to shun childcare responsibilities. It is responsible for the socio-economic and political powers that allow men to control women and children, creating gender inequality.[181] Culture represents the customs, norms, practices, and values of a group of people. These are often passed down from generation to generation and can dictate what is acceptable in the community. Studies assessing male involvement in maternal health found that societies in which childcare and household tasks are perceived as a woman's domain can limit paternal involvement.[4,59,69] Similarly, a literature review of four studies on male involvement in childcare in Botswana suggests that socio-cultural factors negatively influence male participation.[81] The review also suggested that legal constraints, such as customary laws pertaining to unmarried men, deter involvement. [81] Bulanda[182] found that fathers with egalitarian views demonstrated greater involvement than fathers with traditional views of gender roles. In some societies, men who do not conform to these societal gender roles are stigmatized, ridiculed, and perceived to be dominated by their wives.[62,63,69,72] Perceived social norm and attitudes towards gender roles can, therefore, be a critical factor that negatively impacts their willingness or actual involvement.

Other studies suggest that self-efficacy, parenting beliefs, and marital satisfaction can influence paternal involvement. Men with higher parenting self-efficacy were more involved in childcare.[105–107] Self-efficacy refers to a person's beliefs about their capabilities to execute tasks[183] and according to Bandura[183], there is a strong link between self-efficacy and performing a behavior. Thus, fathers with higher parental self-efficacy will be more involved in fathering. Similarly, there is a positive correlation of involvement with beliefs about the paternal role.[106,184] A systematic review found that fathers with a good marital relationship or were satisfied with their relationships were found to engage in co-parenting behaviors.[104] Furthermore, in a review of lessons learned, Cowan and Cowan[185] suggest that interventions that do not focus on the relationship between parents may have limited effects. The father's relationship with his own father[107,186–188], partner's employment[189], partner support[186], and lack of infant care skills[169] have been found to influence involvement in care duties. In some instances, the attitudes of family members, or the community can influence involvement. Two studies in Asia found that a man's spouse or partner and his family members did not expect him to be involved in the care of his infants despite his desires to be involved.[107,190]

Fathering is and has been shaped and influenced by social changes and contexts. Therefore, father engagement differs by culture and context. Some studies suggest that fathering even differs across ethnic groups.[191,192] More importantly, studies have found that early engagement of fathers tends to endure and last long.[101,169] Thus, it is important to understand a father's intention or willingness to be involved before the child's birth and address the factors that can deter involvement. Although intention is not performing the actual behavior, it is a key predictor for a person's readiness for an action.[124] Furthermore, a meta-analysis by Sheeran[193] indicated that the average intention-to-behavior correlation is r = 0.53. In addition to the above, much of the research on research on paternal involvement is primarily based on families in developed countries and less is known about involvement in sub-Sharan Africa.[22,48,194] To date, little research has been conducted on paternal involvement in childcare activities in the DRC; therefore, it is important to study fathering and its determinants within the DRC.

Conceptual framework

The identification of determinants of male partner's willingness to participate in routine childcare was guided by the conceptual model illustrated in Figure 2. The development of the model was informed primarily by the responsible fathering framework (Figure 6).[93] The framework posits that involvement can be influenced by a myriad of factors; however, this paper focuses on the male partner or father (individual level) factors and co-parental relationship factors.

Building on the responsible fatherhood framework, the conceptual model suggests that a male partner's perceived social norm about paternal involvement can determine his willingness to be involved. Constructs from the Theory of Social Norms by Bicchieri and the Integrated Behavioral Model (IBM) will guide the measurement of perceived social norms. Perceived social norms are the social pressure a person feels to perform or not perform a behavior.[195] According to the IBM, perceived norms are made up of two aspects: (1) whether or not people are performing the behavior (descriptive norm) or (2) whether or not people approve or disapprove the behavior (injunctive norm).[124] Bicchieri further suggests normative expectation (the belief that others expect one to conform given the norm or what participant thinks others expect him to do) is an important aspect of perceived norm.[110,196]

Further data analysis to explore mediation was based on the mediation model depicted in Figure 7.

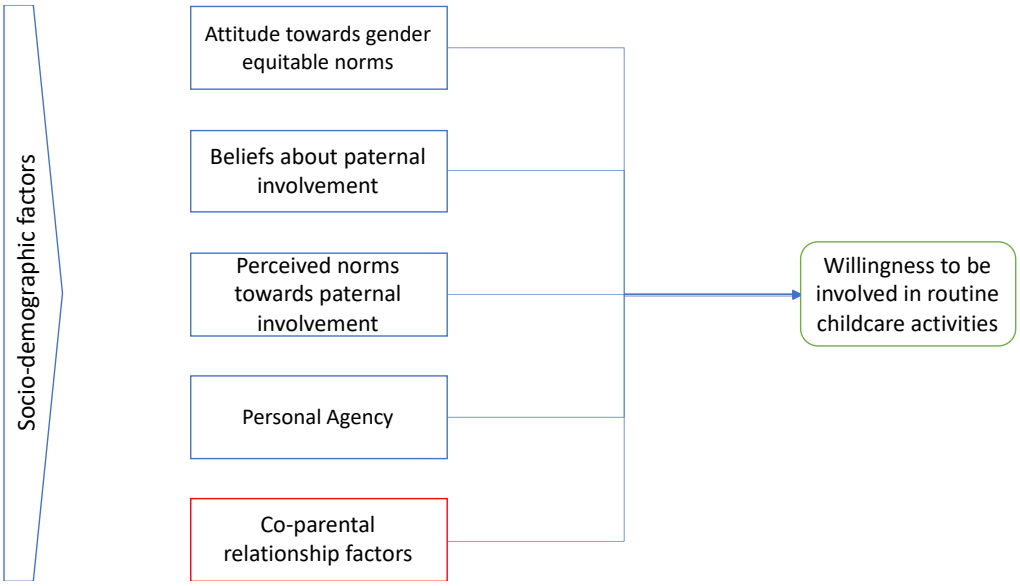

Figure 6: Conceptual model of the determinants of male partner willingness to be involved in routine childcare activities.

Note: The red box shows the primary factors of interest informed by the responsible fatherhood framework. Some of these factors are included in the socio-demographic characteristics.

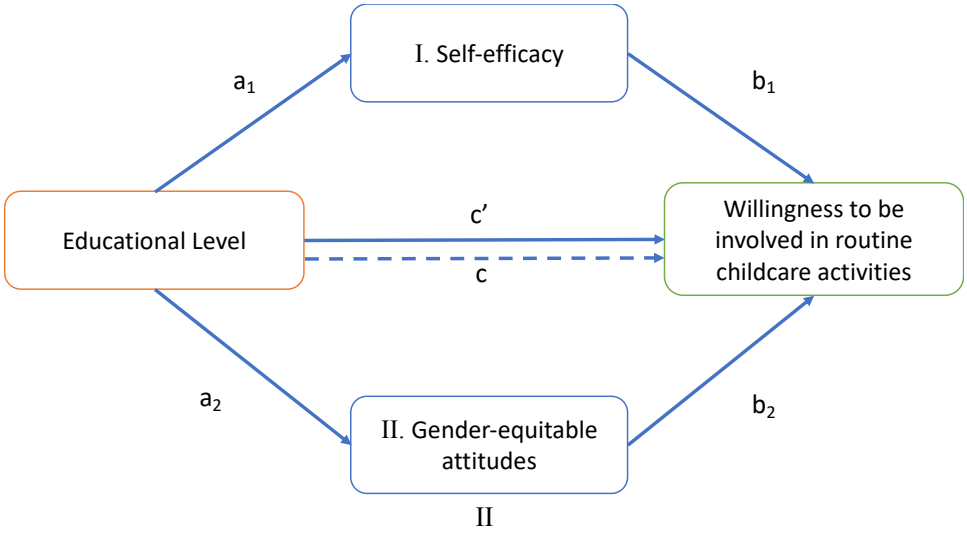

Figure 7: Model for the mediation analysis.

Note: I and II are the two mediators that were explored separately. The dashed line (c) denotes the effect of educational level on willingness when self-efficacy or attitude towards gender norms is not included as a mediator. Indirect effects ($a_1 * b_1$ and $a_2 * b_2$); direct effect (c and c'); total effect [($a_1 * b_1$) + c'] and [($a_2 * b_2$) + c]; percentage of the total effect mediated = indirect effects/total effect.

Research question and hypothesis

The overall aim of this paper is to better understand factors influencing the willingness to be involved in routine childcare activities by answering the following research questions:

1. What factors are associated with a male partner's willingness to be involved in routine childcare activities?
2. To what extent does a male partners' age moderate the association between gender-equitable attitudes or self-efficacy and his willingness to be involved in routine childcare activities?
3. To what extent do equitable attitudes towards gender norms or self-efficacy mediate the association between educational level and a male partners' willingness to be involved in routine childcare activities?
    a. To what extent does this vary with the male partner's age?

Hypotheses tested are described below and are based on previous research.

Hypothesis A. Male partners with a more equitable attitude towards gender norms are more willing to be involved in routine childcare.

Rationale. As mentioned in the introduction, previous research found that fathers with more equitable attitudes towards gender roles are more involved with childcare than those with traditional beliefs.[182]

Hypothesis B. Male partners with higher self-efficacy are more willing to be involved in routine childcare.

Rationale. Bandura[183] posits that there is a strong positive correlation between self-efficacy and performing a behavior. Additionally, studies have found that parenting self-efficacy was positively associated with involvement in childcare.[106,184]

Hypothesis C. Male partners who believe that more than half of the fathers in their community participate in routine childcare activities are more willing to participate in routine childcare.

Rationale. According to the IBM, people's behavior is influenced by perceptions of what other people do (descriptive norms).[124] Although not related to male involvement, a meta-analysis on consumer decision making suggest descriptive norms have a stronger impact on behavior and people's behavior tends to reflect the behaviors of others.[122]

Hypothesis D. Age will moderate the association between self-efficacy and willingness to participate in routine childcare, with a positive association being amplified among older male partners.

Rationale. Studies suggest that older age is associated with male involvement.[58,62,63] Male partners with higher self-efficacy who are older may have more experience than their younger counterparts and thus may be more willing to be involved.

Hypothesis E. The association between a male partner's educational level and his willingness to participate in routine childcare is mediated by his attitude towards gender norms.

Hypothesis F. The association between a male partner's educational level and his willingness to participate in routine childcare is mediated by his self-efficacy.

Rationale. In some studies, having a higher education increases the odds of involvement[39,62,64] However, in one of the few studies conducted in the DRC, education did not influence participation.[58] To explore the difference in association for male partners in the DRC compared to the other studies, self-efficacy and gender-equitable attitudes were explored as mediators. Previous studies suggest that intrapersonal factors, such as self-efficacy and father's belief about paternal roles, often have a mediating role in parenting behaviors. For instance, father's self-efficacy and belief about roles acted as a mediator between spousal capital and paternal involvement[106] In another study, self-efficacy was found to be a mediating factor between personality and parenting.[197]

Methods

This analysis used the same dataset as Paper 2, the MOMENTUM baseline survey, and the sample consisted of 1,674 male partners of first-time mothers (FTMs) who had data on specific characteristics of the FTMs. Data are cross-sectional and were restricted to participants with no missing data on any of the variables included in the analysis.

Measures

Willingness to participate in routine childcare activities. The outcome variable was measured by asking, "how willing you are to perform the following activities after [name of first-time mother]'s first child is born?" Male partners were asked about their willingness to participate in 16 routine childcare activities, identified using the child-related tasks listed in the "Who Does What?" questionnaire[198] and the Program M manual.[199] They indicated their willingness to participate in these activities pertaining to children under 12 months, using a 5-point Likert scale (1 - not willing at all, 2 - somewhat unwilling, 3 - undecided, 4 - somewhat willing and 5 -extremely willing).

Using Lamb's definition of childcare[32], the 16 activities listed in Table 13 were categorized into two sections: caregiving responsibility and interactive/engaging activities. Caregiving responsibility pertained to 11 daily caregiving tasks (e.g., bathing the baby, washing baby's clothes) and interactive activities comprised of five activities (e.g., singing to the baby, playing with the baby). In each category, responses were coded as 1 if the male partner was extremely willing to participate and were summed up to create two scores such that a higher score, the greater number of activities a male partner was extremely willing to participate in (interactive: α = 0.9216; caregiving: α = 0.9155).

Table 13: List of routine childcare activities for children under 12 months

Routine Childcare Activities	Routine Childcare Activities
1. Changing the baby's diapers	9. Cooking or preparing food House cleaning
2. Helping/supporting feeding	10. Putting the baby to sleep/bed
3. Helping when baby cries	11. Singing to the baby
4. Bathing the baby	12. Talking to the baby
5. Playing with the baby	13. Staying home when the child is/was sick
6. Looking after the baby when the mother goes out or is at work	14. Smiling/making silly faces at the baby
7. Washing the baby's clothes	15. Dancing with the baby
8. Cooking or preparing food	*16.* Taking the baby to the doctor

Note: Interactive activities include activities numbered 5, 11, 12, 14, 15; Caregiving responsibility activities include activities numbered 1, 2, 3, 4, 6, 7, 8, 9, 10, 13, 16

Gender-equitable attitudes. The Gender Equitable Men's (GEM) scale was used to measure male partners' attitude towards gender norms. As previously described in Paper 2, the GEM scale has been used to measure attitudes towards gender norms in intimate relationships or differing social expectations for men and women. In the baseline questionnaire, male partners were asked about their level of agreement with 17 statements that focus on violence, sexual relationship, masculinity, gender norms and relationship (Table 2, Paper 2). Using exploratory factor analysis, items with a factor loading of less than 0.3 or with a negative correlation coefficient. The final scale consisting of 11 items ranged from 11 to 33 (α = 0.7221), and a higher score on the scale signifies greater support for gender-equitable norms (see Appendix III for detailed information on factor analysis).

Male partner's belief about paternal involvement was assessed using two variables, personal belief and perceived community belief.

Personal belief. This variable was measured by asking male partners to rate their agreement with the appropriateness of the 16 routine childcare activities listed above (Table 1): "How appropriate do you think each of the following activities is for fathers to do?" Response categories ranged from 1 for "extremely inappropriate" to 2 for "inappropriate," 3 for "appropriate," and 4 for "extremely appropriate." To create

the personal belief scale, responses that indicated that the routine childcare activities was extremely appropriate was coded as 1 and all other responses were coded as zero. Corresponding to the categorization of interactive and caregiving activities in the outcome, the responses were summed up, with higher values of the score signifying a greater number of routine childcare activities that were extremely appropriate for fathers to do (interactive: α = 0.8901, range 0 – 5; caregiving: α = 0.8467, range 0 – 11). Thereafter, the score was divided into three categories: (1) no activity was extremely appropriate; (2) 1 activity was extremely appropriate; and (3) two or more activities were extremely appropriate.

Perceived community belief. Male partners were asked, "How appropriate would most fathers in your community think the following activities [listed in Table 1] are for fathers to do?" This variable was measured using the same Likert scale used to measure personal belief. Similar to the personal belief, extremely appropriate" was coded as 1 and all other responses as zero. The higher the values on the score, the greater the number of routine childcare activities that male partners believe most fathers in the community considered extremely appropriate (interactive: α = 0.8893, range 0 – 5; caregiving: α = 0.8121, range 0 – 11). Similar to personal belief, the resulting variable was a categorical variable: (1) no activity was extremely appropriate; (2) 1 activity was extremely appropriate; and (3) two or more activities were extremely appropriate

In the analysis, perceived norms were evaluated using the male partners' descriptive norms, injunctive norms, and normative expectations towards paternal involvement.

Descriptive norms. This variable was measured by asking respondents, "How many fathers in your community do you believe perform routine childcare activities for children under 12 months of age?" Male partners responded using the following response options: all of them, more than half of them, about half of them, less than half of them, or none of them. For the analysis, response options "all of them" and "more

than half of them" were combined into one response category (more than half of them), and "less than half of then" and "none of them" were combined into another category (less than half).

Injunctive norms. An indirect measure was used to measure injunctive norms regarding routine childcare activities. Male partners were first asked to name the top five key influencers/referents when making decisions about routine childcare activities. Thereafter, the referent approval (also referred to as normative belief) was measured by asking, "Would the following people you mentioned approve or disapprove of you performing routine childcare activities (such as, changing the diapers, bathing the baby, washing the baby's clothes, taking the baby to the doctor, etc.) for your child who is under 12 months of age?" To calculate perceived injunctive norms, referent approval was weighted by the male partner's motivation to comply with each referent. Motivation to comply was measured by asking, "Please tell me whether you strongly agree, agree, disagree or strongly disagree with each of the following statements: When it comes to deciding how to care for my child who is under 12 months of age, I want to do: I do what my [name of referent] thinks I should do." A summative score was calculated and measured the number of normative pressures that male partner has. The higher the score on the index, the greater the social pressure from referents to participate in routine childcare activities and the male partner's motivation to comply with the referents (α = 0.9798; range 0 – 5).

Normative expectations. Normative expectations are the expectations about what others think male partners should do. To measure this, male partners were asked how strongly they agreed, agreed, disagreed, or strongly disagreed with the following statement: "Most people who are important to me think I ought to perform routine childcare activities (such as, changing the diapers, bathing the baby, washing the baby's clothes, taking the baby to the doctor, etc.) for my child who is under 12 months of age." Responses were combined, such that strongly agreed and agreed were in one category (agreed) and strongly disagreed and disagreed in another (disagreed).

Personal agency is individual's ability to perform a behavior[124] and was assessed using variables measuring a male partner's self-efficacy and autonomy.

Self-efficacy. In the baseline survey, self-efficacy was measured using the generalized self-efficacy scale (previously described in Paper 2). Male partners were asked a series of 10 statements (e.g., I can always manage to solve difficult problems if I try hard enough; I can usually handle whatever comes my way) and they indicated their level of agreement (not at all true, hardly true, moderately true, or exactly true) with the statements. Items were summed up and higher values of the scale signified greater self-efficacy and capacity to execute behavior (α = 0.7573; range 0 – 40).

Autonomy. Autonomy is a person's ability to make a decision unaided by others. To measure this, male partners were asked "If most people who are important to you did not want you to perform routine childcare activities for your baby who is under 12 months of age, would you still do it?" Male partners were considered to have greater autonomy in their decision making about childcare if their response was "yes" and less autonomy if their response was "no".

Co-parental relationship factors included variables measuring male partner's involvement in pregnancy, relationship satisfaction, and intimate partner violence.

Male involvement in pregnancy. This was measured using the two composite variables created in Paper 2. Male partners were asked about their participation in the various activities before childbirth: development of a birth plan, finding information about pregnancy, saving money for emergencies, arranging transport for delivery, arranging for a blood donor, and involvement in decision making about antenatal care, presence of skilled attendant at delivery, where to deliver the baby, and when and where to seek care/treatment of danger signs. Higher values on the scores indicated participation in more antenatal care and birth preparedness activities (α = 0. 8602; 0 – 7; Appendix III) and shared decisions about pregnancy

(α = 0. 7272; 0 – 3; Appendix III). Further analysis suggests that bidirectional associations between the two measures of male involvement during pregnancy and willingness do not exist (see Appendix VIII).

Relationship satisfaction. Relationship dynamics between the male partner and FTM was measured using the relationship assessment scale (RAS) described in Paper 2. RAS is a continuous variable (α = 0. 7992; Appendix III) and ranges from 7 to 35.

Past-year Intimate partner violence. Intimate partner violence (IPV) perpetrated against FTM was measured using an abbreviated version of the conflict tactics scales.[155–157] A dichotomous variable was created such that male partners who reported they had often or sometimes perpetrated emotional, physical or sexual violence in the past 12 months were be described as aggressors of violence and coded as 1.

Control variables. As shown in Table 14, a number of socio-demographic variables were controlled for in the analysis, including marital status, educational level, ethnicity, household wealth, employment in the past 12 months, duration of employment in the past 12 months, and employment by both partners. Duration of residence in the health zone and health zone of current residence were measured as reported. The number of children of a male partner and the relative age difference between the partners were included as ordinal variables. The regressions also controlled for a male partner's age (15-24 years (reference group) and 25+ years).

Table 14: Descriptions of socio-demographic variables that were used as control variables

Variable name	Categories	Values/Range
Age	15-24 years	0 (reference group)
	25+ years	1
Level of education	Lower than secondary	0 (reference group)
	Secondary complete	1
	Higher	2
Marital status	Never married/Ever married	0 (reference group)/1
Ethnicity	Bakongo	1 (reference group)
	Bas Kasai & Kwilu-Kwango	2
	Kasai/Katana/Tanganyika	3
	Other	4
Health zone of residence	Bumbu	1 (reference group)
	Kingasani	2

Variable name	Categories	Values/Range
	Lemba	3
	Masina 1	4
	Matete	5
	Ndjili	6
Duration of residence in health zone	< 5 years	1 (reference group)
	5+ years	2
	Always	3
	Visitor	4
Household wealth	Low	0 (reference group)
	Medium	1
	High	2
Number of children	0	0 (reference group)
	1	1
	2+	2
Employment (in past 12 months)	Unemployed	0 (reference group)
	Employed with cash earnings	1
	Employed without cash earnings	2
Duration of employment (in past 12 months)	Unemployed	0 (reference group)
	Throughout	1
	Seasonally	2
	Occasionally	3
Both partners worked for cash	No/Yes	0 (reference group)/1
Relative age difference	MP younger/<5 years older	0 (reference group)
	5 - 9 years older	1
	10+ years older	2

Analytical strategy

Descriptive analysis was conducted to describe the sample of male partners who are willing to participate in routine childcare activities. Chi-square statistics and t-tests were used to examine the age differentials in each of the variables representing background characteristics, social norms, and gender norms. Pearson's correlation and one-way ANOVA tests were conducted during the bivariate analysis to provide a preliminary overview of socio-demographic differentials in willingness. Multiple linear regressions were used to test the association between the independent variables and willingness to participate in routine childcare activities. The regressions were run in several stages. The first model, a crude analysis, examined the association between the outcome and the independent variables of interest (gender-equitable attitudes, personal agency, co-parental relationship factors, and beliefs and perceived norms about paternal involvement). Thereafter, the socio-demographic characteristics were added to the model to control for these factors (Model 2). The third model tested examined the moderating effect of age on

self-efficacy and gender equitable attitudes. To obtain the marginal effect of the moderator, the command "*margins*, *dydx()*" was used and the significance of the interactions was determined using the test of joint significance ("*testparm*" command). Graphical plots were created using the "*marginsplot*" command.

Mediation was assessed using path analysis and the maximum-likelihood estimation was used as it can account for missing data with minimal bias.[200] Bootstrapping (5,000 bias-corrected resamples) was used to obtain standard errors and confidence intervals for each path coefficient and each indirect effect. The bootstrap provided bias-corrected confidence intervals and standard errors. The overall model fit was evaluated using the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The SRMR measures the discrepancy between the predicted model and the observed model. SRMR values lower than 0.08 indicate acceptable fit with lower values indicating a better fit.[200–202] The CFI measures the extent to which the model of interest is better than an alternative model where measured variables are uncorrelated; values closer to 1 are considered acceptable fit.[200–202] Lastly, the RMSEA measures the amount of error present in each degree of freedom. RMSEA values less than 0.08 indicate reasonably close fit and values less than 0.05 indicate a good fit.[200–202] Generally, the closer the RMSEA value is to 0, the better the fit.

Statistical analyses was carried out using STATA v15 software[159], with statistical significance indicated by a p-value less than 0.05. A variance inflation factor of less than 4 was used to demonstrate the absence of multicollinearity in the model [158] and Cronbach's alpha scores of 0.7 and 0.8 represented "adequate" and "good" reliability, respectively.[203–205]

Comparison of participants with missing data

As described in Paper 2, 305 male partners who were interviewed at baseline had missing data (92 had no data on specific characteristics of FTMs used in the analysis and 213 did not have privacy). Participants significantly varied by marital status, health zone of residence and duration of residence in the

health zone (Table A11, Appendix IV). Significantly more male partners without missing data were never married, resided in Lemba and Ndjili and had always lived in the health zone. The remaining demographic characteristics and exploratory variables of interest did not vary significantly by the degree of missingness.

Results

Participant characteristics

Table 15 describes the characteristics of the male partners by age group. Overall, about two-thirds had completed secondary school or higher education and majority were ever married (86%). Over one in five lived in Kingasani and Masina 1 health zones, and over two in five were 5-9 years older than their FTMs, resided in the health zone for less than five years and belonged to the Bas Kasai and Kwilu-Kwango ethnic groups. Most male partners were first time fathers (73%), worked for cash only (80%), and did not have a FTM who was also employed for cash (75%). About half were employed throughout the year.

Most male partners agreed that most people important to them thought they should perform routine childcare activities for their child under 12 years (normative expectation, 83%) however, only about one in ten (9%) believed that more than half of the fathers in their community performed these routine childcare activities (descriptive norm). Personal and perceived community belief about the appropriateness of childcare was more prevalent for caregiving responsibility activities compared to interactive activities. For instance, 13% of male partners perceived that most fathers in the community would think that 2 or more interactive activities are extremely appropriate and twice as many reported this for caregiving responsibility activities. Autonomy was high with over 70% reporting that they were autonomous and over half had not perpetuated any form of intimate partner violence in the 12 months. Male partners had high levels of relationship satisfaction (mean=29.6), moderate levels of self-efficacy (mean=34.2) and gender equitable attitudes (mean=21.6), and low levels of involvement in antenatal care and birth preparedness (mean=2.2) as well as shared decision making about pregnancy (mean=0.8).

