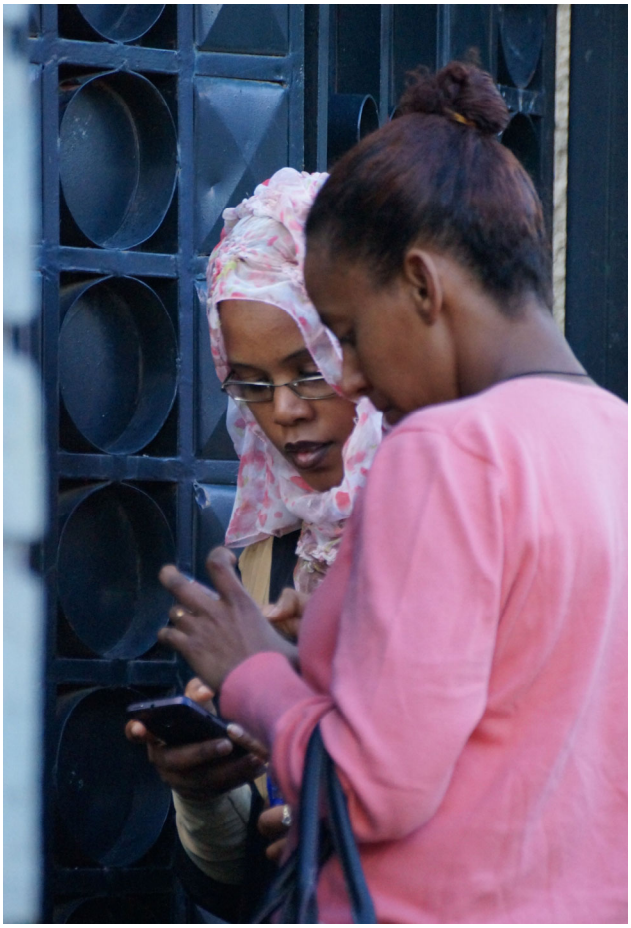
Women's and Girls' Empowerment in Sexual and Reproductive Health Index Construction



Technical Report
October 2018

PMA2020
Performance Monitoring and Accountability 2020
Measuring Performance, Informing Policy, Empowering Communities.

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ACKNOWLEDGEMENTS: This study was conducted with support received from the Bill & Melinda Gates Foundation through two grants received by the Bill & Melinda Gates Institute for Population and Reproductive Health for the Performance Monitoring and Accountability 2020 (OPP1079004) and PMA Plus (OPP1163880) projects.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Women's and Girls' Empowerment in Sexual and Reproductive Health (WGE-SRH) project is the product of a collaborative study involving research teams from Addis Ababa University in Ethiopia; Bayero University Kano and the Center for Research, Evaluation and Resource Development in Nigeria; Makerere University in Uganda; and the Bill & Melinda Gates Institute for Population and Reproductive Health at Johns Hopkins University in the United States. The project aimed to 1) develop a comprehensive WGE-SRH framework, building on existing literature and grounding our process in the voices of women from different geographies and cultural settings in sub-Saharan Africa, and 2) develop a quantitative WGE-SRH index reflecting the proposed framework. The resulting multidimensional WGE-SRH index captures a process including women's sexual and reproductive autonomy (existence of choice) and women's sexual and reproductive