Table 15: Characteristics of study sample by age group, Kinshasa 2018

	Age distribution			
	Age 15-24	Age 25+	Total	
Level of education				***
Lower than secondary	44.0	27.9	33.1	
Secondary complete	46.6	45.6	45.9	
Higher †	9.4	26.5	21.0	
Marital Status				***
Never married	19.0	11.9	14.2	
Ever married	81.0	88.1	85.8	
Ethnicity				
Bakongo	31.1	29.0	29.7	
Bas Kasai & Kwilu-Kwango	42.5	41.4	41.8	
Kasai/Katana/Tanganyika	12.2	13.7	13.2	
Other	14.2	15.9	15.4	
Health zone of residence				***
Bumbu	14.0	11.5	12.3	
Kingasani	25.7	21.9	23.1	
Lemba	16.5	12.1	13.5	
Masina1	16.5	25.1	22.3	
Matete	9.4	11.4	10.8	
Ndjili	17.9	18.1	18.0	
Duration of residence in the health zone				***
<5 years	35.1	47.0	43.1	
5+ years	20.3	17.0	18.1	
Always	42.0	32.5	35.5	
Visitor†	2.6	3.5	3.2	
No of children ever fathered				***
0	89.5	65.7	73.4	
1	9.2	21.4	17.4	
2 †	1.3	13.0	9.2	
Household wealth				***
Low	40.1	31.1	34.0	
Middle	31.2	33.8	33.0	
High	28.7	35.1	33.0	
Employment in the past 12 months				***
No Work	17.0	7.6	10.6	
Work for cash only	72.1	83.9	80.1	
Work but not paid, worked for kind or cash and kind	10.9	8.5	9.3	
Duration of employment				***
Unemployed	21.4	12.1	15.1	
Throughout the year	39.2	58.3	52.1	
Seasonally	16.6	13.3	14.4	
Occasionally	22.7	16.3	18.4	
Dual employment				***
No	81.5	69.7	73.5	
Yes	18.5	30.3	26.5	
Relative age difference				***
MP younger/<5 years older	65.4	12.4	29.5	
5 - 9 years older	34.4	47.9	43.5	
10+ years older†	0.2	39.7	26.9	
Normative expectations				
Disagree	15.2	17.5	16.7	
Agree	84.8	82.5	83.3	
Descriptive norms				
Less than half of them	76.9	75.8	76.2	
About half of them	14.0	14.9	14.6	

	Age distribution			
	Age 15-24	Age 25+	Total	
More than half of them	9.1	9.3	9.2	
Autonomous				
No	28.1	29.7	29.2	
Yes	71.9	70.3	70.8	
Personal belief about appropriateness of interactive activities				
No activity extremely appropriate	72.1	70.6	71.1	
1 activity extremely appropriate	10.4	8.6	9.2	
2 or more activities extremely appropriate	17.6	20.7	19.7	
Personal belief about appropriateness of caregiving activities				
No activity extremely appropriate	50.6	53.5	52.6	
1 activity extremely appropriate	19.8	15.2	16.7	
2 or more activities extremely appropriate	29.6	31.3	30.8	
Perceived community belief about appropriateness of interactive activities				
No activity extremely appropriate	77.4	78.9	78.4	
1 activity extremely appropriate	9.6	7.5	8.2	
2 or more activities extremely appropriate	12.9	13.6	13.4	
Perceived community belief about appropriateness of caregiving activities				
No activity extremely appropriate	56.7	58.5	57.9	
1 activity extremely appropriate	16.5	16.4	16.4	
2 or more activities extremely appropriate	26.8	25.1	25.6	
Past-year intimate partner violence perpetuation‡				***
No	51.4	63.8	59.7	
Yes	48.6	36.2	40.3	
Total	100.0	100.0	100.0	
Mean (SD)				
Relationship satisfaction	28.83 (5.71)	30.00 (4.68)	29.62 (5.06)	***
Gender-equitable attitudes	20.96 (4.65)	21.96 (4.88)	21.64 (4.83)	***
Perceived self-efficacy	33.42 (4.86)	34.51 (4.45)	34.16 (4.61)	***
Injunctive index	2.99 (2.25)	2.61 (2.32)	2.73 (2.30)	**
Involvement in antenatal care and birth preparedness activities	2.02 (2.26)	2.34 (2.33)	2.23 (2.31)	**
Involvement in pregnancy decision making	0.72 (1.00)	0.86 (1.10)	0.82 (1.07)	*
N	541	1,133	1,674	

Note: max – maximum value; SD - Standard deviation

† The number of partners in at least one cell in the category was less than 25;

‡ Only men who had privacy during the interview were asked IPV questions (15-24 years (N = 484); 25+ years (N=977); 15+ years (N=1,461)

***<0.001; ** <0.01; *<0.05

Age differentials were also examined. Compared to younger male partners, significantly more of the older male partners had completed at least secondary school, were ever married, were 5-9 years older than the FTM, resided in Masina 1, resided in the health zone for less than 5 years, had at least one child, worked for cash only, were employed throughout the year and had a FTM who was also employed. Prevalence of past-year intimate partner violence perpetration and the injunctive index were significantly higher among the younger male partners, while relationship satisfaction, gender-equitable attitudes, self-efficacy, and involvement during pregnancy (shared decisions and antenatal care/birth preparedness) were

significantly lower among the younger than the older male partners. For the remaining characteristics, the age differentials were not significant.

Participation in routine childcare activities

Out of all the 16 activities, extreme willingness to take the baby to the doctor (73%) was most common and willingness to clean the house was least common (33%, Table 16). Two-third of male partners were extremely willing to play with the baby (68%) and talk to the baby (67%). Over three in five were extremely willing to sing (64%), smile or make silly faces (63%), help or support feeding (62%), dance (61%), and help when baby cries (61%). Over half were extremely willing to and look after the baby when the mother goes to work (60%), put the baby to sleep (58%) and stay home when the child is sick (52%). Less than half were extremely willing to participate in the remaining activities: bathe the baby (45%), change the baby's diapers (47%), washing the baby's clothes (37%), and cooking (36%). Overall, there was very little significant variation across the age groups, with the exception of cleaning the house.

Male partner's extreme willingness to participate in childcare varied depending on the number of activities. More male partners were extremely willing to participate in at least one caregiving responsibility than interactive activity (86% versus 78%), however for all activities, the inverse was observed. Less than one in five male partners were extremely willing to participate in all caregiving responsibility activities (17%), while half were extremely willing to participate in all interactive activities.

Table 16: Percentage of male partners who were extremely willing to participate in routine childcare activities, by age group, Kinshasa 2018

Routine childcare activities	Age distribution			
	Age 15-24	Age 25+	Total	
Caregiving responsibilities				
Changing the baby's diapers	42.9	48.7	46.8	
Helping or supporting feeding	59.3	63.5	62.1	
Helping when baby cries	59.2	61.1	60.5	
Bathing the baby	43.4	45.1	44.6	
Looking after the baby when the mother goes out or is at work	60.3	59.8	60.0	
Washing the baby's clothes	35.5	37.8	37.0	
Cooking or preparing food	32.9	37.6	36.1	
Cleaning the house	29.0	34.2	32.5	*
Putting the baby to sleep or bed	56.6	58.2	57.7	
Staying home when the child is or was sick	52.9	51.2	51.7	
Taking the baby to the doctor	71.9	72.7	72.5	
Participation in one caregiving responsibility	88.5	84.7	86.0	*
Participation in all caregiving responsibilities	13.7	18.5	17.0	*
Interactive activities				
Playing with baby	65.8	68.8	67.9	
Singing to the baby	61.9	64.3	63.6	
Talking to the baby	66.0	67.4	67.0	
Smiling or making silly faces at the baby	62.3	63.3	63.0	
Dancing with the baby	59.2	61.6	60.8	
Participation in one engaging/interactive activity	77.5	78.5	78.1	
Participation in all engaging /interactive activities	48.2	50.1	49.5	
N	541	1,133	1,674	

***<0.001; ** <0.01; *<0.05

Bivariate results

Table 17 presents the results of the bivariate analysis showing socioeconomic variations in the average number of interactive and caregiving childcare activities that male partners were extremely willing to participate in. Maler partners with the highest levels of education, who were ever married, always resided in the health zone, and were employed throughout the year were willing to participate in more interactive and caregiving activities. For both forms of childcare activities, there was significant variation in the mean number of activities that male partners were willing to participate in across levels of education, marital status, ethnicity, health zone of residence, duration of residence in the health zone, employment in the past 12 months and duration of employment. Similarly, there was significant variation in the mean number of activities by the male partner's normative expectations and perceived descriptive norm. Male partners who agreed that most people important to them thought they should perform routine childcare activities for their child under 12 years were willing to participate more activities than those who disagreed.

More male partners who believed that most fathers in their community performed childcare activities were willing to participate in interactive and caregiving activities compared to the others.

Regarding beliefs about paternal involvement in childcare activities, male partners willingness was highest for those who believed that two or more activities were extremely appropriate. For instance, male partners who believed that two or more interactive activities were extremely appropriate were willing to participate in about four activities compared to those with beliefs about zero or one activity. Significant positive correlations were observed for male partners' relationship satisfaction and self-efficacy for both forms of childcare activities such that willingness increased with increasing relationship satisfaction and self-efficacy. However, for gender-equitable attitudes and involvement in antenatal care/birth planning, the correlation was negative and significant for only interactive activities. Involvement in shared pregnancy decisions was positively and significantly correlated with willingness to participate in caregiving activities.

Table 17: Average number of interactive and caregiving childcare activities male partners are extremely willing to participate in, by socio-demographic characteristics and independent variables, Kinshasa 2018

	Interactive Activities			Caregiving Responsibilities		
	Mean	(SD)		Mean	(SD)	
Age distribution						
15-24	3.15	(2.11)		5.44	(3.76)	
25+	3.26	(2.08)		5.70	(4.00)	
Level of education			**			*
Lower than secondary	3.01	(2.14)		5.25	(3.90)	
Secondary complete	3.29	(2.07)		5.74	(3.91)	
Higher	3.40	(2.02)		5.91	(3.99)	
Marital Status			***			***
Never married	2.63	(2.26)		4.31	(3.95)	
Ever married	3.32	(2.04)		5.83	(3.88)	
Ethnicity			***			**
Bakongo	2.95	(2.10)		5.22	(3.74)	
Bas Kasai & Kwilu-Kwango	3.21	(2.12)		5.64	(4.05)	
Kasai/Katana/Tanganyika	3.40	(2.09)		5.73	(3.87)	
Other	3.61	(1.91)		6.23	(3.94)	
Health zone of residence			**			***
Bumbu	2.94	(2.21)		4.84	(3.80)	
Kingasani	3.40	(2.11)		6.03	(4.13)	
Lemba	3.31	(2.13)		5.40	(3.85)	
Masina1	3.43	(2.11)		5.92	(4.10)	
Matete	3.02	(2.06)		4.21	(3.74)	
Ndjili	2.99	(1.89)		6.23	(3.40)	
Duration of residence in the health zone			***			**
<5 years	3.12	(2.09)		5.43	(3.93)	
5+ years	3.02	(2.10)		5.28	(3.73)	
Always	3.51	(2.02)		6.10	(3.98)	
Visitor	2.54	(2.30)		4.50	(3.93)	
No of children ever fathered						
0	3.20	(2.09)		5.58	(3.90)	
1	3.38	(2.05)		6.01	(3.97)	
2+	3.08	(2.12)		5.10	(3.99)	
Household wealth						
Low	3.15	(2.11)		5.58	(3.91)	
Middle	3.27	(2.08)		5.52	(3.94)	
High	3.25	(2.07)		5.74	(3.94)	
Employment in the past 12 months			*			**
No Work	2.87	(2.14)		4.75	(3.87)	
Work for cash only	3.24	(2.10)		5.66	(3.95)	
Work but not paid, worked for kind or cash and kind	3.44	(1.92)		6.20	(3.61)	
Duration of employment			*			*
Unemployed	3.15	(2.06)		5.35	(3.18)	
Throughout the year	3.34	(2.09)		5.90	(4.00)	
Seasonally	2.88	(2.09)		5.46	(3.92)	
Occasionally	3.21	(2.07)		5.13	(3.76)	
Dual employment						
No	3.18	(2.10)		5.52	(3.93)	
Yes	3.35	(2.05)		5.89	(3.93)	
Relative age difference						
MP younger/<5 years older	3.13	(2.08)		5.37	(3.77)	
5 - 9 years older	3.33	(2.07)		5.77	(3.93)	
10+ years older	3.14	(2.12)		5.63	(4.09)	
Normative expectations			***			***
Disagree	2.68	(2.22)		4.56	(3.87)	
Agree	3.33	(2.04)		5.82	(3.91)	

	Interactive Activities			Caregiving Responsibilities		
	Mean	(SD)		Mean	(SD)	
Descriptive norms			***			***
Less than half of them	3.08	(2.11)		5.33	(3.89)	
About half of them	3.54	(2.02)		5.96	(3.87)	
More than half of them	3.88	(1.84)		7.45	(3.83)	
Autonomous						
No	3.08	(2.05)		5.72	(3.84)	
Yes	3.28	(2.10)		5.57	(3.97)	
Personal belief about interactive activities			***			
No activity extremely appropriate	3.04	(2.21)				
1 activity extremely appropriate	2.74	(1.76)				
2 or more activities extremely appropriate	4.11	(1.46)				
Personal belief about caregiving activities						***
No activity extremely appropriate				5.33	(4.34)	
1 activity extremely appropriate				5.00	(3.61)	
2 or more activities extremely appropriate				6.44	(3.14)	
Perceived community belief about interactive activities			***			
No activity extremely appropriate	3.01	(2.17)				
1 activity extremely appropriate	3.47	(1.75)				
2 or more activities extremely appropriate	4.29	(1.35)				
Perceived community belief about caregiving activities						***
No activity extremely appropriate				5.28	(4.22)	
1 activity extremely appropriate				5.42	(3.75)	
2 or more activities extremely appropriate				6.48	(3.15)	
Past-year intimate partner violence perpetuation†						
No	3.55	(2.07)		5.61	(3.92)	
Yes	3.37	(2.07)		5.93	(3.95)	
Total	3.28	(2.07)		5.74	(3.93)	
Rho (p)	*Rho (p)*			*Rho (p)*		
Relationship satisfaction	0.121	***		0.141	***	
Gender-equitable attitudes	-0.064	**		-0.034		
Perceived self-efficacy	0.112	***		0.092	***	
Injunctive index	0.067	**		0.045		
Involvement in antenatal care and birth preparedness activities	-0.125	***		-0.030		
Involvement in pregnancy decision making	0.027			0.054	*	
N	1,674			1,674		

Note: max – maximum value; SD - Standard deviation

† Only men who had privacy during the interview were asked IPV questions (N=1,461)

***<0.001; ** <0.01; *<0.05

Multivariate analysis results

To answer the first two research questions, multiple linear regressions were conducted for interactive and caregiving responsibility activities. Table 18 reports the regression results for the main exploratory variables of interest after controlling for socio-demographic characteristics and Appendix IX shows the full regression results which includes the socio-demographic characteristics.

What factors are associated with a male partner's willingness to be involved in routine childcare activities?

The findings indicated that normative expectations were significantly associated with willingness. For the male partner who believed that most people important to him thought he ought to perform activities compared to those who did not, there was a 0.38 unit and 1.02 unit increase in his willingness to participate in interactive and caregiving activities, respectively. Confirming one hypothesis (C), there was a positive and significant association between the belief that more than half of the fathers in the community performed routine childcare activities and the male partner's willingness to be involved in routine childcare (interactive: [β=0.49, $p < 0.01$]; caregiving: [β=1.34, $p < 0.001$]). For both forms of childcare, male partner's willingness was positively and significantly associated with past-year intimate partner violence perpetration, involvement in shared pregnancy decision making, relationship satisfaction and perceived self-efficacy. As male partners involvement in the number of antenatal care/birth preparedness activities increased, their willingness decreased, and this negative association was significant for both interactive and caregiving activities (interactive: [β=-0.17, $p < 0.001$]; caregiving: [β=-0.14, $p < 0.01$]). Autonomy and gender-equitable attitudes did not show significant associations.

Personal belief of the extreme appropriateness of two or more interactive activities was positively associated with willingness (β=0.61, $p < 0.001$). The same association was observed for perceived community belief of the extreme appropriateness one or more interactive activities. Compared to male partners who believed none of the interactive activities were extremely appropriate, those who believed

Table 18: Results of regression models of male partner's willingness to participate in interactive activities and caregiving responsibilities, Kinshasa 2018

	Interactive Activities						Caregiving Responsibilities					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Normative expectations												
Disagree	[REF]			[REF]			[REF]			[REF]		
Agree	0.380*	0.149	[0.087, 0.673]	0.391**	0.148	[0.100, 0.681]	1.018***	0.290	[0.450, 1.587]	1.040***	0.288	[0.475, 1.605]
Descriptive norms												
Less than half of them	[REF]			[REF]			[REF]			[REF]		
About half of them	0.245	0.146	[-0.041, 0.530]	0.276	0.145	[-0.008, 0.559]	0.502	0.283	[-0.053, 1.056]	0.557*	0.281	[0.006, 1.109]
More than half of them	0.485**	0.179	[0.136, 0.833]	0.474*	0.176	[0.128, 0.820]	1.344***	0.345	[0.668, 2.020]	1.335***	0.343	[0.663, 2.007]
Autonomous												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.036	0.120	[-0.198, 0.271]	0.057	0.119	[-0.176, 0.291]	-0.300	0.232	[-0.755, 0.156]	-0.276	0.232	[-0.731, 0.179]
Personal belief: interactive activities												
No activity extremely appropriate	[REF]			[REF]								
1 activity extremely appropriate	-0.370	0.188	[-0.738, -0.002]	-0.393*	0.186	[-0.757, -0.028]						
≥ 2 activities extremely appropriate	0.607***	0.172	[0.270, 0.943]	0.635***	0.170	[0.302, 0.969]						
Personal belief: caregiving activities												
No activity extremely appropriate							[REF]			[REF]		
1 activity extremely appropriate							-0.467	0.308	[-1.071, 0.137]	-0.389	0.307	[-0.991, 0.213]
≥ 2 activities extremely appropriate							0.482	0.311	[-0.128, 1.091]	0.482	0.309	[-0.123, 1.088]
Community belief: interactive activities												
No activity extremely appropriate	[REF]			[REF]								
1 activity extremely appropriate	0.425*	0.199	[0.034, 0.816]	0.409*	0.198	[0.021, 0.797]						
≥ 2 activities extremely appropriate	0.849***	0.195	[0.468, 1.231]	0.866***	0.193	[0.487, 1.244]						
Community belief: caregiving activities												
No activity extremely appropriate							[REF]			[REF]		
1 activity extremely appropriate							-0.012	0.300	[-0.600, 0.576]	-0.024	0.298	[-0.609, 0.561]
≥ 2 activities extremely appropriate							0.745*	0.325	[0.108, 1.382]	0.776*	0.323	[0.143, 1.410]
Past-year IPV perpetuation‡												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.315**	0.110	[0.099, 0.531]	0.319**	0.109	[0.105, 0.533]	0.703**	0.213	[0.285, 1.122]	0.710***	0.212	[0.294, 1.125]
Injunctive index	0.047	0.023	[0.002, 0.093]	0.041	0.023	[-0.004, 0.087]	0.061	0.045	[-0.028, 0.150]	0.050	0.045	[-0.038, 0.138]
Involvement in ANC and BP activities	-0.170***	0.023	[-0.215, -0.125]	-0.170***	0.023	[-0.215, -0.125]	-0.144**	0.045	[-0.232, -0.056]	-0.142**	0.045	[-0.230, -0.055]
Involvement in shared preg. decisions	0.135**	0.048	[0.040, 0.229]	0.132**	0.048	[0.038, 0.225]	0.320***	0.093	[0.138, 0.503]	0.318***	0.093	[0.136, 0.499]
Relationship satisfaction	0.035**	0.011	[0.014, 0.056]	0.033**	0.011	[0.012, 0.054]	0.097***	0.021	[0.057, 0.138]	0.095***	0.021	[0.054, 0.135]
Gender-equitable attitude	0.012	0.012	[-0.011, 0.036]	-0.030	0.020	[-0.069, 0.009]	0.026	0.023	[-0.019, 0.071]	-0.059	0.039	[-0.135, 0.016]
Perceived self-efficacy	0.066***	0.013	[0.042, 0.091]	0.119***	0.020	[0.081, 0.158]	0.103***	0.025	[0.055, 0.151]	0.178***	0.038	[0.102, 0.253]
Interaction terms												
Age group x gender-equitable attitude				0.063**	0.024	[0.017, 0.109]				0.126**	0.046	[0.036, 0.216]
Age group x self-efficacy				-0.082***	0.024	[-0.128, -0.036]				-0.115**	0.046	[-0.206, -0.025]
Constant	-2.644***	0.655	[-3.929, -1.359]	--3.458**	0.940	[-5.303, -1.613]	-4.867***	1.323	[-8.403, -3.367]	-6.507***	1.852	[-10.139, -2.875]
Observations	1,461			1,461			1,461			1,461		
adjusted R-squared	0.195			0.210			0.162			0.173		
VIF	1.26						1.26					

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; BP - birth preparedness; preg. - pregnancy; SE- Standard Error; CI - confidence interval; IPV - intimate partner violence; ref- reference group

Regression models control for background variables including age, level of education, marital status, ethnicity, health zone of residence, duration of residence in the health zone, number of children fathered, household wealth, employment in the past 12 months, duration of employment, employment by both partners, and the relative age difference between the male partner and the first-time mother.

***<0.001; ** <0.01; *<0.05

one activity as extremely appropriate had a 0.43 unit increase in willingness and about twice as much was observed for those who believed two or more activities were extremely appropriate (1 activity: [β=0.43, $p < 0.05$]; ≥ 2: [β=0.85, $p < 0.001$]). In contrast, for caregiving responsibility, personal belief was not significantly associated with willingness and only perceived community belief that two or more activities were extremely appropriate was associated. For the latter belief, a 0.75 unit increase in willingness was observed (β=0.75, $p < 0.05$).

Appendix IX shows that several socio-demographic characteristics controlled for were significantly associated with willingness. Male partners who were ever married, completed their secondary education, and belonged to the other ethnicity group were more willing to participate in interactive activities compared to those in the reference groups. Being employed in the past 12 months regardless of the type of income, residing in Kingasani, Lemba, Masina 1, and Ndjili, and always residing in the health zone were positively and significantly associated with willingness to participate in both interactive and caregiving activities. A negative and significant association was observed for duration of employment. Compared to unemployed male partners, those who were employed throughout the year, seasonally and occasionally were less willing to participate in interactive activities, while for caregiving activities, male partners who were seasonally and occasionally employed than unemployed were less willing to participate in activities.

To what extent does a male partners' age moderate the association between gender-equitable attitudes or self-efficacy and his willingness to be involved in routine childcare activities?

The second research question questioned was answered by introducing two interaction terms into the regression model. For each type of routine childcare activity, the tests of joint significance of the interaction terms were significant (p=0.000 for both outcomes).

Age was a significant moderator in the relationship between gender-equitable attitudes and willingness (Table 18). In line with the hypothesis (D), for each unit increase in gender-equitable attitude,

the probability of willingness of older male partners to participate in interactive and caregiving activities increased by 6 and 13 percentage points compared to the younger male partners (interactive: [average marginal effect (AME)=0.06, p=0.01]; caregiving: [AME=0.13, p=0.01]; Table 19). Further analysis revealed a negative relationship between gender-equitable attitude and willingness to participate in interactive and caregiving activities for younger male partners, however neither were statistically significant (interactive: [AME=-0.04, p=0.06]; caregiving: [AME= -0.07, p=0.07]). Among older male partners, the inverse was observed such that male partners willingness increased with increasing gender-equitable attitude. Their probability of willingness to be involved in caregiving activities increased significantly by six percentage points for each unit increase in gender-equitable attitude (AME=0.06, p=0.04), but for interactive activities the increment was not significant (AME=0.02, p=0.11]). Graphical representations of these findings are displayed in Figures 4A and 5A.

Table 19: Average marginal effects of age in the relationship between gender-equitable attitudes, self-efficacy, and willingness to be involved in interactive and caregiving activities, Kinshasa 2018

	Interactive Activities				Caregiving Responsibilities			
	Average Marginal Effect				Average Marginal Effect			
Moderators	Each Level	p-value	Relative to Reference	p-value	Each Level	p-value	Relative to Reference	p-value
Age x Gender-equitable attitude								
15-24 years	-0.039	0.056	[REF]		-0.070	0.074	[REF]	
25+ years	0.022	0.112	0.061	0.011	0.058	0.036	0.128	0.006
Age x Self-efficacy								
15-24 years	0.110	0.000	[REF]		0.173	0.000	[REF]	
25+ years	0.038	0.012	-0.072	0.003	0.056	0.059	-0.117	0.013

Note: REF: reference group

Table 18 also shows that age significantly moderated the relationship between self-efficacy and willingness, however the findings were contrary to what was expected. The positive association was three times higher among younger than older male partners for interactive (15-24: [AME=0.11, p=0.00]; 25+: [AME=0.04, p=0.01]; Table 19) and caregiving activities (15-24: [AME=0.17, p=0.00]; 25+: [AME=0.06,

p=0.01]). Similar to these findings, Figures 8B and 9B also suggest that the positive effect of self-efficacy on willingness was greatest for younger male partners than older male partners.

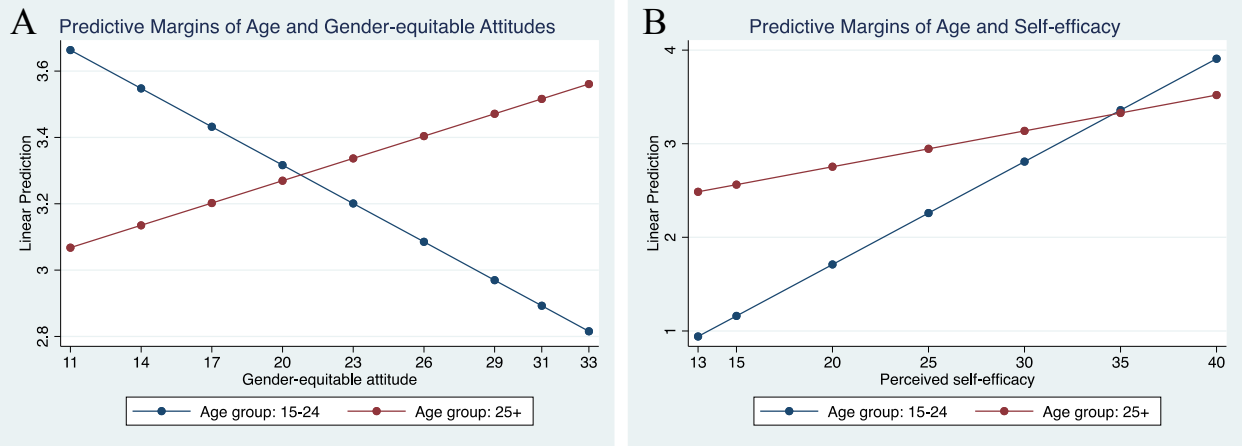

Figure 8: Plots of the predicted margins of the moderator, age, in the relationship between gender-equitable attitude, self-efficacy, and willingness to be involved in interactive childcare activities (A: gender-equitable attitude; B: self-efficacy).

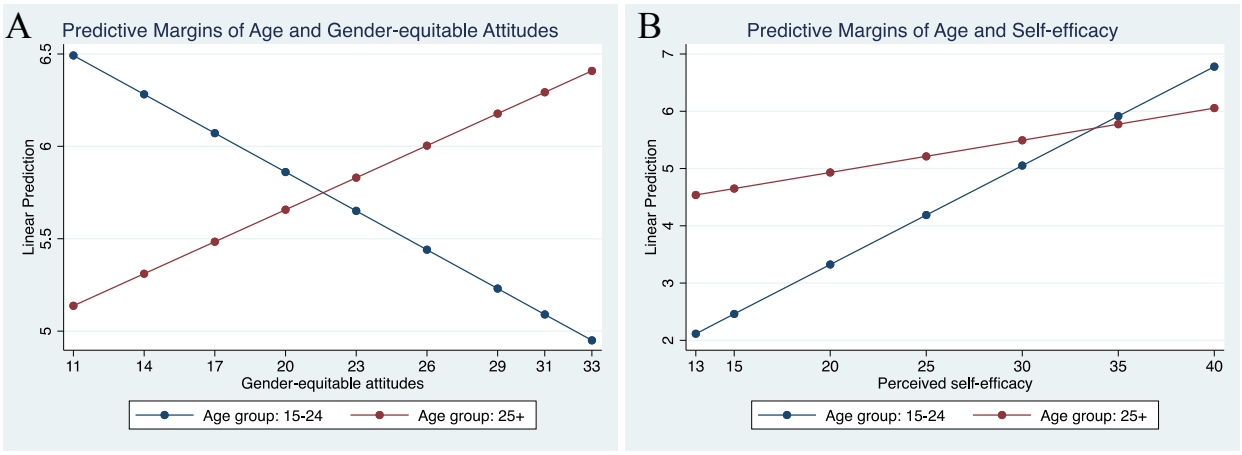

Figure 9: Plots of the predicted margins of the moderator, age, in the relationship between gender-equitable attitude, self-efficacy, and willingness to be involved in caregiving responsibility activities (A: gender-equitable attitude; B: self-efficacy).

Mediation analysis results

To what extent do equitable attitudes towards gender norms or self-efficacy mediate the association between educational level and a male partners' willingness to be involved in routine childcare activities? To what extent does this vary with the male partner's age?

In order to answer the third research question and test hypothesis E and F, mediation was assessed using path analysis and a bootstrapping method. Table 20 and Figure 10 present the estimated standardized parameters (see Appendix X for unstandardized results). The models' goodness of fit indices were not assessed because the models were just-identified. Therefore, there was only one unique solution for each model and the goodness of fit statistics would not be informative.

Self-efficacy as a mediator

As Table 20 and Figure 10 show, the direct effect between education and willingness was significant for both interactive (Standardized (std.) β=0.06, $p < 0.05$) and caregiving activities (std. β=0.053, $p < 0.05$). A significant effect was also found for the association between the mediator, self-efficacy, and education (interactive [std. β=0.13, $p < 0.001$]; caregiving: [std. β=0.13, $p < 0.001$]), as well as the association between the mediator and willingness (interactive [std. β=0.10, $p < 0.001$]; caregiving: [std. β=0.09, $p < 0.01$]). The significance of all three associations confirms hypothesis F and indicates that self-efficacy partially mediates the relationship between education and wellnesses to be involved in interactive and caregiving activities. The results suggest for willingness to participate in interactive activities about a fifth of the total effect of education is mediated by self-efficacy and for caregiving activities, about 17% of the total effect is mediated by self-efficacy.

Further analysis involving the age stratification of the analysis found that among male partners age 15-24, self-efficacy fully mediated the effect of education on willingness and accounted for the total effect (Appendix X). No mediation effect was found among the older male partners.

Gender-equitable attitude as a mediator

Gender-equitable attitudes was a significant mediator in the relationship between education and willingness to participate in interactive activities. This significant mediated effect was smaller than what was found for self-efficacy, and 11% of the total effect of education on willingness to participate in interactive activities was attributed to gender-equitable attitudes. For caregiving activities, the association between gender-equitable attitude and willingness was not significant (std. β=0.-0.04, $p > 0.05$), thus the mediation effect was not significant. Similarly, no mediation was found in the age stratification analysis (Appendix X).

Table 20: Mediation analysis results, Kinshasa 2018

	Interactive Activities				Caregiving Responsibilities			
IV: EDUCATION	Std. Beta		SE	95% CI	Std. Beta		SE	95% CI
Mediator: Self-efficacy								
a-path: IV to MV	0.131	***	0.024	[0.084, 0.178]	0.131	***	0.024	[0.084, 0.178]
b-path: MV to Outcome	0.104	***	0.024	[0.056, 0.152]	0.085	**	0.024	[0.037, 0.133]
Direct Effect	0.058	*	0.024	[0.010, 0.106]	0.053	*	0.024	[0.005, 0.101]
Indirect Effect	0.014	**	0.004	[0.006, 0.022]	0.011	**	0.004	[0.004, 0.019]
Proportion of total effect mediated	19%				17%			
Mediator: Gender-equitable attitude								
a-path: IV to MV	0.107	***	0.024	[0.060, 0.154]	0.107	***	0.024	[0.060, 0.154]
b-path: MV to Outcome	-0.073	**	0.024	[-0.121, -0.025]	-0.041		0.024	[-0.089, 0.007]
Direct Effect	0.080	**	0.024	[0.0312, 0.127]	0.069	**	0.024	[0.021, 0.117]
Indirect Effect	-0.008	*	0.003	[-0.015, -0.002]	-0.004		0.003	[-0.011, 0.001]
Proportion of total effect mediated	11%				N/A			

Note: CI - confidence interval; IV - independent variable; MV- mediating variable; Std. - Standardized coefficient; SE- Standard Error
***<0.001; ** <0.01; *<0.05

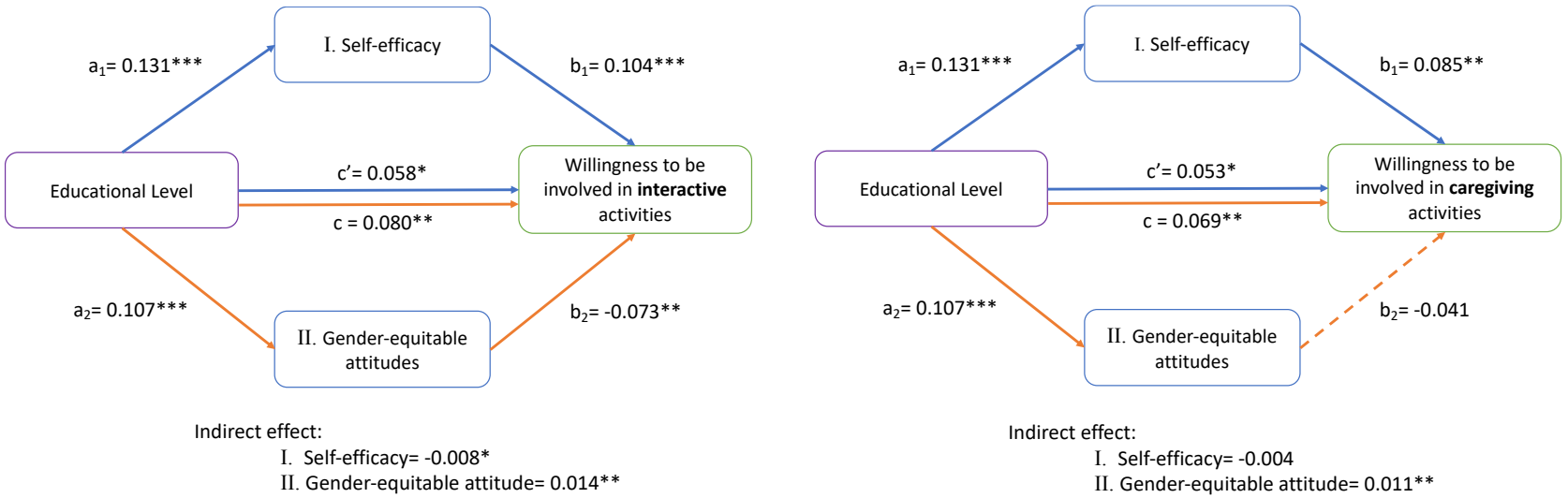

Figure 10: Mediation model for self-efficacy and gender-equitable attitudes as mediators in the relationship between education and willingness to be involved in routine childcare activities.

*Note: Mediators I and II were explored separately and dashed lines between constructs indicate that effects were not statistically significant. The indirect effect was calculated using the formula: (a_1 * b_1 and a_2 * b_2). Standardized coefficients are presented in the models. ***<0.001; ** <0.01; *<0.05*

Discussion

The purpose of this study was to identify the patterns of male partner's willingness to be involved in routine childcare, determine the predictors of willingness, and examine potential moderating and mediating effects. Findings suggest that over three-fourths male partners were extremely willing to participate in one activity, however, willingness to participate in all activities varied depending on the type of activity. About half of the male partners were extremely willing to participate in all interactive activities but under one-fifth were extremely willing to participate in all caregiving activities.

Although this study did not measure actual involvement, studies measuring involvement found fathers were more engaged in interactive childcare and less in caregiving responsibilities.[192,206,207] For instance, In Taiwan and Thailand, researchers found that fathers had higher mean scores in engagement tasks (e.g., playing with infant) compared to caregiving tasks (e.g., feeding infants).[206] Cabrera and colleagues[208] suggest that fathers were more engaged in play, goal-oriented, and physically stimulating tasks with their children. Another study in Rwanda reported that male participation in childcare and household tasks were low with men participating in an average of 1.8 out of 5 tasks.[47] Contrary to the study's findings, the MICs found low involvement childcare activities which included some interactive activities measured in this study.[209] Only 7% of fathers were engaged in four or more activities that promoted early stimulation and responsive care in the DRC and this low engagement was also observed in neighboring countries including Rwanda (2%), Burundi (3%), Congo (6%), Uganda (3%) and Central African Republic (6%).[209] The difference could be because the MICs' focus was on infants age 24-59 months, while for this study infants were under 12 months. Evidence suggests that father involvement varies over the age of the infant. Engagement is higher when infants are three to 20 months[210] and as the child gets older, one study found that involvement reduced.[211] This could explain the lower involvement with an older age group of infants.

Predictors of willingness to be involved in interactive and caregiving activities included involvement in shared decisions about pregnancy, relationship satisfaction and perceived self-efficacy. These findings from the multiple regression are consistent with previous studies.[106,184,192,210,212,213] Two of the three measures of perceived norms (normative expectations and descriptive norms) were significantly associated with willingness to be involved in both activities. Fathers can be influenced by their surroundings, people important to them and the context in which they live. This in turn can influence their willingness to be involved. This finding is consistent with social norm theories[110,124] and literature from other fields that have found that positive normative expectation resulted in assumption of care roles[214] and strong descriptive norms impact behavior.[122] Additionally, stronger beliefs about childcare were positively associated with willingness to participate in interactive activities, while for caregiving, perceived community belief was the only significant predictor. Jacobs and Kelly[215] suggest that fathers' beliefs about fathering significantly predicted fathers' engagement, accessibility, responsibility, and the percentage of time fathers engaged as primary caregivers. Although their findings are similar to this study's findings, the Jacobs and Kelly study measure did not distinguish between personal belief and perceived community belief. This study highlights the differential effect that personal and community beliefs have on willingness depending on the form of childcare.

Unlike previous studies[192], the results also suggest that past-year intimate partner violence perpetrators were more willing to be involved. Perpetrators could possibly be more willing to be involved to exert power and control over the FTM, thereby limiting the FTM's need for reliance on others, as well as isolating them from their family members and friends. To fully understand this result, future research should examine male partner's controlling behavior as it pertains to willingness to be involved in childcare. For both forms of childcare, interestingly, men who were involved in antenatal care/birth planning were less willing to be involved in childcare. This contradicts previous studies that found that men involved during pregnancy were more likely to continue to be involved later in the child's life.[101,170] A male partner's

experience during pregnancy could potentially influence their involvement in childcare. It is plausible that the reinforcement of norms that suggests pregnancy is a woman's domain and settings that are not inclusive of men may affect men's willingness to be involved. The inability to "fit" into the woman's domain may cause the male partners to avoid such environments or activities.[216,217] Paternal involvement and prenatal spaces may not be a good "fit" with their social identities. Further research is needed to understand a male partner's satisfaction with his involvement during pregnancy as well as environmental factors (e.g., welcoming health facility for fathers, sanctions and rewards, women's perception of partner involvement) that influence willingness to be involved.

Consistent with previous studies, several of the socio-demographic characteristics were significant for both types of childcare activities including always residing in the health zone, and residing in Kingasani, Lemba, Masina 1, and Ndjili. For interactive activities, positive associations were also found for male partners with secondary education, who were ever married and who belonged to the other ethnic groups. Being employed in the past 12 months was positively associated with willingness, however the duration of employment was negatively associated and did not show a pattern with increasing time spent working. Research on postnatal involvement indicates that greater human capital is associated with greater paternal involvement[192], and other evidence suggests that men who spent more time at work were less involved in caring for young children.[218] One study found that long working hours did not adversely affect involvement because a subset of new fathers in the sample had high levels of involvement.[219] It is unclear if the differences in the observed associations with employment are because the fathers were less motivated, were discouraged from participating as a form of maternal gatekeeping, or because of their employment, they were able to afford adequate support.

The analysis also examined and confirmed that age moderated the effect of self-efficacy and gender-equitable attitude on willingness. For gender-equitable attitude, the positive association was amplified among the older male partners as expected. Older fathers tend to be more involved with their

children[58,62], and this compounded with their positive attitude towards gender roles could improve their willingness to be involved. On the other hand, age had an inverse effect on self-efficacy, with older male partners experiencing a less positive effect than their younger counterparts. This finding suggests that self-efficacy was more important for younger male partners' willingness to be involved in childcare and they may be more reliant on their perceived ability to perform a behavior when deciding their parental involvement intention. This finding should be interpretated with caution because this study used the generalized self-efficacy scale, and the use of a more specialized scale such as the parental self-efficacy scale may provide a better insight on the role of self-efficacy.

Finally, the study explored the mediating effect of self-efficacy and gender-equitable attitude on the relationship between education and willingness. Self-efficacy partially mediated the effect of education on willingness for both forms of childcare, and the effect of education reduced after the inclusion of self-efficacy. According to Zhao et al.,[220] the partial mediation effect observed is an example of complementary mediation. For gender-equitable attitudes, partial mediation, specifically competitive mediation, was seen for interactive activities and the inclusion of the mediator increased the effect of education on willingness to be involved in interactive activities. Both forms of mediation indicate that there may be omitted mediators in the model which coexist with the mediator[220], nevertheless, the findings support previous research that suggest intrapersonal factors mediate parental behaviors.[105,197] In the age stratification analysis, full mediation was observed among younger male partners for the effect of self-efficacy on both forms for willingness. This suggested that the education had no effect on willingness, but rather the male partner's self-efficacy explained the relationship observed. No mediation was observed among the older male partners.

Program implications

The decision of fathers to participate in interactive and caregiving activities is an intricate process influenced by several factors. Likewise, father's willingness or intention to be involved is impacted by multiple factors and addressing these factors can ultimately improve the likelihood he participates in childcare. As noted at the beginning of the discussion section and in the results section, the study provides evidence that relationship satisfaction, shared decision making about pregnancy, self-efficacy, positive beliefs regarding paternal involvement and social norms encouraging paternal involvement are associated with willingness to participate in interactive activities and caregiving responsibilities. When designing strategies, programs should aim to address several of these factors.

To address descriptive norms, programs can adopt messaging that depicts fathers in various aspects of childcare as well as activities that are perceived as a woman's domain are needed. These messages can include peer role models and other influential people within the community of interest. In developing messaging, programs should be weary of just providing information/statistics on messaging. Although the evidence is not consistent[221–223], some studies suggest there is a boomerang effect where people who adopt healthy behaviors as a result of the messages sometimes regress and develop undesirable behaviors. One explanation is that there may not be enough support within the community to ensure long term adaptation of the behavior. Based on this, programs should also incorporate multiple strategies that address people's individual attitudes, local policies, community norms and the any environmental support which may help maintain the behavior.

Including key influencers and peers in intervention strategies can help address the normative expectations because male partners will see these important people to them approving of childcare and participating in childcare. It could encourage the male partner to question and challenge his perceived belief and ultimately allow him to change his viewpoint. Community-based interventions such as community dialogue have also been found to be effective in achieving behavioral change.[224,225] Such

interventions can be used to address norms at the individual as well as the family and community level thereby making the environment more conducive for male involvement in childcare. Together with the aforementioned strategies, educational content on the importance of gender-equity and paternal involvement should be included in programs to improve the male partner's knowledge and develop more supportive attitudes and beliefs about paternal involvement. Additionally, particular attention should be made to improve gender-equitable attitudes among young male partners as the results show they have lower gender-equitable attitudes.

While the study shows that greater self-efficacy increases willingness, it also suggests this positive effect is higher among the younger population and in the mediation analysis, self-efficacy mediated the total effect of education on willingness among younger male partners. These findings emphasize the role self-efficacy plays in decisions to be involved, thus programs should increase male partners self-efficacy through educational programs about responsible fathering. A meta-analysis on the effectiveness of responsible fatherhood educational programs found that they produced small but statistically significant effects for parenting and co-parenting.[226] In addition to increasing knowledge, interventions should be longer than 10 weeks[227] and should provide male partners with the skills related to infant care. Longer programs have been shown to produce more significant improvements in self-efficacy and moreover, self-efficacy interventions may be protective against the detrimental effects of fatigue and psychological distress that men may experience[227], especially in places that don't support paternal involvement. Programs should also tailor their strategies to the age group of their audience.

Shared decision making can be improved by offering training in communication and problem-solving skills. Nunes and colleagues[228] in a meta-analysis found that programs had a larger positive effect in co-parenting programs when these two strategies were used compared to programs addressing knowledge and motivation. Improving the male partner's ability to make decisions with their partner can also affect their relationship satisfaction. The study also found that male who were more involved during

antenatal care/birth planning were less involvement. Although, earlier in the discussion it was suggested that further research was needed to understand how environmental factors influence their involvement, programs can still implement strategies that encourage long term paternal involvement. One example is ensuring that the establishments of practices at health facilities to make it more male friendly, and training of service providers and community health workers with appropriate knowledge and skills to accommodate men during childcare.

Strengths and limitations

The study builds on the existing studies of paternal involvement in childcare and contribute to the literature on this topic, especially within sub-Saharan Africa where the is a limited number of studies. It also explores gender-equitable attitude and various aspects of social norms, which have been identified as major determinants in a male partners' willingness or participation in routine childcare. Despite the strengths, this study had several limitations. The analysis used self-reported data and thus there is a possibility that men may overestimate their willingness to be involved in routine childcare. This may result in social desirability bias in understanding a male partner's willingness to be involved in childcare.

Another limitation stems from the cross-sectional nature of the data, which will not allow for a causal interpretation of any observed associations. The use of secondary data also limits the availability of ideal variables for measurement and examination of desired features and associations. This can lead to residual confounding due to variables not included in analyses. Some of these omitted variables have been found to be associated with paternal involvement in caregiving. For example, Fagan et al.[229] found that paternal involvement is influenced by social support (support from family and friends), but this variable was not measured in the study. Other studies found that knowledge of importance of paternal involvement, timing or wantedness of pregnancy, cohabiting status (resident or non-resident), relationship with parents or satisfaction with the experience of being fathered were associated with participation in caregiving.[170,230–

[232] The absence of these variables from the questionnaire will not allow for the operationalization of these concepts.

According to Bicchieri, sanctions maintain social norms. The study measures various aspects measuring perceived norms; however, there was no measure of the sanctions that male partners believe they may face in routine childcare. Additionally, while this study focuses on the perceived norm about paternal involvement, it is possible that these norms may be misperceived. Thus, the perceived norms may be inaccurate such that they may over or underestimate the prevalence and approval of paternal involvement. Yet, these misperceptions may influence behavior thus it's important to understand its influence on behavior.

The outcome variable does not account for the financial participation of the father; therefore, it limits our understanding of paternal involvement. Lastly, it is important to note that the study only focuses on factors that affect involvement from the perspective of male partners and does not account for mother factors, institutional factors or policies that may influence paternal involvement in routine childcare.

Conclusion

Increasing recognition of the importance of paternal involvement in childcare and the lack of research within the DRC provided motivation for this research. The study addressed the research gap in the DRC by exploring the patterns of willingness to be involved in childcare, predictors of willingness, the moderating effect of age and effect of potential mediators. Understanding the male partner's willingness prior to birth of the child can inform their actual involvement. Findings indicate that willingness varies depending on the type of childcare and relationship satisfaction, shared decision making, self-efficacy, positive beliefs regarding paternal involvement and social norms encouraging paternal involvement are positively associated with willingness. Age moderated the effect of self-efficacy and gender-equitable attitude on willingness and the mediation analysis suggests that among the younger male partners self-

efficacy fully mediated the effect of education on willingness. Paternal involvement has tremendous benefits on the child's development and the mother's well-being, thus programs that seek to improve paternal involvement should integrate strategies that address these predictors and tailor the strategies based on the age of their audience.

APPENDICES

Appendix I: Studies measuring male involvement in sub-Saharan Africa

Table A1: Studies measuring male involvement during pregnancy and in childcare in sub-Saharan Africa

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
Pregnancy									
(Farquhar et al., 2004)	2004	Kenya	Yes	15.0%	ANC-VCT	Program data and male partners	Cohort study	1,991	15% male partners participated in VCT, of whom 38% received couple counselling.
(Msuya et al., 2008)	2008	Tanzania	Yes	12.5% 40.0%	ANC-VCT Postnatal care	Program data, male partners, wives/female partners	Study nested within a cohort study	184	12.5% and 40% of men attended ANC-VCT services during prenatal care and postnatal care respectively.
(Katz et al., 2009)	2009	Kenya	Yes	16.0%	ANC	Wives/female partners	pre and post study design (one group)	1,993	Of 1,993 women who invited their partner, 313 (16%) returned with their partners to ANC.
(Olayemi et al., 2009)	2009	Nigeria	No	44.4% 63.9%	ANC Delivery	Wives/female partners	Cross-sectional survey	462	- 44% of partners accompanied their wives to ANC - 73% of male partners accompanied their wives to the hospital for their last delivery, but only 63.9% were present at last delivery - 86% helped with household chores during pregnancy
(Aarnio et al., 2009)	2009	Malawi	Yes	8.6%	ANC	Male partners	Cross-sectional survey	388	8.6% had ever accompanied wife to antenatal care services and 1.1% had ever attended any HIV-related services in ANC
(Theuring et al., 2010)	2010	Tanzania	Yes	61.0%	ANC/PMTCT	Providers	Qualitative	100	61% of providers reported that male partners attended ANC/PMTCT services in their health services.
(Byamugisha et al., 2010) ***Index Measure***	2010	Uganda	Yes	26.0%	ANC (index measure)	Male partners	Cross-sectional survey	388	26% of men whose wives were attending ANC at Mbale Regional Referral hospital reported to have high male involvement according to the index. A total score of 4-6 was considered as a 'high' male involvement score and 0-3 as 'low'. <u>Individual components of score</u> - 5% of men accompanied their wives to ANC - 55% of men knew ANC appointments - 97% of men provided financial support to partner to attend ANC - 30% of men discussed with partner information/interventions given at ANC - 39% of men asked partner if he could use a condom - 27% of men took their time to find out what goes on in ANC

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
(Iliyasu et al., 2010)	2010	Nigeria	No	32.1%	Maternity care (ANC, delivery or postnatal care)	Male partners	Cross-sectional survey	389	32.1% of male were involved in maternity care <u>Antenatal care</u> - 15.5% gave permission, 77.1% provided money for transportation/medication, 13% accompanied their partner for routine ANC <u>Delivery</u> - 6.2% gave permission, 71.4% provided money for transportation and medication, 18.7% accompanied their partner to the hospital <u>Postnatal care</u> - 6.3% gave permission, 80.4% provided money for transportation/medication, 12% accompanied their partner for postnatal care
(Tweheyo et al., 2010)	2010	Uganda	No	65.4	ANC	Male partners	Cross-sectional survey	331	65% of male partners attended at least one skilled ANC visit. 60.5% attended no more than two ANC visits.
(Byamugisha et al., 2011)	2011	Uganda	Yes	16.0%	ANC	Wives/female partners	Randomized facility-based intervention trial	600	16% of men in the intervention group attended ANC, while 14% in the non-intervention groups attended. The intervention group received an invitation letter and an information leaflet to increase couple attendance. Increase by 10% from baseline.
(Ditekemena et al., 2011)	2011	DRC	Yes	22% (2% pre intervention)	VCT	Male partners	Randomized controlled trial (3 arm)	2,706	- prior to the intervention male involvement in PMTCT activities was 2% in Kingasani. - male partner participation in VCT in bars, health facilities and church was 26%, 18% and 21% respectively
(Aluisio et al., 2011)	2011	Kenya	Yes	31.0%	ANC	Program data, male partners, wives/female partners	Cohort study	456	31% women were accompanied by their male partners
(Haile & Brhan, 2014)	2014	Ethiopia	Yes	20.0%	ANC/PMTCT	Wives/female partners	Cross-sectional survey	473	20% were accompanied by their male partner to ANC/PMTCT service
(Nyondo et al., 2015)	2015	Malawi	Yes	23.6%	ANC	Wives/female partners	Randomized controlled trial	462	23.6% attended with their partners during the next visit. In the intervention group 28.6% attended ANC with their partner while in the control group 19% reported with their male partner
(Kashitala et al., 2015)	2015	Zambia	Yes	11.0%	ANC	Health facility data	Retrospective cohort study	2,007	- 11% of women were accompanied by a male partner during ANC visits and of these women, 40% delivered at the health facility. While of the women who were not accompanied by their partner, only 30.3% delivered at a health facility (OR 1.53 CI 1.15-2.03) - Of the women who attended ANC with their partner, 48.2% returned for a postnatal visit while, for those who were not only 37% returned for a postnatal visit (OR 1.58 CI 1.2-2.1)

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
(August et al., 2016) ***Index Measure***	2016	Tanzania	No	39.20%	Maternity care (index measure)	Male partners	Quasi-experimental pre-posttest design	Baseline Int-725; control-701 Endline Int - 653; control-658	Intervention results Improvement in male involvement score by 42% from baseline to endline (39% -> 81%) - 20% increase in escorting wives to ANC (52% -> 72%) - 34% increase in escorting wives to delivery (47% -> 81%) - 40% increase in shared decision-making for delivery (47% -> 87%) - 28% increase in knowledge of at least 3 danger signs in each stage of pregnancy (2.5% -> 16.5%) - 23% increase in three or more birth preparedness/ complication readiness actions (22% -> 45%)
(Audet et al., 2016)	2016	Mozambique	Yes	34% (5% pre intervention)	ANC (first visit)	Health facility data	Pre and post study design (one group)	5,971	Pre intervention vs post intervention - 5% vs 34% male partners were present at the first ANC visit ; and 10% vs 37% were present at any ANC visit - 8% vs 34% male partners attended and had an HIV test, 1% vs 3% attended but did not get tested for HIV Pre and post intervention combined - 26% of male partners were present at the first ANC visit and 30% were present at any ANC visit - 27% of male partners attended and had an HIV test, 3% attended but did not get tested for HIV
(Demissie, 2016)	2016	Ethiopia	No	59.9% 50.8%	ANC BP/CR	Male partners	Cross-sectional survey	374	Antenatal care - 59.9% accompanied wife to ANC - 42.5% involved in PMTCT with his wife - 49.2% helped wife in domestic household tasks - 34% made joint decisions about health facility for care Birth readiness and complication readiness - 62.8% saved money for emergency - 54.3% arranged skilled birth attendant for delivery - 63.6% arranged transportation for delivery - 63.9% prepared essential items for clean delivery and postpartum care - 80.5% had identified a place for delivery - 12% have identified a blood donor
(Elias et al., 2017)	2017	Tanzania	Yes	24.7%	PMTCT	Wives/female partners	Cross-sectional survey	300	24.7% of mothers reported their male partners were involved in PMTCT.
(Craymah et al., 2017)	2017	Ghana	No	35.0%, 44.0%, 20.0%	ANC, delivery, postnatal care	Male partners	Cross-sectional survey	100	35%, 44%, and 20% of men accompanied their partners to antenatal care, delivery, and postnatal care services, respectively
(Oyugi et al., 2017) ***Index Measure***	2017	Kenya	Yes	19.0%	PMTCT (index measure)	Wives/female partners	Cross-sectional survey	216	19% male partners had high male involvement (participation in 3-5 activities). Low involvement was considered as participation in 0 to 2 activities. Individual components of measure - 22% were accompanied by their partner to at least

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
									one ANC visit - 14% men took an HIV test during one of the ANC visits - 65% reported male partner was aware of ANC appointments and discussed ANC interventions with the partner - 60% male partners consulted their partner on the use of condoms and other contraception - 81% provided financial support for the woman's ANC attendance on at least one occasion
(Akama et al., 2018)	2018	Kenya	Yes	7.4%	ANC	Health facility data, Ministry of health data	pre and post study design (one group)	7,236	7.4% of male partners accompanied their partner to at least one ANC and received the comprehensive counseling services
(Doyle et al., 2018)	2018	Rwanda	No	mean - 1.82 mean - 1.84	ANC Division of childcare and household tasks (range 1 - 5)	Couple reports	Randomized controlled trial	1123 men, 1162 women	Multiple indicators of male involvement <u>Maternal Health</u> - *Baseline*: Men reported accompanying their partner to an average of 1.82 ANC visits - *Endline*: Men reported accompanying their partner to an average of 1.82 ANC visits (women reported 1.42 visits) <u>Gendered division of childcare and household tasks</u> - *Baseline*: Men reported sharing an average of 1.84 tasks (range 1 to 5) - *Endline*: Men reported sharing an average of 1.92 tasks (women reported 1.83) - *Endline*: Men reported spending an average of 1.8 hours per day on tasks (women reported 8.34 hours per day) <u>Decision making</u> - *Baseline*: 58.6% men reported that they have the final say on decisions regarding the household's income and expenses, while 42.5% reported that had the final say on how many children to have or the spacing of children. - *Endline*: 58.5% men reported that they have the final say on decisions regarding the household's income and expenses (Women reported 67.9%) - *Endline*: 40.8% men reported that had the final say on how many children to have or the spacing of children. (Women reported 41.6%)
(Aluisio et al., 2016)	2018	Kenya	Yes	26.2%	ANC	Male and female program report	Cohort study	830	26.2% men attended the ANC
(Kabanga et al., 2019)	2019	Tanzania	No	56.9%	ANC	Wives/female partners	Cross-sectional survey	174	56.9% male partners attended to the ANC services with their partners. Of which, 40.2% attended because it was a government requirement to attend.

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
(Gibore et al., 2019) ***Index Measure***	2019	Tanzania	No	20.3%	Maternity care (index measure)	Male partners	Cross-sectional survey	966	1 in 5 men were involved in different activities in maternity care (high involvement index). Participation in 3 to 4 activities was categorized as high involvement and participation in 0-2 activities was categorized as low involvement. <u>Individual components of score</u> - 1.6% accompanied partners to the health care facility during delivery - 63.4% accompanied partners to ANC - 64.1% accompanied partners to postnatal care - 77.3%, 82.2% and 82.2% had provided physical support to their partners during ANC, delivery and postnatal care, respectively. - 89%, 88% and 90.2% had planned for seeking care during ANC, delivery and postnatal care, respectively - 23.5%, 19.7% and 21% had discussed maternal health issues with their partners health care providers during ANC, delivery and postnatal care, respectively - High level of involvement in antenatal and postnatal care (53.9% and 59.3% respectively). Delivery period had lower levels of high involvement (15.8%).
(Ongolly & Bukachi, 2019)	2019	Kenya	No	55.8% 55.8% 54.4%	ANC PNC Child immunization	Male partners	Cross-sectional survey	96	Multiple binary measures of involvement - 55.8% and 55.8% of male partners accompanied their partners to ANC and postnatal care respectively during the last pregnancy - 50% joined partner in consultations during ANC and 41.5% joined their partner during postnatal care - 33.7% joined their partner in group discussions during ANC and 31.6% joined their partner during postnatal care - 72.6% helped with household chores during ANC and 70.5% did this during postnatal care - 68.4% and 68.4% provided financial support during ANC and postnatal care respectively - 23.2% and 27.4% checked on partner's and child's health physically during ANC and postnatal care - 54.4% accompanied their partner for child immunization
(Doegah, 2019)	2019	Ghana	No	43.4%	ANC	Male partners	Cross-sectional survey (DHS)	1,139	43.4% of men were present at ANC
(Hampanda et al., 2020) ***Index Measure***	2020	Kenya	Yes	mean - 2.9 mean - 3.12 mean - 1.4	PMTCT (Index measure) encouragement/reminders subscale Active participation subscale	Wives/female partners	Cross-sectional survey	180	Men participated in an average of 2.9 activities (overall scale; range 0.78 - 4.78) Mean score for encouragement/reminders - 3.2 (range 1-5) Mean score for active participation - 1.4 (range 0 - 4.66) <u>Individual Behaviors</u>

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
									Encouragement and reminders *(unless otherwise stated % refers to all the time/most of the time/more often than not)* - encouraging a facility delivery - 29% all the time, 52% most of the time/more often than not - reminders to take HIV medication - 68% - reminders to go for HIV or PMTCT care - 73% - giving transport money to go to the clinic/dispensary - 44% - reminders to give infant prophylaxis; - 69% - encouraging specific infant feeding behaviors - 62% - encouraging infant HIV testing - 70% Active Participation - attendance at health care visits during pregnancy or postpartum - 19% - collecting HIV medication for the woman or infant - less than 12% (about 10%) - help giving infant prophylaxis - 40%
Childcare									
(National Statistical Office, 2015)	2015	Malawi	No	3%	Engaged in activities promoting learning and school readiness	Mother or primary caregiver for children under 5 years	Cross-sectional survey (Multiple Indicator Survey [MICS5])	5,254	- 3% of children (age 36-59 months) with whom biological fathers engaged in four or more activities[a] that promote learning and school readiness - Mean number of activities 0.4
(Zimbabwe National Statistics Agency (ZIMSTAT), 2015)	2015	Zimbabwe	No	2.6%	Engaged in activities promoting learning and school readiness	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS5)	2,074	- 2.6% of children (age 36-59 months) with whom biological fathers engaged in four or more activities[a] that promote learning and school readiness - Mean number of activities 0.5
(Baguma et al., 2016) ***Index Measure***	2016	Uganda	No	29%	Routine child immunization (index measure)	Male partners	Cross-sectional survey	460	- 29% of fathers were highly involved in routine child immunization activities (participated in 4-5 activities) Individual components of score - 18.3% took child for routine immunization (alone) - 61.5% accompanied partner for routine child immunization - 76.1% provided financial support for child's routine immunization visits - 57.8% discussed with partner about child's immunization schedule - 42.4% participated in making decision with partner to have the child routinely immunized
(Institut national de la statistique, 2016)	2016	Mali	No	5.1%	Engaged in activities promoting learning and school readiness	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS5)	5,678	- 5.1% of children (age 36-59 months) with whom biological fathers engaged in four or more activities[a] that promote learning and school readiness - Mean number of activities 0.7
(Ministère du plan et du développment & United Nations	2017	Cote d'Ivoire	No	4.9%	Engaged in activities promoting learning and school readiness	Mother or primary caregiver	Cross-sectional survey (MICS5)	2,629	- 4.9% of children (age 36-59 months) with whom biological fathers engaged in four or more activities[a] that promote learning and school readiness

Author	Year	Country	HIV-related study?	Prevalence	Outcome	Data source	Study design	N	Male involvement prevalence (detailed findings)
Children's Fund (UNICEF), 2017)						for children under 5 years			- Mean number of activities 0.8
(National Bureau of Statistics & UNICEF, 2017)	2017	Nigeria	No	10.8%	Engaged in activities promoting learning and school readiness	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS5)	10,387	- 10.8% of children (age 36-59 months) with whom biological fathers engaged in four or more activities[a] that promote learning and school readiness - Mean number of activities 1.1
(Doyle et al., 2018)	2018	Rwanda	No	mean - 1.84	Division of childcare and household tasks (range 1 - 5)	Couple reports	Randomized controlled trial	1123 men, 1162 women	Gendered division of childcare and household tasks - *Baseline*: Men reported sharing an average of 1.84 tasks (range 1 to 5) - *Endline*: Men reported sharing an average of 1.92 tasks (women reported 1.83) - *Endline*: Men reported spending an average of 1.8 hours per day on tasks (women reported 8.34 hours per day)
(Ghana Statistical Service, 2018)	2018	Ghana	No	3.1%	Engaged children in activities promoting early stimulation and responsive care	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS6)	5,495	- 3.1% of children (age 24-59 months) with whom fathers have engaged in four or more activities[a] that promote early stimulation and responsive care - Mean number of activities 0.5
(Statistics Sierra Leone, 2018)	2018	Sierra Leone	No	4.9%	Engaged children in activities promoting early stimulation and responsive care	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS6)	7,090	- 4.9% of children (age 24-59 months) with whom fathers have engaged in four or more activities[a] that promote early stimulation and responsive care - Mean number of activities 0.5
(l'Institut National de la Statistique, 2019)	2019	DRC	No	6.7%	Engaged children in activities promoting early stimulation and responsive care	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS6)	12,815	- 6.7% of children (age 24-59 months) with whom fathers have engaged in four or more activities[a] that promote early stimulation and responsive care - Mean number of activities 0.7
(Ongolly & Bukachi, 2019)	2019	Kenya	No	54.4%	Child immunization	Male partners	Cross-sectional survey	96	- 54.4% accompanied their partner for child immunization
(ZIMSTAT & UNICEF, 2019)	2019	Zimbabwe	No	3.4%	Engaged children in activities promoting early stimulation and responsive care	Mother or primary caregiver for children under 5 years	Cross-sectional survey (MICS6)	3,754	- 3.4% of children (age 24-59 months) with whom fathers have engaged in four or more activities[a] that promote early stimulation and responsive care - Mean number of activities 0.6

NB: ANC- antenatal care; BP/CR – birth preparedness/complication readiness; DHS – demographic and health survey; DRC – Democratic Republic of Congo; Int – intervention; N- number analyzed; PNC – postnatal care

[a] Activities they participated in the last 3 days include reading books or looking at picture books, telling stories, singing songs, taking children outside the home, compound or yard, playing with children, and spending time with children naming, counting, or drawing things.

Appendix II: Summary of qualitative findings (Paper 1)

Table A2: Summary of participants perceptions of men's roles during pregnancy and in childcare

	Focus Group Participant		
Type of role	First-time Mother		Male Partner
Pregnancy			
Accessibility	Accompany to health visits	⇔	Accompany to health visits
	Accompany only to childbirth/delivery	⇔	Accompany only to childbirth/delivery
	-		Be present
Engagement	Spiritual or moral support	⇔	Spiritual or moral support
	Spousal love/affection	⇔	Spousal love/affection
	Ask questions about pregnancy	⇔	Ask questions about pregnancy
	Follow up or provide remainders about upcoming appointments	⇔	Follow up or provide remainders about upcoming appointments
	Accompany and actively participate in health visits	⇔	Accompany and actively participate in health visits
	FTM-initiated discussions		-
	In touch with doctor		-
	Give advice (general and about lifting heavy items)		-
	Engage with baby in-vitro		-
	Prepare for birth		-
Responsibility	Financial responsibility	⇔	Financial responsibility
	Assist with household chores	⇔	Assist with household chores
	Provide accommodation	⇔	Provide accommodation
	Support/take care	⇔	Support/take care
	Carry Bags		-
	Buy clay		-
Other	Recognition/ownership of pregnancy	⇔	Recognition/ownership of pregnancy
	Provide regular sex	⇔	Provide regular sex
	Remain faithful		-
	Pay wife family		-
Childcare			
Accessibility	Be present		-
Engagement	Show love and affection	⇔	Showing love and affection
	Encourage dialogue	⇔	Encouraging dialogue
	Counseling	⇔	Counseling
	Pray or provide religious guidance	⇔	Praying or religious guidance
Responsibility	Education	⇔	Education
	Provide food and clothing	⇔	Provide food and clothing
	Responsible for child's health	⇔	Responsible for child's health
	Find a job (financial responsibility)	⇔	Find a job (financial responsibility)
	Supervision	⇔	Supervision
	Take care of child (general)	⇔	Take care of child (general)
	Take child to school		-
	Help children (general)		-
	Provide toiletries		-
	-		Bathe the child
Other	Head of house	⇔	Head of house
	Protection	⇔	Protection

Note: ⇔ mentioned by both male partner and first-time mother

Table A3: Summary of the normative factors regarding childcare

	Focus Group Participant		
	First-time Mother		Male Partner
Empirical Expectations			
	Financial support	⇔	Financial support
	Take care of child's needs	⇔	Take care of child's needs
	Provide affection or love	⇔	Provide affection or love
	Accept responsibility/ownership of child	⇔	Accept responsibility/ownership of child
	-		Assist with childcare
	-		Ask questions
	Protection		-
	Name the child		-
	Organize parties or celebrations		-
Normative expectations			
	Financial support	⇔	Financial support
	Education	⇔	Education
	Take care of child's needs	⇔	Take care of child's needs
	Accept responsibilities	⇔	Accept responsibilities
	Provide affection or love	⇔	Provide affection or love
	-		Organize parties or celebrations
	-		Live with newborn and be present
	-		Registering the birth certificate
	Present drinks		-
	Provide accommodation		-
	Protect child		-
	Name the child		-
Sanctions			
Positive	Praise (for providing financial support)		-
Negative	Masculinity questioned, labelled as weak or wife is dominant	⇔	Masculinity questioned, labelled as weak or wife is dominant
	Verbal abuse	⇔	Verbal abuse
	Ridicule or mockery	⇔	Ridicule or mockery
	Verbal abuse of wife		Verbal abuse of wife
	Perceived as a witch or performed traditional medicine	⇔	Perceived as a witch or performed traditional medicine
	Perception wife does not respect		-
	Isolation		
Sensitivity to Sanction			
Continue	Love or affection	⇔	Love or affection
	Wife birthed recently	⇔	Wife birthed recently
	Live together in the same house	⇔	Live together in the same house
	Lack of external support	⇔	Lack of external support
	Not only a woman's domain	⇔	Not only a woman's domain
	-		Wife is "human" and needs rest
	-		Double standard of community and peers
Stop	Peer influence		-
	Female or woman's domain	⇔	Female or woman's domain
	FTM lives with parents	⇔	FTM lives with parents
Conditional	Situation or presence of others	⇔	Situation or presence of others
	Level of affection		-
	Motivation to be involved		-
	-		Type of childcare
	-		Consideration of cost and benefits

Note: ⇔ mentioned by both male partner and first-time mother

Table A4: Summary of barriers to and enablers of male involvement during pregnancy and in childcare

	Focus Group Participant		
Factors	First-time Mother		Male Partner
Barriers to involvement during pregnancy			
Individual	Time constraints	⇔	Time constraints
	Financial difficulties	⇔	Financial difficulties
	Attitudes and beliefs		Attitudes and beliefs
	Roles in pregnancy	⇔	Roles in pregnancy
	Premarital pregnancy	⇔	Premarital pregnancy
	Interest in the pregnancy process		-
	Lack of knowledge		-
Interpersonal	Couple relationship factors		Couple relationship factors
	Not in a relationship or married	⇔	Not in a relationship or married
	No longer in relationship	⇔	No longer in relationship
	Not living together	⇔	Not living together
	Female partner opposition		Female partner opposition
	Inflation of costs	⇔	Inflation of costs
	Shame to be seen with partner	⇔	Shame to be seen with partner
	Influence of peers and family	⇔	Influence of peers
Community/societal	Pregnancy is a woman's domain	⇔	Pregnancy is a woman's domain
	Health provider opposition		-
Enablers of involvement during pregnancy			
Individual	Perceived as an obligation	⇔	Perceived as an obligation
Interpersonal	Couple relationship (love/affection)	⇔	Couple relationship (love/affection)
Community/societal	Health provider invitations		-
Barriers to involvement in childcare			
Individual	Financial difficulties		Financial difficulties
	Lack of income	⇔	Lack of income
	Competing needs of income		-
	Poor spending habits		-
	Availability and leisure activities		-
	-		Attitude and beliefs
	-		Role of men in childcare
	-		External support available
Interpersonal	Couple relationship factors		Couple relationship factors
	Marital status	⇔	Marital status
	Not living together	⇔	Not living together
	Behavior of wife/partner		-
	No sex		-
	No communication		-
	Influence of peers and family		-
	Partner opposition		-
Community/ societal	Childcare is a woman's domain	⇔	Childcare is a woman's domain
	Matrilineal society		-
Enablers of involvement in childcare			
Individual	Acknowledgement of paternity	⇔	Acknowledgement of paternity
	Financial stability	⇔	Financial stability
	-		Joy or excitement about newborn
Interpersonal	Couple relationship (love/affection)	⇔	Couple relationship (love/affection couple)

Note: ⇔ mentioned by both male partner and first-time mother

Appendix III: Factor analysis

Factor analysis is a multivariate statistical technique that can identify underlying relationships and associations in a larger set of observed variables. The approach groups similar variables into dimensions in order to identify latent variables or constructs. Exploratory factor analysis (EFA) is a type of factor analysis that identifies the structure and dimensions in a set of variables when the structure has not been predefined. The number of factors to include in the model were chosen using principal components extraction methods and factors with eigenvalues greater than 1.0 were retained.

Secondly, scree plots were used to visually assess the importance of the factors and narrow down the selection of factors. Finally, the oblique rotation was applied to allow for correlation between the factors, evaluate the factor solution and facilitate interpretation of factor loadings. Factor loadings > 0.3 were used as the minimum acceptable value for a significant correlation in the identification of the different dimensions of activities that comprise composite score.[205] Kaiser-Meyer-Olkin (KMO) was used as a measure of sample adequacy of items included in the score and Cronbach's alpha was used to measure the internal consistency of the items included in the composite score or scales created. KMO scores of 0.8 are deemed acceptable and indicate sample adequacy while alpha scores of 0.7 or higher are typically accepted as showing adequate reliability and alpha scores of 0.8 or higher, showing good reliability.[1-3] The Bartlett test of sphericity was used to determine the appropriateness of EFA. The Bartlett test examines the correlations among the variables and p-values less than 0.05 indicate that the correlation matrix has significant correlations and factor analysis may be suitable for the data.[4]

To confirm the identified structure and dimensions in the scale, confirmatory factor analysis (CFA) was employed. CFA examines how well the measured variables represent the pre-specified constructs. CFA assumes that normality, a sufficient sample size greater than 200 subjects, an a priori model specification and data from a random sample. Five model fits indices were used to assess the construct validity.[5,6] (1) root mean squared error of approximation (RMSEA); (2) comparative fit index (CFI); (3) Tucker-Lewis Index

(TLI); (4) standardized root mean square residual (SRMR); and (5) p close. See Table A5 for more details on the cut-off points for the CFA fit indices.

Table A5: Fit indices used to assess construct validity in confirmatory factor analysis

Fit indices	Cut-off points [200,233]
Root mean squared error of approximation (RMSEA)	< 0.05 – close fit < 0.08 – acceptable fit
Comparative fit index (CFI)	³ 0.95 – good fit ³ 0.90 – acceptable fit
Tucker-Lewis Index (TLI)	³ 0.95 – good fit ³ 0.90 – acceptable fit
Standardized root mean square residual (SRMR)	< 0.05 – close fit < 0.08 – acceptable fit
P close	< 0.05 – poor fit

Prior to running the factor analysis, the dataset was randomly split into two. EFA was run with the first half of the data (n=883) and confirmatory factor analysis (CFA) with the remainder (n=883). The differences across the sample were not statistically significant with the exception of marital status of the male partners (Table A6). EFA was used to identify the important items in the scales and the CFA was used to confirm the identified structure by examining the construct validity of the developed scales. This approach was used for the male involvement in pregnancy scale, gender equitable men's scale, and the relationship assessment scale.

Descriptive statistics of EFA sample

About 67% of the sample were 25+ years or older, 23% had a higher education, 16 percent were married, 15% had never been married, 74 percent had no kids and 34% had low household wealth (Table A6). Forty-one percent of the male partners were Bas Kasai & Kwilu, 23% lived in Kingasani, 45% had lived continuously in the health zone for less than five years, and 81% worked for cash only.

Descriptive statistics of CFA sample

The distribution for the sample used to run CFA was similar to that used for the EFA. Sixty eight percent of this sample were 25+ years old, 19% had a higher education, 12% were married, 15% had never been married and about three-fourths had no children. About 43% belonged to the Bas Kasai and Kwilu-Kwango ethnic group, a quarter lived in Kingasani, 42% had lived continuously in the health zone for less than five years, 79% worked for cash only and 34% had low household wealth.

Table A6: Characteristics of random sample used for EFA and CFA

	Sample Split					Sample Split		
	EFA	CFA	Total			EFA	CFA	Total
Age distribution					**Duration of residence in the HZ**			
15-24	33.0	32.4	32.7		<5 years	44.6	42.0	43.3
25+	67.0	67.6	67.3		5+ years	17.0	19.0	18.0
Level of education					Always	35.0	35.9	35.4
Lower than secondary	33.0	33.3	33.1		Visitor	3.4	3.1	3.2
Secondary complete/higher	44.4	47.9	46.1		**Employment (past 12 months)**			
Higher	22.7	18.8	20.7		No Work	10.3	11.4	10.9
Marital Status				*	Work for cash only	80.6	79.4	80.0
Currently married	16.5	11.9	14.2		Work but not paid, worked for			
Living together	57.3	61.8	59.6		kind or cash and kind	9.1	9.2	9.1
Engaged or previously married	10.9	11.7	11.3		**Household wealth**			
Never married	15.3	14.6	14.9		Low	34.3	33.6	34.0
Ethnicity					Middle	32.7	33.2	33.0
Bakongo	29.7	30.1	29.9		High	33.0	33.2	33.1
Bas Kasai & Kwilu-Kwango	41.3	42.6	42.0		**Owns a mobile phone**			
Kasai/Katana/Tanganyika	13.9	12.2	13.1		No	23.1	21.9	22.5
Other	15.1	15.1	15.1		Yes	76.9	78.1	77.5
Health zone (HZ) of residence					**Ever used internet**			
Bumbu	13.9	10.3	12.1		No	42.9	41.4	42.2
Kingasani	22.5	24.9	23.7		Yes	57.1	58.6	57.8
Lemba	13.6	13.7	13.6		**No of children ever fathered**			
Masina1	22.0	21.4	21.7		0	73.8	73.3	73.6
Matete	10.6	10.8	10.7		1	16.4	17.9	17.2
Ndjili	17.3	18.9	18.1		2+	9.7	8.8	9.3
	100.0	100.0	1,766			100.0	100.0	1,766

Male involvement in pregnancy score

Male involvement in pregnancy, the outcome of interest in Paper 2, was identified via EFA using self-reported data from the MOMENTUM baseline questionnaire. The KMO measure of sampling adequacy was 0.858 which indicates that the variation in the data is well suited for the EFA (Table A7). After rotation, the EFA resulted in a two-factor structure with eigen values greater than 1.0 (3.54 and 1.41). The factors

explained 79.5% and 30.4% of the variance respectively. All items had factor loadings greater than 0.3, except the item measuring the male partner's presence during antenatal care checkups.

Table A7: Results of the exploratory factor analysis for the male involvement in pregnancy scale

	Factor loadings	
	Analysis 1	Analysis 2
KMO for EFA sample	0.8579	0.8579
Cronbach alpha for EFA sample	0.7804	0.7804
Bartlett test (p value)	0.000	0.000
FACTOR 1: Participation in ANC and BP		
Eigenvalue (proportion of variance explained)	3.6024 (0.8091)	3.5394 (0.7950)
Cronbach alpha for items in factor 1	0.8473	0. 8473
Were you present during any of the antenatal care checkups?	-	-
Participation in finding information about pregnancy	0.6077	0.5873
Participation in making decisions about ANC	0.7950	0.7858
Participation in making a birth plan	0.8595	0.8656
Participation in saving money for emergencies (BP step)	0.8388	0.8504
Participation in arranging transport for delivery (BP step)	0.7661	0.7746
Participation in deciding on skilled attendance at delivery (BP step)	0.5847	0.5577
Participation in arranging for a blood donor (BP step)	0.4325	0.4147
FACTOR 2: Decision Making		
Eigenvalue (proportion of variance explained)	1.3420 (0.3014)	1.4062 (0.3035)
Cronbach alpha for items in factor 2	0.7153	0. 7153
Joint decision making in where to deliver the baby	0.4895	0.4934
Joint decision making in when to seek care and treatment for danger signs of the newborn	0.7193	0.7216
Joint decision making in where to seek care and treatment for danger signs of the mother and newborn	0.7384	0.7414
Analysis on all 11 items in the outcome	x	x
Rotation		x

Note: ANC - antenatal care; BP - birth preparedness; KMO - Kaiser-Meyer-Olkin Measure of Sampling Adequacy
- Factor loadings less than 0.3

CFA was used to examine the construct validity of the male involvement scale. The CFA was conducted on the two domains identified using the maximum likelihood method. Overall, the CFA supported a two-factor model as suggested in the EFA. The fit indices indicated that the two-factor model was a good fit for the data: root mean squared error of approximation (RMSEA) - 0.057, p close - 0.114, comparative fit index (CFI) – 0.970, Tucker-Lewis Index (TLI) – 0.958, and standardized root mean square residual (SRMR) – 0.047.

Gender equitable men's scale

As Table A8 shows, the KMO results indicate that the data was acceptable for EFA (0.7515). The items loaded on one factor with an eigen value greater than 1.0, with and without rotation. Since no difference was observed in the number of factors with eigen values greater than one, the interpretation of the EFA was based on the EFA without rotation. The factor had an eigen value of 2.18 and explained about 80.1% of the variance. Six items with factor loadings less than 0.3 were dropped and thus the final scale included 11 items from the original GEMs scale. The CFA also supports the one factor model suggested in the EFA (Table A9).

Table A8: Results of the exploratory factor analysis for the gender equitable men's scale

	Factor loadings	
	Analysis 1	Analysis 2
KMO for EFA sample	0.7515	0. 7515
Cronbach alpha for EFA sample	0.7125	0.7125
Bartlett test (p value)	0.000	0.000
FACTOR 1: GEM scale		
Eigenvalue (proportion of variance explained)	2.1834 (0.8014)	1.044 (0.3830)
A woman's most important role is to take care of her home and cook for her family.	0.4881	0.5924
Men need sex more than women do.	0.5277	-
You don't talk about sex; you just do it.	0.3964	-
There are times when a woman deserves to be beaten.	0.3211	-
Changing diapers, giving a bath, and feeding kids is the mother's responsibility.	0.4411	0.5672
It is a woman's responsibility to avoid getting pregnant.	0.4579	0.3336
A man should have the final word about decisions in his home	0.4265	-
Men are always ready to have sex.	0.5260	-
A woman should tolerate violence in order to keep her family together.	0.3115	-
I would be outraged if my wife asked me to use a condom.	-	-
A man and a woman should decide together what type of contraceptive to use.*	-	-
I would never have a gay friend	-	-
If someone insults me, I will defend my reputation, with force if I have to.	0.3445	-
To be a man, you need to be tough.	0.3968	-
Men should be embarrassed if they are unable to get an erection during sex.	-	-
A couple should decide together if they want to have children.*	-	-
A man should know what his partner likes during sex.*	-	-
Analysis on all 17 items	x	x
Rotation		x

Note: KMO - Kaiser-Meyer-Olkin Measure of Sampling Adequacy
- Factor loadings less than 0.3
*items were reversed coded such that a higher score supports gender equality

Table A9: Fit indices obtained from the confirmatory factor analysis of the gender equitable men's scale and the relationship assessment scale

	CFA results		
Fit indices	Gender equitable men's scale	Relationship assessment scale	Cut-off points [200,233]
RMSEA	0.048	0.061	< 0.05 – close fit < 0.08 – acceptable fit
CFI	0.940	0.980	³ 0.95 – good fit ³ 0.90 – acceptable fit
TLI	0.918	0.968	³ 0.95 – good fit ³ 0.90 – acceptable fit
SRMR	0.037	0.026	< 0.05 – close fit < 0.08 – acceptable fit
P close	0.626	0.126	< 0.05 – poor fit

CFA - confirmatory factor analysis; CFI - Comparative fit index; RMSEA - Root mean squared error of approximation; SRMR - Standardized root mean square residual (SRMR); TLI - Tucker-Lewis Index

Relationship Assessment Scale

Table A10 presents the results of the EFA for the relationship assessment scale. The KMO value of 0.845 indicates that the sample was adequate for EFA. In the preliminary EFA (without rotation), all items loaded on one factor (eigen value 2.88) and factor loadings were greater than 0.3. In the second EFA analysis with rotation, only one factor had an eigen value greater than 1.0, however two items had factor loadings less than 0.3. Given that there was no difference in the number of factors and that the prior analysis had a higher eigen value (2.88 vs 2.540), the interpretation of the EFA was based on the prior analysis. Therefore, all the items were retained in the relationship assessment scale. Many fit indices from the CFA indicate that the one factor model is a close fit (CFI – 0.98; TLI – 0.67; SRMR – 0.026; p close – 0.126), while the RMSEA indicates that it is an acceptable fit (Table A9).

Table A10: Results of the exploratory factor analysis for the relationship assessment scale

	Factor loadings	
	Analysis 1	Analysis 2
KMO for EFA sample	0. 8452	0. 8452
Cronbach alpha for EFA sample	0. 8060	0. 8060
Bartlett test (p value)	0.000	0.000
FACTOR 1: RAS scale		
Eigenvalue (proportion of variance explained)	2.8756 (1.0398)	2.5404 (0.9186)
How well does (NAME OF FTM) meet your needs?	0.7184	0.6824
In general, how satisfied are you with your relationship?	0.8062	0.8163
How good is your relationship compared to most?	0.7773	0.7724
How often do you wish you had not gotten into this relationship?*	0.3588	-
To what extent has your relationship met your original expectations?	0.5673	0.5498
How much do you love (NAME OF FTM)?	0.6774	0.6325
How many problems are there in your relationship?*	0.4427	-
Analysis on all 7 items	x	x
Rotation		x

Note: KMO - Kaiser-Meyer-Olkin Measure of Sampling Adequacy; RAS – relationship assessment scale
- Factor loadings less than 0.3
*items were reversed coded such that a higher score supports relationship satisfaction

References

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Appendix IV: Exploration of non-response bias

Table A11: Characteristics of study sample, by missing data, Kinshasa 2018

	Male partners without missing data			
	No	Yes	Total	
Age distribution				
15-24	30.5	33.1	32.7	
25+	69.5	66.9	67.3	
Level of education				
None/Primary/Sec incomplete	35.1	32.7	33.1	
Secondary complete/higher	47.9	45.8	46.1	
Higher	17.0	21.5	20.7	
Marital Status				***
Never married	74.4	87.3	85.1	
Ever married	25.6	12.7	14.9	
Ethnicity				
Bakongo	27.2	30.5	29.9	
Bas Kasai & Kwilu-Kwango	43.3	41.7	42.0	
Kasai/Katana/Tanganyika	16.7	12.3	13.1	
Other	12.8	15.5	15.1	
Health zone of residence				***
Bumbu	8.2	12.9	12.1	
Kingasani	30.5	22.3	23.7	
Lemba	8.5	14.7	13.6	
Masina1	30.5	19.8	21.7	
Matete†	7.5	11.4	10.7	
Ndjili	14.8	18.8	18.1	
Duration of residence in the health zone				*
<5 years	47.5	42.4	43.3	
5+ years	19.7	17.7	18.0	
Always	27.9	37.0	35.4	
Visitor†	4.9	2.9	3.2	
No of children ever fathered				
0	73.4	73.6	73.6	
1	16.1	17.4	17.2	
2+	10.5	9.0	9.3	
Household wealth				
Low	31.5	34.5	34.0	
Middle	33.8	32.8	33.0	
High	34.8	32.7	33.1	
Employment in the past 12 months				
No Work	11.8	10.7	10.9	
Work for cash only	82.0	79.6	80.0	
Work but not paid, worked for kind or cash and kind†	6.2	9.7	9.1	
Duration of employment				
Unemployed	15.4	15.2	15.2	
Throughout the year	51.8	51.8	51.8	
Seasonally	13.8	14.7	14.6	
Occasionally	19.0	18.3	18.4	
.				
Total	100.0	100.0	100.0	
.				
N	305	1,674	1,766	

Note: SD - Standard deviation

† The number of partners with missing data in the indicated categories was less than 25

***<0.001; ** <0.01; *<0.05

Appendix V: Exploration of the bidirectional relationship between knowledge and involvement during pregnancy

Male partners can increase their knowledge by attending ANC. Thus, there is a potential for their involvement to influence their knowledge. Path analysis was used to rule out the presence of a bidirectional relationship between the knowledge indicators and the two forms of involvement. As shown in Table A12, none of the associations were significant and thus, it can be concluded that there are no bidirectional relationships. Furthermore, male participation in ANC was dropped during factor analysis and thus it was not included in the final score created measuring male partner's involvement in ANC and birth preparedness (see Appendix III). This further reduces the potential of the presence of this bidirectional relationship.

Table A12: Results of path analysis exploring the bidirectional relationship between male involvement and the knowledge variables, Kinshasa 2018

	ANC and birth preparedness		Shared decisions	
	Beta	p-value	Beta	p-value
Knowledge of ANC benefits				
Outcome: Involvement	0.235	0.999	-	
Outcome Knowledge	-0.001	0.999	-	
Knowledge of the number of ANC visits				
Outcome: Involvement	0.313	0.999	0.039	1.000
Outcome Knowledge	0.022	0.999	0.016	1.000
Knowledge of the start of ANC				
Outcome: Involvement	0.022	1.000	0.062	0.999
Outcome Knowledge	0.001	1.000	0.001	1.000
Knowledge about danger signs for mother				
Outcome: Involvement	0.331	0.996	0.109	0.999
Outcome Knowledge	-0.018	0.999	0.031	1.000
Knowledge about danger signs for newborns				
Outcome: Involvement	0.172	1.000	0.073	1.000
Outcome Knowledge	0.023	1.000	0.303	1.000
Knowledge of birth preparedness steps				
Outcome: Involvement	0.240	1.000	0.128	0.998
Outcome Knowledge	0.067	0.999	0.030	0.999

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; SE- Standard Error
- failure to converge
***<0.001; ** <0.01; *<0.05

Appendix VI: Paper 2 regression results

Table A13: Results of full regression models of male involvement in joint decision making and antenatal care and birth preparedness, Kinshasa 2018

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Knowledge of ANC benefits												
0 - 1	[REF]			[REF]			[REF]			[REF]		
2	0.912	0.170	[-0.142, 0.526]	0.187	0.170	[-0.147, 0.521]	0.195*	0.085	[0.028, 0.363]	0.200*	0.085	[0.032, 0.367]
3+	0.040	0.176	[-0.306, 0.385]	0.052	0.176	[-0.294, 0.399]	0.218*	0.088	[0.045, 0.391]	0.231**	0.088	[0.058, 0.405]
Knowledge of the number of ANC visits												
<4 times	[REF]			[REF]			[REF]			[REF]		
≥ 4 times	0.5212**	0.125	[0.277, 0.767]	0.523***	0.125	[0.278, 0.768]	0.097	0.063	[-0.026, 0.219]	0.094	0.063	[-0.029, 0.217]
Knowledge of the start of ANC												
After first trimester	[REF]			[REF]			[REF]			[REF]		
During first trimester	-0.077	0.113	[-0.298, 0.144]	-0.081	0.113	[-0.302, 0.140]	-0.013	0.056	[-0.124, 0.098]	-0.014	0.056	[-0.125, 0.097]
Knowledge about danger signs for mother												
0	[REF]			[REF]			[REF]			[REF]		
1	0.490	0.262	[-0.023, 1.003]	0.467	0.261	[-0.046, 0.980]	-0.017	0.131	[-0.274, 0.240]	-0.016	0.131	[-0.273, 0.241]
2	0.101	0.258	[-0.405, 0.606]	0.092	0.258	[-0.413, 0.597]	0.127	0.129	[-0.126, 0.381]	0.132	0.129	[-0.121, 0.385]
3+	0.220	0.276	[-0.319, 0.760]	0.226	0.275	[-0.314, 0.765]	0.227	0.138	[-0.043, 0.497]	0.238	0.138	[-0.033, 0.508]
Knowledge about danger signs for newborns												
0	[REF]			[REF]			[REF]			[REF]		
1	0.462*	0.233	[0.004, 0.919]	0.469	0.235	[0.009, 0.929]	0.089	0.117	[-0.140, 0.318]	0.072	0.118	[-0.159, 0.303]
2	0.415	0.243	[-0.063, 0.892]	0.436	0.244	[-0.042, 0.914]	0.099	0.122	[-0.140, 0.338]	0.089	0.122	[-0.151, 0.329]
3+	0.159	0.264	[-0.359, 0.678]	0.191	0.265	[-0.328, 0.710]	0.010	0.132	[-0.250, 0.269]	0.006	0.133	[-0.255, 0.266]
Knowledge of birth preparedness steps												
0	[REF]			[REF]			[REF]			[REF]		
1	0.737**	0.266	[0.215, 1.260]	0.732**	0.266	[0.210, 1.254]	0.040	0.133	[-0.221, 0.302]	0.032	0.133	[-0.229, 0.294]
2	1.964***	0.283	[1.408, 2.520]	1.957***	0.283	[1.402, 2.513]	0.165	0.142	[-0.113, 0.444]	0.159	0.142	[-0.119, 0.438]
3+	2.495***	0.348	[1.812, 3.179]	2.464***	0.349	[1.779, 3.149]	0.275	0.175	[-0.067, 0.618]	0.253	0.175	[-0.091, 0.596]
Any form of emotional violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.322	0.179	[-0.029, 0.673]	-0.643	0.931	[-2.469, 1.183]	-0.148	0.090	[-0.324, 0.028]	0.104	0.466	[-0.811, 1.019]
Any form of physical violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.195	0.140	[-0.471, 0.080]	-0.391	0.856	[-2.071, 1.288]	-0.044	0.070	[-0.182, 0.094]	-0.175	0.429	[-1.017, 0.667]
Any form of sexual violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.133	0.211	[-0.546, 0.281]	-0.295	1.084	[-2.421, 1.831]	0.025	0.106	[-0.182, 0.232]	-1.023	0.543	[-2.089, 0.042]
Relationship satisfaction (max = 35)	0.036**	0.012	[0.012, 0.059]	-0.110*	0.054	[-0.215, -0.004]	0.001	0.006	[-0.011, 0.012]	-0.054*	0.027	[-0.107, -0.001]
Gender-equitable attitude (max = 33)	-0.023	0.013	[-0.049, 0.002]	-0.222**	0.075	[-0.368, -0.075]	0.034***	0.007	[0.021, 0.047]	-0.041	0.037	[-0.115, 0.032]
Perceived self-efficacy (max = 40)	0.092***	0.013	[0.066, 0.118]	0.093***	0.013	[0.066, 0.119]	-0.016*	0.007	[-0.029, -0.002]	-0.016*	0.007	[-0.029, -0.003]
Interaction terms												
Relationship sat. x gender-equitable attitude				0.007**	0.002	[0.002, 0.011]				0.002*	0.001	[0.000, 0.005]
Relationship sat. x emotional IPV perpetration				0.034	0.032	[-0.028, 0.097]				-0.009	0.016	[-0.040, 0.023]
Relationship sat. x physical IPV perpetration				0.006	0.028	[-0.049, 0.061]				0.004	0.014	[-0.023, 0.032]
Relationship sat. x sexual IPV perpetration				0.006	0.038	[-0.069, 0.080]				0.037*	0.019	[0.000, 0.075]
Age distribution												
15-24	[REF]			[REF]			[REF]			[REF]		
25+	-0.045	0.152	[-0.344, 0.253]	-0.057	0.152	[-0.356, 0.242]	-0.044	0.076	[-0.193, 0.106]	-0.055	0.076	[-0.204, 0.095]
Level of education												
Lower than secondary	[REF]			[REF]			[REF]			[REF]		

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Secondary complete	-0.054	0.132	[-0.313, 0.205]	-0.064	0.132	[-0.324, 0.195]	-0.070	0.066	[-0.200, 0.060]	-0.069	0.066	[-0.198, 0.061]
Higher	0.183	0.174	[-0.158, 0.524]	0.174	0.174	[-0.167, 0.514]	0.094	0.087	[-0.077, 0.264]	0.095	0.087	[-0.075, 0.266]
Marital Status												
Never married	[REF]			[REF]			[REF]			[REF]		
Ever married	-0.260	0.170	[-0.595, 0.074]	-0.233	0.171	[-0.568, 0.102]	0.059	0.085	[-0.108, 0.227]	0.069	0.085	[-0.099, 0.237]
Ethnicity												
Bakongo	[REF]			[REF]			[REF]			[REF]		
Bas Kasai & Kwilu-Kwango	0.060	0.154	[-0.242, 0.361]	0.062	0.153	[-0.239, 0.362]	-0.054	0.077	[-0.205, 0.097]	-0.054	0.077	[-0.204, 0.097]
Kasai/Katana/Tanganyika	0.193	0.201	[-0.587, 0.200]	-0.187	0.201	[-0.581, 0.206]	-0.050	0.100	[-0.247, 0.148]	-0.054	0.101	[-0.251, 0.144]
Other	0.019	0.184	[-0.343, 0.380]	0.021	0.184	[-0.341, 0.382]	-0.048	0.092	[-0.229, 0.133]	-0.047	0.092	[-0.229, 0.134]
Health zone of residence												
Bumbu	[REF]			[REF]			[REF]			[REF]		
Kingasani	0.268	0.235	[-0.194, 0.730]	0.318	0.236	[-0.144, 0.781]	0.160	0.118	[-0.071, 0.391]	0.181	0.118	[-0.051, 0.413]
Lemba	0.870***	0.239	[0.400, 1.339]	0.931***	0.240	[0.460, 1.401]	-0.232	0.120	[-0.468, 0.003]	-0.241	0.120	[-0.450, 0.021]
Masina1	0.103	0.230	[-0.347, 0.553]	0.154	0.230	[-0.298, 0.606]	-0.019	0.115	[-0.244, 0.207]	-0.012	0.115	[-0.238, 0.215]
Matete	-0.133	0.239	[-0.602, 0.337]	-0.072	0.240	[-0.543, 0.399]	0.003	0.120	[-0.232, 0.239]	0.019	0.120	[-0.217, 0.255]
Ndjili	1.482***	0.223	[1.046, 1.919]	1.553***	0.224	[1.113, 1.993]	-0.135	0.112	[-0.353, 0.084]	-0.108	0.112	[-0.329, 0.112]
Duration of residence in the health zone												
<5 years	[REF]			[REF]			[REF]			[REF]		
5+ years	0.050	0.159	[-0.261, 0.362]	0.054	0.159	[-0.257, 0.366]	-0.132	0.080	[-0.288, 0.024]	-0.132	0.080	[-0.288, 0.024]
Always	-0.292*	0.190	[-0.545, -0.039]	-0.294*	0.130	[-0.548, -0.040]	0.006	0.066	[-0.121, 0.133]	-0.003	0.065	[-0.130, 0.125]
Visitor	0.182	0.338	[-0.482, 0.846]	0.142	0.339	[-0.523, 0.806]	-0.002	0.169	[-0.335, 0.331]	-0.001	0.170	[-0.334, 0.332]
No of children ever fathered												
0	[REF]			[REF]			[REF]			[REF]		
1	-0.227	0.152	[-0.525, 0.070]	-0.221	0.151	[-0.518, 0.076]	-0.125	0.076	[-0.274, 0.024]	-0.126	0.076	[-0.275, 0.023]
2+	-0.203	0.210	[-0.614, 0.209]	-0.211	0.210	[-0.623, 0.200]	0.044	0.105	[-0.251, 0.162]	-0.051	0.105	[-0.257, 0.155]
Household wealth												
Low	[REF]			[REF]			[REF]			[REF]		
Middle	-0.105	0.139	[-0.372, 0.173]	-0.094	0.139	[-0.366, 0.179]	0.080	0.070	[-0.057, 0.216]	0.086	0.070	[-0.051, 0.222]
High	0.249	0.150	[-0.034, 0.556]	0.259	0.150	[-0.035, 0.552]	0.068	0.075	[-0.079, 0.215]	0.072	0.075	[-0.075, 0.219]
Employment in the past 12 months												
No Work	[REF]			[REF]			[REF]			[REF]		
Work for cash only	-0.153	0.180	[-0.377, 0.168]	0.760	0.408	[-0.041, 1.561]	-0.059	0.204	[-0.458, 0.341]	-0.082	0.205	[-0.484, 0.319]
Work but not paid, worked for kind or cash and kind	-0.355	0.243	[-0.044, 0.543]	0.107	0.313	[-0.508, 0.722]	0.054	0.157	[-0.254, 0.362]	0.050	0.157	[-0.258, 0.358]
Duration of employment												
Unemployed	[REF]			[REF]			[REF]			[REF]		
Throughout the year	-0.901*	0.369	[-1.624, -0.177]	-0.839*	0.369	[-1.563, -0.114]	0.032	0.185	[-0.330, 0.395]	0.057	0.185	[-0.306, 0.420]
Seasonally	-1.325***	0.370	[-2.051, -0.600]	-1.216**	0.372	[-1.946, -0.487]	0.112	0.185	[-0.251, 0.476]	0.147	0.186	[-0.218, 0.513]
Occasionally	-1.078**	0.382	[-1.828, -0.328]	-1.008**	0.383	[-1.759, -0.257]	0.157	0.191	[-0.219, 0.532]	0.182	0.192	[-0.194, 0.558]
Dual employment												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.098	0.130	[-0.354, 0.158]	-0.093	0.130	[-0.349, 0.162]	0.140*	0.065	[0.012, 0.268]	0.143*	0.065	[0.015, 0.272]
Relative age difference												
MP younger/<5 years older	[REF]			[REF]			[REF]			[REF]		
5 - 9 years older	0.021	0.148	[-0.269, 0.311]	0.048	0.148	[-0.349, 0.162]	0.097	0.074	[-0.048, 0.242]	0.112	0.074	[-0.034, 0.257]
10+ years older	0.059	0.190	[-0.314, 0.432]	0.069	0.190	[-0.305, 0.442]	0.159	0.095	[-0.028, 0.346]	0.173	0.095	[-0.014, 0.360]
Constant	-3.543***	0.785	[-5.083, -2.004]	0.078	1.762	[-2.675, 4.238]	0.113	0.393	[-0.658, 0.885]	1.777*	0.883	[0.045, 3.509]
Observations	1,461			1,461			1,461			1,461		
adjusted R-squared	0.240			0.245			0.100			0.11		
VIF	1.26						1.26					

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; SE- Standard Error; CI - confidence interval; IPV - intimate partner violence; ref- reference group; sat – satisfaction

***<0.001; ** <0.01; *<0.05

Table A14: Results of full regression models (without interaction terms) of male involvement in joint decision making and antenatal care and birth preparedness, by age group, Kinshasa 2018

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	15 - 24 years			25 + years			15 - 24 years			25+ years		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Knowledge of ANC benefits												
0 - 1	[REF]			[REF]			[REF]			[REF]		
2	0.355	0.277	[-0.190, 0.901]	0.055	0.221	[-0.378, 0.489]	0.209	0.139	[-0.065, 0.482]	0.174	0.111	[-0.043, 0.392]
3+	0.346	0.296	[-0.236, 0.928]	-0.193	0.225	[-0.634, 0.249]	0.326*	0.149	[0.034, 0.618]	0.155	0.113	[-0.067, 0.376]
Knowledge of the number of ANC visits												
<4 times	[REF]			[REF]			[REF]			[REF]		
≥ 4 times	0.490*	0.199	[0.100, 0.880]	0.548**	0.163	[0.228, 0.867]	0.210*	0.100	[0.014, 0.406]	0.013	0.082	[-0.147, 0.173]
Knowledge of the start of ANC												
After first trimester	[REF]			[REF]			[REF]			[REF]		
During first trimester	-0.257	0.193	[-0.637, 0.123]	0.043	0.141	[-0.234, 0.320]	-0.005	0.097	[-0.196, 0.185]	-0.030	0.071	[-0.169, 0.109]
Knowledge about danger signs for mother												
0	[REF]			[REF]			[REF]			[REF]		
1	0.801*	0.392	[0.031, 1.572]	0.268	0.358	[-0.434, 0.970]	-0.065	0.197	[-0.451, 0.322]	0.049	0.180	[-0.304, 0.401]
2	0.010	0.384	[-0.745, 0.765]	0.053	0.351	[-0.636, 0.742]	-0.220	0.193	[-0.598, 0.159]	0.333	0.176	[-0.013, 0.679]
3+	0.023	0.429	[-0.819, 0.865]	0.188	0.369	[-0.535, 0.912]	0.083	0.215	[-0.340, 0.505]	0.342	0.185	[-0.021, 0.706]
Knowledge about danger signs for newborns												
0	[REF]			[REF]			[REF]			[REF]		
1	0.389	0.348	[-0.295, 1.073]	0.459	0.322	[-0.172, 1.090]	0.002	0.175	[-0.342, 0.345]	0.127	0.161	[-0.189, 0.444]
2	0.445	0.367	[-0.277, 1.166]	0.429	0.334	[-0.225, 1.084]	0.006	0.184	[-0.356, 0.368]	0.168	0.167	[-0.161, 0.497]
3+	0.250	0.591	[-0.544, 1.044]	0.090	0.357	[-0.610, 0.790]	-0.057	0.203	[-0.455, 0.342]	0.062	0.179	[-0.289, 0.414]
Knowledge of birth preparedness steps												
0	[REF]			[REF]			[REF]			[REF]		
1	0.577	0.407	[-0.223, 1.378]	0.784*	0.355	[0.086, 1.481]	0.106	0.204	[-0.296, 0.508]	-0.084	0.178	[-0.434, 0.266]
2	2.178***	0.443	[1.308, 3.048]	1.904***	0.374	[1.169, 2.639]	0.236	0.222	[-0.201, 0.672]	0.042	0.188	[-0.327, 0.411]
3+	1.438*	0.591	[0.276, 2.600]	2.879***	0.445	[2.005, 3.753]	0.401	0.297	[-0.182, 0.985]	0.089	0.224	[-0.349, 0.528]
Any form of emotional violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.058	0.283	[-0.498, 0.614]	0.638**	0.235	[0.176, 1.099]	-0.085	0.142	[-0.364, 0.194]	-0.164	0.118	[-0.395, 0.068]
Any form of physical violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.450	0.231	[-0.904, 0.003]	-0.092	0.181	[-0.447, 0.262]	-0.014	0.116	[-0.242, 0.214]	-0.083	0.091	[-0.261, 0.095]
Any form of sexual violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.091	0.318	[-0.534, 0.715]	-0.234	0.288	[-0.800, 0.332]	0.172	0.159	[-0.141, 0.486]	-0.084	0.145	[-0.368, 0.200]
Relationship satisfaction (max = 35)	0.047*	0.018	[0.011, 0.083]	0.040*	0.016	[0.008, 0.072]	0.009	0.009	[-0.009, 0.027]	-0.006	0.008	[-0.022, 0.010]
Gender-equitable attitude (max = 33)	0.014	0.023	[-0.030, 0.058]	0-0.041*	0.016	[-0.073, -0.010]	0.043***	0.011	[0.020, 0.065]	0.029***	0.008	[0.013, 0.045]
Perceived self-efficacy (max = 40)	0.099***	0.023	[0.054, 0.144]	0.085***	0.017	[0.052, 0.119]	-0.010	0.012	[-0.032, 0.013]	-0.021*	0.008	[-0.038, -0.005]
.												
Level of education												
Lower than secondary	[REF]			[REF]			[REF]			[REF]		
Secondary complete	0.006	0.206	[-0.400, 0.412]	-0.066	0.172	[-0.404, 0.271]	-0.098	0.103	[-0.283, 0.123]	-0.065	0.086	[-0.235, 0.104]
Higher	0.101	0.352	[-0.592, 0.793]	0.204	0.209	[-0.205, 0.614]	-0.122	0.176	[-0.439, 0.253]	0.146	0.105	[-0.060, 0.351]
Marital Status												
Never married	[REF]			[REF]			[REF]			[REF]		
Ever married	-0.491	0.577	[-0.999, 0.017]	-0.110	0.231	[-0.563, 0.343]	0.026	0.292	[-1.205, -0.059]	0.101	0.116	[-0.127, 0.328]
Ethnicity												
Bakongo	[REF]			[REF]			[REF]			[REF]		
Bas Kasai & Kwilu-Kwango	-0.252	0.260	[-0.764, 0.259]	0.218	0.191	[-0.158, 0.594]	-0.038	0.131	[-0.322, 0.192]	-0.081	0.096	[-0.270, 0.107]
Kasai/Katana/Tanganyika	-0.566	0.352	[-1.258, 0.127]	-0.089	0.249	[-0.577, 0.399]	-0.072	0.179	[-0.485, 0.219]	-0.072	0.125	[-0.317, 0.173]
Other	0.085	0.321	[-0.546, 0.715]	0.017	0.228	[-0.431, 0.465]	-0.047	0.160	[-0.371, 0.258]	-0.060	0.115	[-0.285, 0.165]

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	15 - 24 years			25 + years			15 - 24 years			25+ years		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Health zone of residence												
Bumbu	[REF]			[REF]			[REF]			[REF]		
Kingasani	0.488	0.389	[-0.277, 1.253]	0.100	0.299	[-0.486, 0.686]	0.229	0.195	[-0.187, 0.579]	0.15	0.150	[-0.145, 0.444]
Lemba	0.735	0.391	[-0.033, 1.502]	0.855**	0.306	[0.255, 1.455]	-0.141	0.195	[-0.542, 0.225]	-0.254	0.154	[-0.555, 0.048]
Masina1	0.052	0.414	[-0.761, 0.865]	0.074	0.283	[-0.480, 0.629]	-0.114	0.207	[-0.518, 0.294]	0.021	0.142	[-0.257, 0.300]
Matete	0.348	0.421	[-0.479, 1.174]	0-.335	0.297	[-0.919, 0.248]	0.233	0.210	[-0.214, 0.613]	-0.037	0.149	[-0.330, 0.255]
Ndjili	1.076**	0.378	[0.333, 1.818]	1.647***	0.278	[1.100, 2.193]	0.052	0.189	[-0.378, 0.366]	-0.205	0.140	[-0.479, 0.069]
Duration of residence in the health zone												
<5 years	[REF]			[REF]			[REF]			[REF]		
5+ years	0.027	0.262	[-0.487, 0.542]	0.244	0.203	[-0.153, 0.642]	-0.103	0.131	[-0.341, 0.175]	-0.157	0.102	[-0.357, 0.043]
Always	-0.124	0.220	[-0.557, 0.308]	-0.313	0.162	[-0.631, 0.005]	0.233*	0.111	[0.024, 0.458]	-0.093	0.081	[-0.253, 0.067]
Visitor	0.837	0.740	[-0.616, 2.291]	0.181	0.388	[-0.580, 0.943]	-0.316	0.371	[-1.053, 0.406]	0.070	0.195	[-0.312, 0.452]
No of children ever fathered												
0	[REF]			[REF]			[REF]			[REF]		
1	0.028	0.327	[-0.616, 0.671]	-0.229	0.175	[-0.572, 0.114]	0.055	0.164	[-0.308, 0.335]	-0.171	0.088	[-0.343, 0.001]
2+	-1.184	0.728	[-2.713, 0.345]	-0.162	0.225	[-0.604, 0.280]	0.275	0.390	[-0.527, 1.005]	-0.055	0.113	[-0.277, 0.167]
Household wealth												
Low	[REF]			[REF]			[REF]			[REF]		
Middle	-0.202	0.229	[-0.651, 0.247]	-0.081	0.177	[-0.428, 0.266]	0.201	0.114	[-0.000, 0.449]	0.056	0.089	[-0.118, 0.230]
High	0.146	0.257	[-0.359, 0.650]	0.258	0.187	[-0.109, 0.626]	0.069	0.129	[-0.161, 0.346]	0.099	0.094	[-0.085, 0.284]
Employment in the past 12 months												
No Work	[REF]			[REF]			[REF]			[REF]		
Work for cash only	1.011	0.631	[-0.228, 2.250]	0.665	0.543	[-0.401, 1.732]	0.267	0.126	[-0.298, 0.199]	-0.187	0.273	[-0.723, 0.348]
Work but not paid, worked for kind or cash and kind	0.164	0.503	[-0.825, 1.153]	0.150	0.414	[-0.663, 0.963]	0.171	0.181	[-0.475, 0.237]	0.034	0.208	[-0.375, 0.442]
Duration of employment												
Unemployed	[REF]			[REF]			[REF]			[REF]		
Throughout the year	-0.911	0.599	[-0.717, 0.268]	-0.662	0.478	[-1.600, 0.276]	-0.285	0.300	[-0.954, 0.224]	0.164	0.240	[-0.307, 0.635]
Seasonally	-1.63**	0.584	[-2.778, -0.482]	-0.911	0.488	[-1.869, 0.048]	-0.362	0.292	[-0.994, 0.153]	0.346	0.245	[-0.135, 0.827]
Occasionally	-1.436*	0.611	[-2.638, -0.235]	-0.685	0.497	[-1.659, 0.290]	-0.354	0.307	[-1.051, 0.155]	0.425	0.249	[-0.064, 0.914]
Dual employment												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.224	0.251	[-0.715, 0.261]	-0.086	0.155	[-0.391, 0.218]	-0.031	0.126	[-0.301, 0.192]	0.194*	0.078	[0.041, 0.347]
Relative age difference												
MP younger/<5 years older	[REF]			[REF]			[REF]			[REF]		
5 - 9 years older	0.068	0.195	[-0.315, 0.451]	-0.006	0.226	[-0.449, 0.437]	0.033	0.097	[-0.157, 0.224]	0.107	0.113	[-0.116, 0.329]
10+ years older	-1.819	2.063	[-5.875, 2.236]	0.078	0.240	[-0.393, 0.550]	0.325	1.030	[-1.710, 2.340]	0.182	0.121	[-0.055, 0.419]
.												
Constant	-4.395***	1.226	[-6.805, -1.985]	0-3.386**	1.096	[-5.538, -1.234]	-0.558	0.615	[-1.768, 0.651]	0.547	0.550	[-0.533, 1.627]
Observations		484			977			484			977	
adjusted R-squared		0.325			0.241			0.175			0.116	
VIF		1.27			1.21			1.26			1.21	

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; SE- Standard Error; CI - confidence interval; IPV - intimate partner violence; ref- reference group; sat – satisfaction

***<0.001; ** <0.01; *<0.05

Table A15: Results of regression models (including interaction terms) of male involvement in joint decision making and antenatal care and birth preparedness, by age group, Kinshasa 2018

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	15 - 24 years			25+ years			15 - 24 years			25+ years		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Knowledge of ANC benefits												
0 - 1	[REF]			[REF]			[REF]			[REF]		
2	0.331	0.277	[-0.214, 0.876]	0.050	0.221	[-0.384, 0.483]	0.208	0.140	[-0.067, 0.483]	0.178	0.111	[-0.039, 0.396]
3+	0.339	0.297	[-0.244, 0.923]	-0.177	0.225	[-0.619, 0.265]	0.330*	0.150	[0.035, 0.624]	0.170	0.113	[-0.052, 0.392]
Knowledge of the number of ANC visits												
<4 times	[REF]			[REF]			[REF]			[REF]		
≥ 4 times	0.496*	0.199	[0.106, 0.887]	0.566***	0.162	[0.248, 0.885]	0.207*	0.100	[0.010, 0.404]	0.011	0.082	[-0.149, 0.171]
Knowledge of the start of ANC												
After first trimester	[REF]			[REF]			[REF]			[REF]		
During first trimester	-0.253	0.193	[-0.632, 0.126]	0.041	0.141	[-0.235, 0.317]	-0.003	0.097	[-0.194, 0.188]	-0.026	0.071	[-0.164, 0.113]
Knowledge about danger signs for mother												
0	[REF]			[REF]			[REF]			[REF]		
1	0.833*	0.391	[0.064, 1.602]	0.210	0.357	[-0.491, 0.910]	-0.062	0.197	[-0.450, 0.325]	0.048	0.179	[-0.303, 0.400]
2	0.028	0.383	[-0.726, 0.781]	-0.002	0.350	[-0.690, 0.685]	-0.215	0.193	[-0.595, 0.165]	0.343	0.176	[-0.002, 0.688]
3+	0.073	0.429	[-0.771, 0.916]	0.134	0.368	[-0.588, 0.856]	0.088	0.216	[-0.338, 0.513]	0.346	0.185	[-0.016, 0.709]
Knowledge about danger signs for newborns												
0	[REF]			[REF]			[REF]			[REF]		
1	0.331	0.349	[-0.354, 1.016]	0.536	0.323	[-0.098, 1.171]	-0.006	0.176	[-0.351, 0.340]	0.085	0.162	[-0.234, 0.404]
2	0.430	0.367	[-0.292, 1.151]	0.571	0.334	[-0.138, 1.173]	0.007	0.185	[-0.357, 0.371]	0.144	0.168	[-0.185, 0.474]
3+	0.263	0.403	[-0.529, 1.055]	0.202	0.357	[-0.499, 0.903]	-0.055	0.203	[-0.454, 0.345]	0.045	0.179	[-0.308, 0.397]
Knowledge of birth preparedness steps												
0	[REF]			[REF]			[REF]			[REF]		
1	0.554	0.406	[-0.245, 1.353]	0.809*	0.354	[0.113, 1.504]	0.106	0.205	[-0.297, 0.508]	-0.107	0.178	[-0.456, 0.243]
2	2.178***	0.443	[1.307, 3.049]	1.936***	0.373	[1.204, 2.669]	0.231	0.223	[-0.208, 0.670]	0.022	0.187	[-0.346, 0.390]
3+	1.316*	0.593	[0.152, 2.481]	2.886***	0.445	[2.013, 3.758]	0.359	0.299	[-0.228, 0.947]	0.083	0.223	[-0.355, 0.522]
Any form of emotional violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	1.632	1.286	[-0.896, 4.160]	-2.522	1.344	[-5.159, 0.115]	0.026	0.649	[-1.249, 1.301]	0.529	0.675	[-0.795, 1.854]
Any form of physical violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.669	1.266	[-3.156, 1.819]	0.224	1.187	[-2.106, 2.553].	0.601	0.638	[-0.653, 1.856]	-1.078	0.596	[-2.248, 0.093]
Any form of sexual violence perpetuated in past 12 months												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-2.531	1.561	[-5.600, 0.537]	1.410	1.544	[-1.620, 4.440]	-0.303	0.787	[-1.850, 1.245]	-1.665*	0.776	[-3.187, -0.143]
Relationship satisfaction (max = 35)	-0.089	0.086	[-0.258, 0.080]	-0.128	0.071	[-0.267, 0.011]	-0.013	0.043	[-0.098, 0.072]	-0.075*	0.036	[-0.145, -0.006]
Gender-equitable attitude (max = 33)	-0.183	0.115	[-0.408, 0.042]	-0.271**	0.101	[-0.469, -0.073]	0.001	0.058	[-0.113, 0.115]	-0.058	0.051	[-0.157, 0.042]
Perceived self-efficacy (max = 40)	0.098***	0.023	[0.053, 0.143]	0.086***	0.017	[0.053, 0.119]	-0.010	0.012	[-0.032, 0.013]	-0.023**	0.008	[-0.039, -0.006]
Interaction terms												
Relationship sat. x gender-equitable attitude	0.007	0.004	[-0.001, 0.014]	0.007*	0.003	[0.001, 0.014]	0.001	0.002	[-0.002, 0.005]	0.003	0.002	[-0.000, 0.006]
Relationship sat. x emotional IPV perpetration	-0.056	0.044	[-0.143, 0.031]	0.110*	0.046	[0.020, 0.201]	-0.005	0.022	[-0.048, 0.039]	-0.023	0.023	[-0.068, 0.022]
Relationship sat. x physical IPV perpetration	0.008	0.042	[-0.075, 0.090]	-0.010	0.039	[-0.086, 0.065]	-0.021	0.021	[-0.062, 0.021]	0.032	0.019	[-0.006, 0.071]
Relationship sat. x sexual IPV perpetration	0.093	0.055	[-0.014, 0.200]	-0.058	0.054	[-0.163, 0.048]	0.016	0.028	[-0.038, 0.070]	0.056*	0.027	[0.003, 0.110]
Level of education												
Lower than secondary	[REF]			[REF]			[REF]			[REF]		
Secondary complete	-0.004	0.207	[-0.410, 0.402]	-0.095	0.172	[-0.432, 0.242]	-0.110	0.104	[-0.315, 0.095]	-0.055	0.086	[-0.225, 0.114]
Higher	0.151	0.353	[-0.542, 0.844]	0.179	0.208	[-0.229, 0.587]	-0.110	0.178	[-0.460, 0.239]	0.149	0.104	[-0.056, 0.354]
Marital Status												
Never married	[REF]			[REF]			[REF]			[REF]		

	Male involvement in ANC and birth preparedness						Male involvement in shared decisions					
	15 - 24 years			25+ years			15 - 24 years			25+ years		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Ever married	-0.462	0.260	[-0.972, 0.048]	-0.123	0.231	[-0.576, 0.330]	0.031	0.131	[-0.226, 0.289]	0.103	0.116	[-0.125, 0.331]
Ethnicity												
Bakongo	[REF]			[REF]			[REF]			[REF]		
Bas Kasai & Kwilu-Kwango	-0.236	0.261	[-0.749, 0.277]	0.196	0.191	[-0.178, 0.571]	-0.035	0.132	[-0.294, 0.224]	-0.083	0.096	[-0.271, 0.105]
Kasai/Katana/Tanganyika	-0.551	0.352	[-1.244, 0.141]	-0.086	0.248	[-0.574, 0.401]	-0.061	0.178	[-0.411, 0.288]	-86.000	0.125	[-0.330, 0.159]
Other	0.104	0.320	[-0.525, 0.733]	0.018	0.228	[-0.429, 0.466]	-0.045	0.161	[-0.362, 0.273]	-0.054	0.115	[-0.279, 0.171]
Health zone of residence												
Bumbu	[REF]			[REF]			[REF]			[REF]		
Kingasani	0.588	0.391	[-0.179, 1.356]	0.194	0.299	[-0.393, 0.782]	0.237	0.197	[-0.150, 0.624]	0.161	0.150	[-0.134, 0.456]
Lemba	0.838*	0.393	[0.065, 1.611]	0.973**	0.309	[0.372, 1.575]	-0.140	0.198	[-0.530, 0.250]	-0.247	0.154	[-0.549, 0.055]
Masina1	0.110	0.413	[-0.702, 0.923]	0.204	0.285	[-0.354, 0.763]	-0.098	0.208	[-0.508, 0.312]	0.017	0.143	[-0.263, 0.298]
Matete	0.423	0.424	[-0.411, 1.257]	-0.238	0.298	[-0.823, 0.347]	0.228	0.214	[-0.193, 0.649]	-0.037	0.150	[-0.331, 0.257]
Ndjili	1.215**	0.382	[0.465, 1.965]	1.748***	0.280	[1.197, 2.298]	0.073	0.192	[-0.305, 0.451]	-0.205	0.141	[-0.482, 0.071]
Duration of residence in the health zone												
<5 years	[REF]			[REF]			[REF]			[REF]		
5+ years	0.079	0.262	[-0.437, 0.594]	0.231	0.202	[-0.166, 0.629]	-0.090	0.132	[-0.350, 0.170]	-0.178	0.102	[-0.378, 0.021]
Always	-0.135	0.221	[-0.570, 0.299]	-0.289	0.163	[-0.609, 0.030]	0.220*	0.111	[0.001, 0.439]	-0.116	0.082	[-0.277, 0.044]
Visitor	0.858	0.743	[-0.601, 2.318]	0.081	0.388	[-0.680, 0.843]	-0.351	0.374	[-1.087, 0.385]	0.061	0.195	[-0.322, 0.444]
No of children ever fathered												
0	[REF]			[REF]			[REF]			[REF]		
1	-0.106	0.328	[-0.661, 0.628]	-0.231	0.174	[-0.573, 0.110]	0.059	0.165	[-0.266, 0.384]	-0.170	0.087	[-0.341, 0.002]
2+	-1.137	0.779	[-2.668, 0.394]	-0.170	0.225	[-0.611, 0.271]	0.310	0.393	[-0.462, 1.081]	-0.066	0.113	[-0.287, 0.156]
Household wealth												
Low	[REF]			[REF]			[REF]			[REF]		
Middle	-0.181	0.229	[-0.631, 0.269]	-0.066	0.176	[-0.412, 0.280]	0.211	0.115	[-0.016, 0.437]	0.064	0.089	[-0.110, 0.237]
High	0.154	0.256	[-0.350, 0.658]	0.270	0.187	[-0.097, 0.637]	0.073	0.129	[-0.181, 0.327]	0.112	0.094	[-0.072, 0.296]
Employment in the past 12 months												
No Work	[REF]			[REF]			[REF]			[REF]		
Work for cash only	0.890	0.634	[-0.357, 2.137]	0.560	0.543	[-0.506, 1.626]	0.203	0.320	[-0.426, 0.832]	-0.214	0.273	[-0.749, 0.322]
Work but not paid, worked for kind or cash and kind	0.144	0.505	[-0.849, 1.137]	0.071	0.414	[-0.741, 0.884]	0.138	0.255	[-0.363, 0.639]	0.010	0.208	[-0.398, 0.418]
Duration of employment												
Unemployed	[REF]			[REF]			[REF]			[REF]		
Throughout the year	-0.795	0.604	[-1.982, 0.392]	-0.595	0.478	[-1.533, 0.342]	-0.217	0.305	[-0.815, 0.382]	0.200	0.240	[-0.271, 0.671]
Seasonally	-1.504*	0.592	[-2.668, -0.340]	-0.763	0.490	[-1.725, 0.198]	-0.281	0.299	[-0.868, 0.306]	0.397	0.246	[-0.087, 0.880]
Occasionally	-1.309*	0.616	[-2.519, -0.099]	-0.593	0.496	[-1.567, 0.381]	-0.287	0.311	[-0.897, 0.323]	0.457	0.249	[-0.032, 0.946]
Dual employment												
No	[REF]			[REF]			[REF]			[REF]		
Yes	-0.247	0.251	[-0.741, 0.247]	-0.080	0.155	[-0.383, 0.224]	-0.047	0.127	[-0.296, 0.202]	0.198*	0.078	[0.045, 0.350]
Relative age difference												
MP younger/<5 years older	[REF]			[REF]			[REF]			[REF]		
5 - 9 years older	0.112	0.196	[-0.273, 0.498]	0.041	0.226	[-0.402, 0.484]	0.036	0.099	[-0.158, 0.230]	0.117	0.113	[-0.106, 0.339]
10+ years older	-1.883	2.010	[-5.953, 2.188]	0.088	0.240	[-0.382, 0.558]	0.355	1.044	[-1.665, 2.440]	0.200	0.120	[-0.036, 0.436]
Constant	-0.507	2.640	[-5.697, 4.683]	1.625	2.387	[-3.060, 6.310]	0.056	1.375	[-1.828, 3.576]	2.758*	1.199	[0.497, 5.222]
Observations		484			977			484			977	
adjusted R-squared		0.335			0.249			0.162			1.330	

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; SE- Standard Error; CI - confidence interval; IPV - intimate partner violence; ref- reference group; sat – satisfaction

***<0.001; ** <0.01; *<0.05

Appendix VII: Paper 2 plots of predicted margins (age stratification)

Involvement in ANC and birth preparedness

None of the moderators had statistically significant effects on the association between relationship satisfaction and involvement for younger male partners. However, for male partners age 25 and older, gender equitable attitudes and emotional violence were significant moderators (see Figure A1). Male partners with medium and high gender-equitable attitudes had a 3.6 percentage point and 7.2 percentage point increase in involvement with each unit increase in their relationship satisfaction, respectively, compared to those with low gender-equitable attitude. While for perpetrators of sexual IPV, perpetrators saw a 13.6 percentage point increase in involvement with each unit increase in relationship satisfaction compared to non-perpetrators.

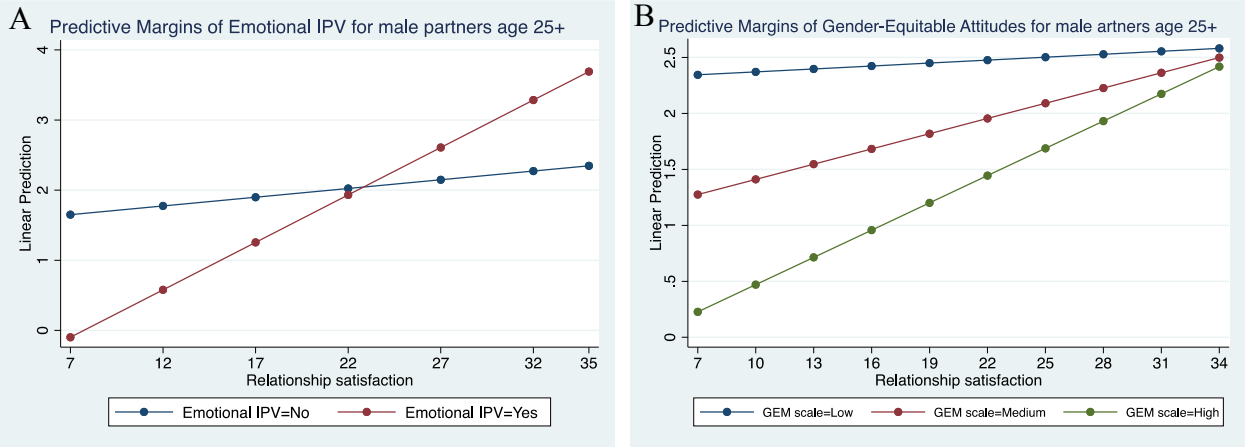

Figure A11: Plots of the predicted margins of statistically significant moderators (A: emotional IPV; B: gender-equitable attitude) in the relationship between relationship satisfaction and male partners' age 25+ involvement in ANC and birth preparedness activities.

Note: Emotional IPV [Average marginal effect for non-perpetrators: 0.0249, p value=0.182; Average marginal effect for perpetrators: 0.1353, p=0.001; Average marginal effect (perpetrators vs non-perpetrators): 0.1105, p value=0.016]. Gender-equitable attitude [Average marginal effect for low GEM: 0.0088, p value=0.665; Average marginal effect for medium GEM: 0.0453, p=0.008; Average marginal effect for high GEM: 0.0811, p=0.002; Average marginal effect (medium vs low): 0.0366, p value=0.021; Average marginal effect (high vs low): 0.0724. p value=0.021; Average marginal effect (high vs medium): 0.0358. p value=0.021]

Involvement in shared decisions

The significant moderating effect of sexual violence was present among older male partners (Table A12 and Figure A2). Male partners age 25 and older who perpetrated sexual violence saw a 5.6 percentage points increase in their level of involvement in shared decisions with each increase in relationship satisfaction compared to those who did not perpetrate sexual violence (average marginal effect– 0.056, p=0.04).

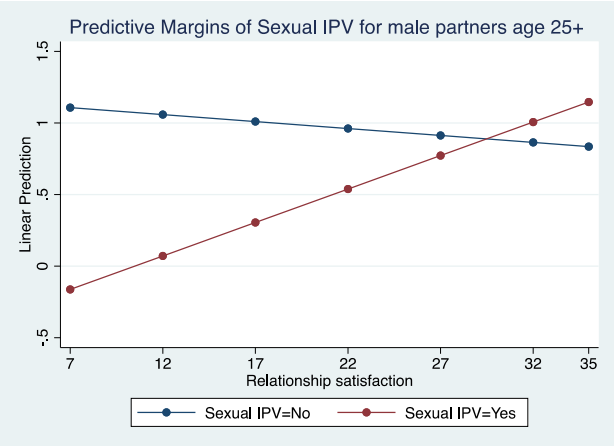

Figure A12: Plot of the predicted margins of a *statistically significant* moderator (sexual IPV) in the relationship between relationship satisfaction and male partners' age 25+ involvement in shared decisions.
Average marginal effect for non-perpetrators: -0.010, p value=0.263; Average marginal effect for perpetrators: 0.047, p=0.077; Average marginal effect (perpetrators vs non-perpetrators): 0.056, p value=0.037.

Appendix VIII: Exploration of the bidirectional relationship between willingness and involvement during pregnancy

Prior to the regression analysis, the bidirectional relationship between male involvement during pregnancy and paternal engagement in childcare were explored using path analysis. As shown in Table A16, none of the associations were significant thus ruling out there is no bidirectional relationship between the indicators measuring male involvement during pregnancy and willingness to participate in childcare.

Table A16: Results of path analysis exploring the bidirectional relationship between male partner's willingness to be involved in childcare and his involvement during pregnancy, Kinshasa 2018

	Interactive Activities		Caregiving Responsibilities	
	Std. Beta	p-value	Std. Beta	p-value
Involvement in antenatal care/birth planning				
Outcome: Willingness	0.017	0.999	-0.015	1.000
Outcome: Involvement	-0.137	0.993	-0.009	1.000
Involvement in shared pregnancy decisions				
Outcome: Willingness	0.026	1.000	-0.019	1.000
Outcome: Involvement	0.010	1.000	0.074	1.000

Note: Std. - Standardized coefficient

Appendix IX: Paper 3 regression results

Table A17: Results of full regression models of male partner's willingness to participate in interactive activities and caregiving responsibilities, Kinshasa 2018

	Interactive Activities						Caregiving Responsibilities					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Normative expectations												
Disagree	[REF]			[REF]			[REF]			[REF]		
Agree	0.380*	0.149	[0.087, 0.673]	0.391**	0.148	[0.100, 0.681]	1.018***	0.290	[0.450, 1.587]	1.040***	0.288	[0.475, 1.605]
Descriptive norms												
Less than half of them	[REF]			[REF]			[REF]			[REF]		
About half of them	0.245	0.146	[-0.041, 0.530]	0.276	0.145	[-0.008, 0.559]	0.502	0.283	[-0.053, 1.056]	0.557*	0.281	[0.006, 1.109]
More than half of them	0.485**	0.179	[0.136, 0.833]	0.474*	0.176	[0.128, 0.820]	1.344***	0.345	[0.668, 2.020]	1.335***	0.343	[0.663, 2.007]
Autonomous												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.036	0.120	[-0.198, 0.271]	0.057	0.119	[-0.176, 0.291]	-0.300	0.232	[-0.755, 0.156]	-0.276	0.232	[-0.731, 0.179]
Personal belief: interactive activities												
No activity extremely appropriate	[REF]			[REF]								
1 activity extremely appropriate	-0.370	0.188	[-0.738, -0.002]	-0.393*	0.186	[-0.757, -0.028]						
≥ 2 activities extremely appropriate	0.607***	0.172	[0.270, 0.943]	0.635***	0.170	[0.302, 0.969]						
Personal belief: caregiving activities												
No activity extremely appropriate							[REF]			[REF]		
1 activity extremely appropriate							-0.467	0.308	[-1.071, 0.137]	-0.389	0.307	[-0.991, 0.213]
≥ 2 activities extremely appropriate							0.482	0.311	[-0.128, 1.091]	0.482	0.309	[-0.123, 1.088]
Community belief: interactive activities												
No activity extremely appropriate	[REF]			[REF]								
1 activity extremely appropriate	0.425*	0.199	[0.034, 0.816]	0.409*	0.198	[0.021, 0.797]						
≥ 2 activities extremely appropriate	0.849***	0.195	[0.468, 1.231]	0.866***	0.193	[0.487, 1.244]						
Community belief: caregiving activities												
No activity extremely appropriate							[REF]			[REF]		
1 activity extremely appropriate							-0.012	0.300	[-0.600, 0.576]	-0.024	0.298	[-0.609, 0.561]
≥ 2 activities extremely appropriate							0.745*	0.325	[0.108, 1.382]	0.776*	0.323	[0.143, 1.410]
Past-year IPV perpetuation‡												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.315**	0.110	[0.099, 0.531]	0.319**	0.109	[0.105, 0.533]	0.703**	0.213	[0.285, 1.122]	0.710***	0.212	[0.294, 1.125]
Injunctive index	0.047*	0.023	[0.002, 0.093]	0.041	0.023	[-0.004, 0.087]	0.061	0.045	[-0.028, 0.150]	0.050	0.045	[-0.038, 0.138]
Involvement in ANC and BP activities	-0.170***	0.023	[-0.215, -0.125]	-0.170***	0.023	[-0.215, -0.125]	-0.144**	0.045	[-0.232, -0.056]	-0.142**	0.045	[-0.230, -0.055]
Involvement in shared preg. decisions	0.135**	0.048	[0.040, 0.229]	0.132**	0.048	[0.038, 0.225]	0.320***	0.093	[0.138, 0.503]	0.318***	0.093	[0.136, 0.499]
Relationship satisfaction	0.035**	0.011	[0.014, 0.056]	0.033**	0.011	[0.012, 0.054]	0.097***	0.021	[0.057, 0.138]	0.095***	0.021	[0.054, 0.135]
Gender-equitable attitude	0.012	0.012	[-0.011, 0.036]	-0.030	0.020	[-0.069, 0.009]	0.026	0.023	[-0.019, 0.071]	-0.059	0.039	[-0.135, 0.016]
Perceived self-efficacy	0.066***	0.013	[0.042, 0.091]	0.119***	0.020	[0.081, 0.158]	0.103***	0.025	[0.055, 0.151]	0.178***	0.038	[0.102, 0.253]
Interaction terms												
Age group x gender-equitable attitude				0.063**	0.024	[0.017, 0.109]				0.126**	0.046	[0.036, 0.216]
Age group x self-efficacy				-0.082***	0.024	[-0.128, -0.036]				-0.115**	0.046	[-0.206, -0.025]
Age distribution												
15-24	[REF]			[REF]			[REF]			[REF]		
25+	0.026	0.138	[-0.244, 0.296]	1.492	1.06	[-0.587, 3.571]	-0.076	0.267	[-0.600, 0.447]	1.210	2.069	[-2.850, 5.269]
Level of education												
Lower than secondary	[REF]			[REF]			[REF]			[REF]		
Secondary complete	0.277*	0.119	[0.042, 0.511]	0.263*	0.118	[0.030, 0.495]	0.404	0.232	[-0.052, 0.860]	0.378	0.231	[-0.075, 0.831]
Higher	0.268	0.157	[-0.040, 0.577]	0.277	0.156	[-0.029, 0.583]	0.038	0.305	[-0.290, 0.906]	0.312	0.304	[-0.285, 0.908]

	Interactive Activities						Caregiving Responsibilities					
	Total sample			Total sample with interaction			Total sample			Total sample with interaction		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Marital Status												
Never married	[REF]			[REF]			[REF]			[REF]		
Ever married	0.375*	0.154	[0.072, 0.678]	0.348*	0.153	[0.047, 0.649]	0.762*	0.300	[0.174, 1.351]	0.726*	0.299	[0.140, 1.311]
Ethnicity												
Bakongo	[REF]			[REF]			[REF]			[REF]		
Bas Kasai & Kwilu-Kwango	0.050	0.139	[-0.222, 0.322]	0.016	0.137	[-0.254, 0.286]	0.176	0.269	[-0.352, 0.704]	0.123	0.268	[-0.403, 0.648]
Kasai/Katana/Tanganyika	0.243	0.181	[-0.113, 0.598]	0.199	0.180	[-0.154, 0.553]	0.841	0.352	[-0.209, 1.171]	0.419	0.350	[-0.269, 1.106]
Other	0.329*	0.167	[0.001, 0.656]	0.266	0.166	[-0.060, 0.591]	0.832**	0.323	[0.199, 1.466]	0.742*	0.322	[0.111, 1.374]
Health zone of residence												
Bumbu	[REF]			[REF]			[REF]			[REF]		
Kingasani	0.804***	0.199	[0.413, 1.195]	0.865***	0.198	[0.476, 1.254]	1.591***	0.388	[0.830, 2.351]	1.682***	0.387	[0.923, 2.441]
Lemba	1.002***	0.213	[0.583, 1.420]	1.037***	0.212	[0.621, 1.452]	1.290**	0.419	[0.469, 2.111]	1.349**	0.417	[0.530, 2.167]
Masina1	0.473*	0.204	[0.073, 0.874]	0.523*	0.203	[0.125, 0.921]	0.839*	0.408	[0.038, 1.639]	0.920*	0.407	[0.122, 1.717]
Matete	0.225	0.214	[-0.195, 0.646]	0.272	0.213	[-0.146, 0.690]	-0.384	0.421	[-1.209, 0.442]	-0.304	0.420	[-1.127, 0.520]
Ndjili	0.814***	0.201	[0.420, 1.208]	0.863***	0.200	[0.471, 1.255]	1.852***	0.394	[1.079, 2.625]	1.909***	0.393	[1.139, 2.680]
Duration of residence in the HZ												
<5 years	[REF]			[REF]			[REF]			[REF]		
5+ years	-0.128	0.143	[-0.408, 0.152]	-0.147	0.142	[-0.425, 0.130]	-0.146	0.278	[-0.691, 0.400]	-0.172	0.277	[-0.715, 0.371]
Always	0.332**	0.117	[0.103, 0.562]	0.310**	0.116	[0.082, 0.538]	0.561*	0.227	[0.116, 1.007]	0.529*	0.226	[0.086, 0.972]
Visitor	-0.251	0.306	[-0.851, 0.349]	-0.268	0.304	[-0.863, 0.328]	-0.629	0.594	[-1.795, 0.536]	-0.649	0.591	[-1.809, 0.511]
No of children ever fathered												
0	[REF]			[REF]			[REF]			[REF]		
1	0.137	0.137	[-0.132, 0.406]	0.13	0.136	[-0.137, 0.396]	0.333	0.267	[-0.190, 0.856]	0.325	0.265	[-0.195, 0.845]
2+	-0.194	0.190	[-0.568, 0.179]	-0.193	0.189	[-0.563, 0.178]	-0.445	0.369	[-1.168, 0.279]	-0.436	0.367	[-1.155, 0.283]
Household wealth												
Low	[REF]			[REF]			[REF]			[REF]		
Middle	0.045	0.126	[-0.201, 0.292]	0.026	0.125	[-0.219, 0.270]	-0.222	0.244	[-0.701, 0.257]	-0.248	0.243	[-0.724, 0.229]
High	0.136	0.135	[-0.130, 0.401]	0.131	0.134	[-0.132, 0.395]	0.218	0.263	[-0.297, 0.733]	0.218	0.261	[-0.295, 0.730]
Employment in the past 12 months												
No Work	[REF]			[REF]			[REF]			[REF]		
Work for cash only	1.401***	0.367	[0.681, 2.122]	1.393***	0.364	[0.679, 2.108]	1.986*	0.713	[0.587, 3.385]	1.974**	0.709	[0.584, 3.365]
Work but not paid, worked for kind or cash and kind	1.250***	0.282	[0.697, 1.803]	1.288***	0.280	[0.739, 1.837]	2.016***	0.548	[0.941, 3.091]	2.068***	0.545	[0.999, 3.138]
Duration of employment												
Unemployed	[REF]			[REF]			[REF]			[REF]		
Throughout the year	-0.986**	0.334	[-1.641, -0.331]	-1.002**	0.331	[-1.651, -0.353]	-1.058	0.649	[-2.332, 0.216]	-1.092	0.646	[-2.358, 0.174]
Seasonally	-1.334***	0.335	[-1.991, -0.676]	-1.376***	0.333	[-2.029, -0.724]	-1.678*	0.651	[-2.955, -0.402]	-1.765**	0.647	[-3.035, -0.495]
Occasionally	-0.991**	0.347	[-1.672, -0.310]	-0.989**	0.344	[-1.664, -0.314]	-1.538*	0.674	[-2.861, -0.216]	-1.546*	0.670	[-2.860, -0.231]
Dual employment												
No	[REF]			[REF]			[REF]			[REF]		
Yes	0.010	0.119	[-0.223, 0.244]	0.035	0.118	[-0.197, 0.267]	0.176	0.230	[-0.276, 0.628]	0.210	0.229	[-0.240, 0.660]
Relative age difference												
MP younger/<5 years older	[REF]			[REF]			[REF]			[REF]		
5 - 9 years older	-0.018	0.134	[-0.281, 0.245]	-0.017	0.133	[-0.278, 0.244]	0.116	0.261	[-0.395, 0.628]	0.121	0.259	[-0.388, 0.630]
10+ years older	-0.123	0.172	[-0.461, 0.215]	-0.151	0.171	[-0.486, 0.185]	0.048	0.334	[-0.608, 0.704]	0.002	0.333	[-0.651, 0.655]
Constant	-2.644***	0.655	[-3.929, -1.359]	--3.458**	0.940	[-5.303, -1.613]	-4.867***	1.323	[-8.403, -3.367]	-6.507***	1.852	[-10.139, -2.875]
Observations		1,461			1,461			1,461			1,461	
adjusted R-squared		0.195			0.210			0.162			0.173	
VIF		1.26						1.26				

Note: ANC- antenatal care; Beta - Unstandardized adjusted coefficient; BP - birth preparedness; HZ - health zone; preg: pregnancy; SE- Standard Error; CI - confidence interval; IPV - intimate partner violence; ref- reference group
***<0.001; ** <0.01; *<0.05

Appendix X: Paper 3 mediation results

Table A18: Results of unstandardized mediation analysis, Kinshasa 2018

	Interactive Activities				Caregiving Responsibilities			
IV: EDUCATION	Beta		SE	95% CI	Beta		SE	95% CI
Mediator: Self-efficacy								
a-path: IV to MV	0.832	***	0.154	[0.530, 1.134]	0.832	***	0.154	[0.530, 1.134]
b-path: MV to Outcome	0.047	***	0.011	[0.025, 0.069]	0.072	**	0.021	[0.031, 0.113]
Direct Effect	0.168	*	0.070	[0.030, 0.306]	0.288	*	0.133	[0.028, 0.548]
Indirect Effect	0.039	**	0.012	[0.018, 0.065]	0.060	**	0.021	[0.023, 0.105]
Proportion of total effect mediated	19%				17%			
Mediator: Gender-equitable attitude								
a-path: IV to MV	0.712	***	0.162	[0.395, 1.029]	0.712	***	0.162	[0.395, 1.029]
b-path: MV to Outcome	-0.031	**	0.011	[-0.052, -0.011]	-0.034		0.020	[-0.073, 0.005]
Direct Effect	0.229	**	0.070	[0.091, 0.367]	0.372	**	0.133	[0.112, 0.632]
Indirect Effect	-0.022	*	0.009	[-0.043, -0.007]	-0.024		0.015	[-0.058, 0.004]
Proportion of total effect mediated	11%				N/A			

Note: Beta - Unstandardized coefficient; CI - confidence interval; IV - independent variable; MV- mediating variable; SE- Standard Error
***<0.001; ** <0.01; *<0.05

Table A19: Results of standardized mediation analysis, by age group, Kinshasa 2018

	Interactive Activities				Caregiving Responsibilities			
IV: EDUCATION	Beta		SE	95% CI	Beta		SE	95% CI
Age 15-24								
Mediator: Self-efficacy								
a-path: IV to MV	0.106	*	0.045	[0.018, 0.194]	0.106	*	0.045	[0.018, 0.194]
b-path: MV to Outcome	0.208	***	0.039	[0.131, 0.284]	0.225	***	0.040	[0.145, 0.304]
Direct Effect	-0.020		0.043	[-0.105, 0.065]	-0.0003		0.044	[-0.086, 0.085]
Indirect Effect	0.022	*	0.010	[0.004, 0.043]	0.024	*	0.011	[0.005, 0.047]
Proportion of total effect mediated	1204%				101%			
Mediator: Gender-equitable attitude								
a-path: IV to MV	0.057		0.040	[-0.021, 0.136]	0.057		0.041	[-0.024, 0.139]
b-path: MV to Outcome	-0.190	***	0.042	[-0.272, -0.107]	-0.173	***	0.045	[-0.262, -0.085]
Direct Effect	0.013		0.437	[-0.073, 0.098]	0.034		0.043	[-0.051, 0.119]
Indirect Effect	-0.011		0.009	[-0.029, 0.005]	-0.010		0.008	[-0.027, 0.005]
Proportion of total effect mediated	N/A				N/A			
Age 25+								
Mediator: Self-efficacy								
a-path: IV to MV	0.113	***	0.028	[0.058, 0.168]	0.113	***	0.028	[0.058, 0.168]
b-path: MV to Outcome	0.049		0.029	[-0.008, 0.105]	0.015	*	0.031	[-0.046, 0.075]
Direct Effect	0.091	**	0.030	[0.032, 00150]	0.071		0.030	[0.012, 0.131]
Indirect Effect	0.091		0.004	[-0.001, 0.014]	0.091		0.003	[-0.005, 0.009]
Proportion of total effect mediated	N/A				N/A			
Mediator: Gender-equitable attitude								
a-path: IV to MV	0.101	***	0.029	[0.044, 0.158]	0.101	***	0.029	[0.044, 0.158]
b-path: MV to Outcome	-0.021		0.031	[-0.081, 0.040]	0.013		0.030	[-0.046, 0.072]
Direct Effect	0.099	**	0.030	[0.040, 0.158]	0.072	*	0.030	[0.013, 0.130]
Indirect Effect	-0.002		0.003	[-0.009, 0.004]	0.001		0.003	[-0.005, 0.008]
Proportion of total effect mediated	N/A				N/A			

Note: CI - confidence interval; IV - independent variable; MV- mediating variable; Std. - Standardized coefficient; SE- Standard Error
***<0.001; ** <0.01; *<0.05

Appendix XI: Participation bias

Male partners of FTMs were recruited into the study if the FTM gave her consent, thus it is plausible that characteristics of FTMs who consented to male partner participation may differ from those who did not provide consent. This may indicate some participation bias and could influence the generalization of the study's findings. Characteristics of FTMs with male partners in the study who provided male partner consent were compared to the characteristics of those who did not consent. It's important to note that there was not possible to identify FTMs who consented to male participation, but their male partners were not interviewed because the men refused (n=62), were not at home (n=38), or could not be found (n=215). As a result, the FTM of these men were included in the no consent category.

Significantly more FTMs who consented to male partner participation were older, had a secondary education, were ever married, and lived in the health zone for less than 5 years. There were no significant differences in the remaining characteristics explored.

Table A20: Characteristics of first-time mothers who consented to male partner participation in the MOMENTUM study, Kinshasa 2018

Characteristics of FTMs	No	Yes	Total	
Age distribution				***
15 - 19	55.7	44.8	48.2	
20 - 24	44.3	55.2	51.8	
Level of education				***
None/Primary	10.2	5.9	7.2	
Secondary	85.6	85.1	85.2	
Higher	4.2	9.1	7.6	
Marital Status				***
Ever married	50.5	79.7	70.6	
Never married	49.5	20.3	29.4	
Ethnicity				
Bakongo	38.3	36.6	37.1	
Bas Kasai & Kwilu-Kwango	28.7	28.0	28.2	
Kasai/Katana/Tanganyika	14.6	14.8	14.7	
Other	18.4	20.7	19.9	
Health zone of residence				***
Bumbu	12.1	12.4	12.3	
Kingasani	29.2	23.1	25.2	
Lemba	14.5	13.6	13.9	
Masina1	16.1	22.3	20.2	
Matete	13.1	10.7	11.5	
Ndjili	15.0	18.0	17.0	
Duration of residence in the health zone				***
<5 years	52.5	64.8	60.7	
5+ years	7.1	5.1	5.7	
Always	38.0	28.2	31.5	
Visitor	2.4	1.9	2.1	
Employment in the past 12 months				
Not employed	64.6	63.6	63.9	
Work, but not paid or paid in kind	6.3	5.3	5.6	
Work for cash and kind, or cash	29.1	31.2	30.5	
Household wealth				
Low	36.4	34.5	35.1	
Middle	34.1	33.3	33.6	
High	29.5	32.2	31.3	
Total	100.0	100.0	100.0	
N	757	1,674	2,431	

***<0.001; ** <0.01; *<0.05

Appendix XII: Questions extracted from the Momentum baseline questionnaire

#	QUESTION AND FILTERS	CODING CATEGORY
	BACKGROUND VARIABLES	
1	What is the main source of drinking water for members of your household?	PIPED WATER ..... 01 TUBE WELL OR BOREHOLE ..... 02 DUG WELL ..... 03 WATER FROM SPRING ..... 04 RAINWATER ..... 05 TAKER TRUCK ..... 06 CART WITH SMALL TRUCK ..... 07 SURFACE WATER (RIVER/DAMLAKE/POND, STREAM/CANAL/IRRIGATION CANAL) ..... 08 BOTTLED WATER ..... 09 OTHER _____ 96 (SPECIFY)
2	What kind of toilet facility do members of your household usually use?	FLUSH OR POUR FLUSH TOILET ..... 01 VENTILATED IMPROVED PIT LATRINE ..... 02 PIT LATRINE WITH SLAB ..... 03 PIT LATRINE WITHOUT SLAB/OPEN PIT ..... 04 COMPOSTING TOILET ..... 05 BUCKET TOILET ..... 06 HANGING TOILET/HANGING LATRINE ..... 07 NO FACILITY/BUSH/FIELD ..... 08 OTHER _____ 09 (SPECIFY)
3	What type of fuel does your household mainly use for cooking?	ELECTRICITY ..... 01 LPG ..... 02 NATURAL GAS ..... 03 BIOGAS ..... 04 KEROSENE ..... 05 COAL, LIGNITE ..... 06 CHARCOAL ..... 07 WOOD ..... 08 STRAW/SHRUBS/GRASS ..... 09 CROP RESIDUE/PLANT STALKS ..... 10 ANIMAL DUNG ..... 11 NO FOOD COOKED IN HOUSEHOLD ..... 95 OTHER _____ 96 (SPECIFY)
4	Does your household have: A Electricity? B A radio? C A television? D A non-mobile telephone?	YES / NO A ELECTRICITY ..... 1 2 B RADIO ..... 1 2 C TELEVISION 1 2

	E A computer? F A refrigerator? G A stove: gas burner or electric stove?	D NON-MOBILE TELEPHONE..... 1 2 E COMPUTER..... 1 2 F REFRIDGERATOR ..... 1 2 G STOVE..... 1 2
5	Does any member of this household own: A A watch? B A mobile phone? C A bicycle? D A motorcycle/scooter? E An animal-drawn cart? F A car/truck? G A boat with a motor?	YES NO A WATCH..... 1 2 B MOBILE PHONE ..... 1 2 C BICYCLE ..... 1 2 D MOTORCYCLE/SCOOTER ..... 1 2 E ANIMAL-DRAWN CART..... 1 2 F CAR/TRUCK..... 1 2 G BOAT WITH MOTOR..... 1 2
6	Does any member of this household have a bank account?	YES..... 1 NO 2
7	OBSERVE MAIN MATERIAL OF THE FLOOR OF THE DWELLING. RECORD OBSERVATION.	NATURAL FLOOR EARTH/SAND ..... 11 DUNG..... 12 RUDIMENTARY FLOOR WOOD PLANKS ..... 21 PALM/BAMBOO..... 22 FINISHED FLOOR PARQUET OR POLISHED WOOD ..... 31 VINYL OR ASPHALT STRIPS..... 32 CERAMIC TILES ..... 33 CEMENT..... 34 CARPET ..... 35 OTHER _____ 96 (SPECIFY)
8	OBSERVE MAIN MATERIAL OF THE ROOF OF THE DWELLING. RECORD OBSERVATION.	NATURAL ROOFING NO ROOF ..... 11 THATCH/PALM LEAF ..... 12 SOD..... 13 RUDIMENTARY ROOFING RUSTIC MAT..... 21 PALM/BAMBOO..... 22 WOOD PLANKS ..... 23 CARDBOARD..... 24 FINISHED ROOFING METAL ..... 31 WOOD ..... 32 CALAMINE/CEMENT FIBER..... 33 CERAMIC TILES ..... 34 CEMENT..... 35 ROOFING SHINGLES..... 36 OTHER _____ 96 (SPECIFY)

9	OBSERVE MAIN MATERIAL OF THE EXTERIOR WALLS OF THE DWELLING. RECORD OBSERVATION.	NATURAL WALLS NO WALLS..... 11 CANE/PALM/TRUNKS ..... 12 DIRT ..... 13 RUDIMENTARY WALLS BAMBOO WITH MUD ..... 21 STONE WITH MUD..... 22 UNCOVERED ADOBE..... 23 PLYWOOD..... 24 CARDBOARD ..... 25 REUSED WOOD..... 26 FINISHED WALLS CEMENT..... 31 STONE WITH LIME/CEMENT..... 32 BRICKS ..... 33 CEMENT BLOCKS ..... 34 COVERED ADOBE..... 35 WOOD PLANKS/SHINGLES..... 36 OTHER _____ 96 (SPECIFY)
10	How long have you been living continuously in this health zone? IF LESS THAN ONE YEAR, RECORD '00' YEARS.	YEARS ..... ▒▒ ALWAYS..... 95 VISITOR..... 96
11	In what month and year were you born?	MONTH ..... ▒▒ DON'T KNOW MONTH ..... 98 YEAR ..... ▒▒▒▒ DON'T KNOW YEAR 9998
12	Have you ever attended school?	YES..... 1 NO 2
13	What is the highest level of school you attended: primary, secondary or higher?	PRIMARY..... 1 SECONDARY..... 2 HIGHER..... 3
14	What is the highest (GRADE/FORM/YEAR) you completed at that level? IF COMPLETED LESS THAN ONE YEAR AT THAT LEVEL, RECORD '00'.	[GRADE/FORM/YEAR]..... ▒▒
15	What is your ethnic group?	BAKONGO..... 01 BAS KASAI AND KWILU-KWANGO..... 02 CUVETTE CENTRAL ..... 03 UBANGI ET ITIMBIRI-NGIRI..... 04

		UELE; LAKE ALBERT ..... 05 BASELE-KOMO, MANIEMA ET KIVU..... 06 KASAÏ; KATANGA; TANGANYIKA ..... 07 LUNDA..... 08 PYGMY..... 09 OTHER _____ 98 (SPECIFY)
16	What is your marital or partnership status now?	CURRENTLY MARRIED ..... 1 LIVING TOGETHER..... 2 FORMALLY ENGAGED..... 3 WIDOWED..... 4 DIVORCED..... 5 SEPARATED..... 6 NEVER MARRIED ..... 7 OTHER _____ 9 (SPECIFY)
17	Now, I would like to talk about work. Have you done any work in the last 7 days?	YES..... 1 NO 2
18	Although you did not work in the last seven days, do you have any job or business from which you were absent for leave, illness, vacation, or any other such reason? SKIP IF QUESTION #17 IS YES	YES..... 1 NO 2
19	Have you done any work in the last 12 months? SKIP IF QUESTION #17 IS YES	YES..... 1 NO 2
20	Do you usually work throughout the year, or do you work seasonally, or only once in a while?	THROUGHOUT THE YEAR ..... 1 SEASONALLY/PART OF THE YEAR ..... 2 ONCE IN A WHILE 3
21	Are you paid in cash or kind for this work or are you not paid at all?	CASH ONLY ..... 1 CASH AND KIND ..... 2 IN KIND ONLY ..... 3 NOT PAID 4
	VARIABLES IN PAPERS 2 AND 3	
22	Can you please tell me three important benefits of a woman seeing someone for antenatal care when she is pregnant? RECORD ALL MENTIONED DO NOT READ OUT LIST	CHECK FOR DANGER SIGNS..... A CHECK THAT BABY IS GROWING WELL..... B BE IMMUNIZED AGAINST TETANUS ..... C GET TABLETS TO PREVENT ANEMIA..... D GET MEDICINE TO PREVENT MALARIA..... E LEARN TO PREPARE FOR HEALTHY BIRTH ..... F LEARN HOW TO CARE FOR NEWBORN..... G CAN'T NAME ANY BENEFITS..... H OTHER _____ X (SPECIFY)
23	How many times should a pregnant woman go for antenatal care?	NUMBER..... ▒▒ DON'T KNOW/CAN'T REMEMBER..... 98

24	In what month of pregnancy should a woman start attending antenatal services?	NUMBER..... ▒▒ DON'T KNOW/CAN'T REMEMBER..... 98
25	Were you present during any of those antenatal check-ups?	YES..... 1 NO 2
26	What danger signs during pregnancy, delivery or soon thereafter do you know that need immediate medical attention? ANYTHING ELSE? RECORD ALL MENTIONED DO NOT READ OUT LIST	SEVERE HEADACHE..... A FEVER ..... B FOUL DISCHARGE ..... C PLACENTA DOES NOT FOLLOW BABY IN 30 MINS. D SWOLLEN FEET ..... E FITS OR CONVULSIONS..... F SEVERE BLEEDING ..... G PROLONGED LABOR OF 12 HOURS OR MORE..... H BABY DOES NOT COME HEAD FIRST..... I OTHER _____ X (SPECIFY)
27	What signs tell you that your newborn is in danger and needs health care right away? ANYTHING ELSE? RECORD ALL MENTIONED DO NOT READ OUT LIST	HIGH FEVER..... A FITS, CONVULSION, SHAKING OF BODY ..... B YELLOW EYES, PALMS OR SOLES OF FEET ..... C DIFFICULTY OR FAST BREATHING..... D DIFFICULTY OR FAST BREATHING..... E FEELS COLDER THAN NORMAL..... F RED, SWELLING, OR PUS AROUND EYES..... G RED, SWELLING, PUS OR BAD SMELL AROUND BELLY BUTTON OR CORD..... H OTHER _____ X (SPECIFY)
28	How can you and (NAME OF FTM) prepare for a possible maternal emergency? ANYTHING ELSE? RECORD ALL MENTIONED DO NOT READ OUT LIST	LEARN DANGER SIGNS..... A SAVE MONEY FOR EMERGENCY CARE..... B OBTAIN STANDING PERMISSION FROM FTM'S FAMILY TO GO TO HOSPITAL..... C ARRANGE FOR EMERGENCY TRANSPORT..... D MAKE SURE FAMILY KNOWS BLOOD DONOR..... E OTHER _____ X (SPECIFY)
29	Please tell me if you (have) participated in the following things for (NAME OF FTM)'s pregnancy: A Finding information about the pregnancy? B Making decisions about antenatal care? C Making a birth plan? D Saving money for emergencies? E Arranging transport for delivery? F Deciding on skilled attendance at delivery? G Arranging for a blood donor?	YES NO A FINDING INFORMATION..... 1 2 B ANTENATAL CARE DECISIONS ..... 1 2 C BIRTH PLAN ..... 1 2 D SAVING MONEY..... 1 2 E ARRANGING TRANSPORT 1 2

	H Encouraging exclusive breastfeeding? X Anything else?	F SKILLED ATTENDANCE ..... 1 2 G ARRANGE BLOOD DONOR ..... 1 2 OTHER _____ X (SPECIFY)
30	Please tell me how willing you are to perform the following activities after (NAME OF FTM'S) first child is born? Will you be not at all willing, somewhat unwilling, undecided, somewhat willing, or extremely willing? A Changing the baby's diapers? B Helping/supporting feeding? C Helping when baby cries? D Bathing the baby? E Playing with the baby? F Looking after the baby when the mother goes out or is at work? G Washing the baby's clothes? H Cooking or preparing food? I House cleaning? J Putting the baby to sleep/bed? K Singing to the baby? L Talking to the baby? M Staying home when the child is/was sick? N Smiling/making silly faces at the baby? O Dancing with the baby? P Taking the baby to the doctor X Anything else?	NOT AT ALL / SOMEWHAT UNWILLING / UNDECIDED / SOMEWHAT WILLING / EXTREMELY WILLING A CHANGING DIAPERS ..... 1 2 3 4 5 B HELPING WITH FEEDING..... 1 2 3 4 5 C HELPING WHEN BABY CRIES..... 1 2 3 4 5 D BATHING BABY ..... 1 2 3 4 5 E PLAYING WITH BABY..... 1 2 3 4 5 F LOOKING AFTER BABY ..... 1 2 3 4 5 G WASHING BABY'S CLOTHES..... 1 2 3 4 5 H COOKING/PREPARING FOOD.... 1 2 3 4 5 I HOUSE CLEANING..... 1 2 3 4 5 J PUTTING BABY TO SLEEP ..... 1 2 3 4 5 K SINGING TO BABY ..... 1 2 3 4 5 L TALKING TO BABY ..... 1 2 3 4 5 M STAY HOME WITH SICK BABY ... 1 2 3 4 5 N MAKING SILLY FACES ..... 1 2 3 4 5 O DANCING WITH BABY ..... 1 2 3 4 5 P TAKING BABY TO DOCTOR..... 1 2 3 4 5 OTHER _____ X (SPECIFY)
31	Would you say that **where to deliver the baby** is (was) mainly your decision, mainly (NAME OF FTM)'s decision, someone else's decision, or do (did) you and (NAME OF FTM) decide together?	RESPONDENT ..... 1 FTM ..... 2 RESPONDENT AND FTM JOINTLY..... 3 SOMEONE ELSE ..... 4 OTHER _____ X (SPECIFY)
32	Would you say that **when to seek care and treatment for danger signs** of the newborn is (was) mainly your decision, mainly (NAME OF FTM)'s decision, someone else's decision, or do (did) you and (NAME OF FTM) decide together?	RESPONDENT ..... 1 FTM ..... 2 RESPONDENT AND FTM JOINTLY..... 3 SOMEONE ELSE ..... 4 OTHER _____ X (SPECIFY)
33	Would you say **that where to seek care and treatment for danger signs** of the mother or newborn is (was) mainly your decision, mainly (NAME OF FTM)'s decision, someone else's decision, or do (did) you and (NAME OF FTM) decide together?	RESPONDENT ..... 1 FTM ..... 2 RESPONDENT AND FTM JOINTLY..... 3 SOMEONE ELSE 4

		OTHER _____ X (SPECIFY)
34	The next set of questions will ask you about your views on the relations between men and women. Please indicate if you totally agree, partially agree, or disagree with the following statements. A A woman's most important role is to take care of her home and cook for her family. B Men need sex more than women do. C You don't talk about sex; you just do it. D There are times when a woman deserves to be beaten E Changing diapers, giving a bath, and feeding kids is the mother's responsibility. F It is a woman's responsibility to avoid getting pregnant. G A man should have the final word about decisions in his home. H Men are always ready to have sex. I A woman should tolerate violence in order to keep her family together. J I would be outraged if my wife asked me to use a condom. K A man and a woman should decide together what type of contraceptive to use. L I would never have a gay friend. M If someone insults me, I will defend my reputation, with force if I have to. N To be a man, you need to be tough. O Men should be embarrassed if they are unable to get an erection during sex. X Anything else?	TOTALLY AGREE / PARTIALLY AGREE / DISAGREE A WOMEN'S ROLE ..... 1 2 3 B MEN NEED SEX MORE ..... 1 2 3 C DON'T TALK ABOUT SEX ..... 1 2 3 D DESERVE BEATING..... 1 2 3 E CHANGING DIAPERS..... 1 2 3 F WOMAN'S RESPONSIBILITY..... 1 2 3 G HAVE FINAL WORD..... 1 2 3 H ALWAYS READY ..... 1 2 3 I TOLERATE VIOLENCE..... 1 2 3 J OUTRAGED..... 1 2 3 K DECIDE CONTRACEPTIVE USE ..... 1 2 3 L GAY FRIEND..... 1 2 3 M DEFEND REPUTATION ..... 1 2 3 N NEED TO BE TOUGH..... 1 2 3 O EMBARASSED..... 1 2 3 OTHER _____ X (SPECIFY)
35	Now I am going to read you a number of sentences. Please let me know if these sentences about you are not at all true, hardly true, moderately true, or exactly true. A I can always manage to solve difficult problems if I try hard enough. B If someone opposes me, I can find the means and ways to get what I want. C It is easy for me to stick to my aims and accomplish my goals. D I am confident that I could deal efficiently with unexpected events. E Thanks to my resourcefulness, I know how to handle unforeseen situations. F I can solve most problems if I invest the necessary effort.	NOT AT ALL TRUE / HARDLY TRUE / MODERATELY / HARDLY TRUE A ALWAYS MANAGE..... 1 2 3 4 B FIND MEANS AND WAYS..... 1 2 3 4 C ACCOMPLISH GOALS..... 1 2 3 4 D CONFIDENT..... 1 2 3 4 E HANDLE UNFORESEEN..... 1 2 3 4 F SOLVE PROBLEMS..... 1 2 3 4 G REMAIN CALM 1 2 3 4

	G I can remain calm when facing difficulties because I can rely on my coping abilities. H When I am confronted with a problem, I can usually find several solutions. I If I am in trouble, I can usually think of a solution. J I can usually handle whatever comes my way.	H FIND SOLUTIONS..... 1 2 3 4 I THINK OF SOLUTIONS ..... 1 2 3 4 J CAN HANDLE..... 1 2 3 4
36	Now I want to ask you some questions about social norms regarding parents' involvement in child care. By child care, we are referring to the care of children under the age of 12 months. How appropriate do you think each of the following activities is for fathers to do: extremely inappropriate, inappropriate, appropriate, or extremely appropriate? A Changing the baby's diapers? B Helping/supporting feeding? C Helping when baby cries? D Bathing the baby? E Playing with the baby? F Looking after the baby when the mother goes out or is at work? G Washing the baby's clothes? H Cooking or preparing food? I House cleaning? J Putting the baby to sleep/bed? K Singing to the baby? L Talking to the baby? M Staying home when the child is/was sick? N Smiling/making silly faces at the baby? O Dancing with the baby? P Taking the baby to the doctor	EXTREMELY INAPPROPRIATE / INAPPROPRIATE / APPROPRIATE / EXTREMELY APPROPRIATE A CHANGING DIAPERS ..... 1 2 3 4 B HELPING WITH FEEDING ..... 1 2 3 4 C HELPING WHEN BABY CRIES ..... 1 2 3 4 D BATHING BABY..... 1 2 3 4 E PLAYING WITH BABY..... 1 2 3 4 F LOOKING AFTER BABY ..... 1 2 3 4 G WASHING BABY'S CLOTHES..... 1 2 3 4 H COOKING/PREPARING FOOD ..... 1 2 3 4 I HOUSE CLEANING..... 1 2 3 4 J PUTTING BABY TO SLEEP..... 1 2 3 4 K SINGING TO BABY ..... 1 2 3 4 L TALKING TO BABY ..... 1 2 3 4 M STAY HOME WITH SICK BABY..... 1 2 3 4 N MAKING SILLY FACES ..... 1 2 3 4 O DANCING WITH BABY..... 1 2 3 4 P TAKING BABY TO DOCTOR 1 2 3 4
37	How appropriate would most fathers in your community think the following activities are for fathers to do - extremely inappropriate, inappropriate, appropriate, or extremely appropriate? A Changing the baby's diapers? B Helping/supporting feeding? C Helping when baby cries? D Bathing the baby? E Playing with the baby? F Looking after the baby when the mother goes out or is at work? G Washing the baby's clothes? H Cooking or preparing food? I House cleaning? J Putting the baby to sleep/bed? K Singing to the baby?	EXTREMELY INAPPROPRIATE / INAPPROPRIATE / APPROPRIATE / EXTREMELY APPROPRIATE A CHANGING DIAPERS ..... 1 2 3 4 B HELPING WITH FEEDING ..... 1 2 3 4 C HELPING WHEN BABY CRIES ..... 1 2 3 4 D BATHING BABY..... 1 2 3 4 E PLAYING WITH BABY..... 1 2 3 4 F LOOKING AFTER BABY ..... 1 2 3 4 G WASHING BABY'S CLOTHES..... 1 2 3 4 H COOKING/PREPARING FOOD ..... 1 2 3 4 I HOUSE CLEANING..... 1 2 3 4

	L Talking to the baby? M Staying home when the child is/was sick? N Smiling/making silly faces at the baby? O Dancing with the baby? P Taking the baby to the doctor	J PUTTING BABY TO SLEEP..... 1 2 3 4 K SINGING TO BABY ..... 1 2 3 4 L TALKING TO BABY ..... 1 2 3 4 M STAY HOME WITH SICK BABY..... 1 2 3 4 N MAKING SILLY FACES ..... 1 2 3 4 O DANCING WITH BABY ..... 1 2 3 4 P TAKING BABY TO DOCTOR..... 1 2 3 4
38	How many fathers in your community do you believe perform routine child care activities for children under 12 months of age (such as, changing the diapers, bathing the baby, washing the baby's clothes, taking the baby to the doctor, etc.) : all of them, more than half of them, about half of them, less than half of them, or none of them?	ALL OF THEM ..... 1 MORE THAN HALF OF THEM ..... 2 ABOUT HALF OF THEM..... 3 LESS THAN HALF OF THEM ..... 4 NONE OF THEM..... 5
39	Please tell me up to five people who are most important to you, either generally, or when deciding how you, as a father, should care for your children under 12 months of age. What are these people's relationship to you? A Mother? B Father? C (NAME OF FTM) D Sister? E Other family member? F Mother-in-law/FTM's mother G Friend? H Religious authority figure? I Health worker? J Teacher? K Co-worker? L Neighbor? M Other? OTHER _____ (SPECIFY) DO NOT READ OUT THE OPTIONS/RESPONSES. RECORD THE RELATIONSHIP TO FIRST PERSON MENTION IN THE COLUMN "1ST", TO THE SECOND PERSON MENTIONED IN THE COLUMN "2ND", ETC.	1ST 2ND 3RD 4TH 5TH A MOTHER..... 1 2 3 4 5 B FATHER ..... 1 2 3 4 5 C FTM..... 1 2 3 4 5 D SISTER ..... 1 2 3 4 5 E OTHER FAMILY ..... 1 2 3 4 5 F MOTHER-IN-LAW ..... 1 2 3 4 5 G FRIEND ..... 1 2 3 4 5 H RELIGIOUS ..... 1 2 3 4 5 I HEALTH WORKER..... 1 2 3 4 5 J TEACHER ..... 1 2 3 4 5 K CO-WORKER..... 1 2 3 4 5 L NEIGHBOR..... 1 2 3 4 5 M OTHER..... 1 2 3 4 5
40	Would the following people you mentioned approve or disapprove of you performing routine child care activities (such as, changing the diapers, bathing the baby, washing the baby's clothes, taking the baby to the doctor, etc.) for your child who is under 12 months of age? A Mother? B Father?	APPROVE DISAPPROVE NOT MENTIONED A MOTHER 1 2 3

	C (NAME OF FTM) D Sister? E Other family member? F Mother-in-law/FTM's mother G Friend? H Religious authority figure? I Health worker? J Teacher? K Co-worker? L Neighbor? M Other? CHECK QUESTION #39 AND RECORD "3" IF PERSON WAS NOT MENTIONED.	B FATHER ..... 1 2 3 C FTM..... 1 2 3 D SISTER ..... 1 2 3 E OTHER FAMILY..... 1 2 3 F MOTHER-IN-LAW..... 1 2 3 G FRIEND..... 1 2 3 H RELIGIOUS ..... 1 2 3 I HEALTH WORKER..... 1 2 3 J TEACHER..... 1 2 3 K CO-WORKER ..... 1 2 3 L NEIGHBOR ..... 1 2 3 M OTHER..... 1 2 3
41	Please tell me whether you strongly agree, agree, disagree or strongly disagree with each of the following statements: When it comes to deciding how to care for my child who is under 12 months of age, I want to do: A What my mother thinks I should do. B What my father thinks I should do. C What my husband/partner thinks I should do. D What my sister thinks I should do. E What other family members thinks I should do. F What my mother-in-law/partner's mother thinks I should do. G What my friends think I should do. H What my religion thinks I should do. I What my health worker thinks I should do. J What my teacher thinks I should do. K What my co-worker thinks I should do. L What my neighbor thinks I should do. M What people in my community think I should do. ASK ALL QUESTIONS EVEN IF THE PERSON WAS NOT MENTIONED BY THE RESPONDENT IN QUESTION #40.	STRONGLY AGREE / AGREE / DISAGREEE / STRONGLY DISAGREE A MOTHER ..... 1 2 3 4 B FATHER ..... 1 2 3 4 C FTM..... 1 2 3 4 D SISTER ..... 1 2 3 4 E OTHER FAMILY..... 1 2 3 4 F MOTHER-IN-LAW..... 1 2 3 4 G FRIEND..... 1 2 3 4 H RELIGIOUS ..... 1 2 3 4 I HEALTH WORKER..... 1 2 3 4 J TEACHER..... 1 2 3 4 K CO-WORKER ..... 1 2 3 4 L NEIGHBOR ..... 1 2 3 4 M OTHER..... 1 2 3 4
42	Please tell me whether you strongly agree, agree, disagree, or strongly disagree with the following statement: Most people who are important to me think I ought to perform routine childcare activities (such as, changing the diapers, bathing the baby, washing the baby's clothes, taking the baby to the doctor, etc.) for my child who is under 12 months of age.	STRONGLY AGREE..... 1 AGREE..... 2 DISAGREE ..... 3 STRONGLY DISAGREE 4
43	If most of the people who are important to you did not want you to perform routine childcare activities (such as, changing the diapers, bathing the bay, washing the baby's clothes, taking the baby to the doctor, etc.) for your baby who is under 12 months of age, would you still do it?	YES..... 1 NO 2

44	Now I need to ask some more questions about your relationship with (NAME OF FTM). A. Have you ever:				B. How often did this happen during the last 12 months: often, only sometimes, or not at all?			
		EVER				OFTEN	SOMETIMES	NOT IN THE LAST 12 MONTHS
	A Said or done something to humiliate her in front of others?	YES NO	1 2	® -	®	1	2	3
	B Threatened to hurt or harm her or someone she cares about?	YES NO	1 2	® -	®	1	2	3
	C Insulted her or made her feel bad about herself?	YES NO	1 2	®	®	1	2	3
45	A. Have you ever done any of the following things to (NAME OF FTM)?				B. How often did this happen during the last 12 months: often, only sometimes, or not at all?			
		EVER				OFTEN	SOMETIMES	NOT IN THE LAST 12 MONTHS
	A push her, shake her, or throw something at her?	YES NO	1 2	® -	®	1	2	3
	B twist her arm or pull her hair?	YES NO	1 2	® -	®	1	2	3
	C punch her with your fist or with something that could hurt her?	YES NO	1 2	® -	®	1	2	3
	D Insulted her or made her feel bad about herself?	YES NO	1 2	® -	®	1	2	3
	E kick her, drag her, or beat her up?	YES NO	1 2	® -	®	1	2	3
	F try to choke her or burn her on purpose?	YES NO	1 2	® -	®	1	2	3
	G threaten or attack her with a knife, gun, or other weapon?	YES NO	1 2	® -	®	1	2	3
	H physically force her to have sexual intercourse with you when she did not want to?	YES NO	1 2	® -	®	1	2	3
	I physically force her to perform any other sexual acts she did not want to?	YES NO	1 2	® -	®	1	2	3
	J forced her with threats or in any other way to perform sexual	YES NO	1 2	®	®	1	2	3

	acts she did not want to?	
46	Now I would like to ask you some questions to find out how satisfied you are with your relationship with (NAME OF FTM). For each question, give me a number between 1 and 5, where 1 means low and 5 means high. A How well does (NAME OF FTM) meet your needs? B In general, how satisfied are you with your relationship? C How good is your relationship compared to most? D How often do you wish you had not gotten into this relationship? E To what extent has your relationship met your original expectations? F How much do you love (NAME OF FTM)? G How many problems are there in your relationship?	LOW HIGH A MEET NEEDS ..... 1 2 3 4 5 B SATISFIED ..... 1 2 3 4 5 C QUALITY OF RELATIONSHIP.. 1 2 3 4 5 D NOT GOETTEN INTO RELATIONSHIP..... 1 2 3 4 5 E ORIGINAL EXPECTATIONS .... 1 2 3 4 5 F HOW MUCH LOVE..... 1 2 3 4 5 G HOW MANY PROBLEMS..... 1 2 3 4 5

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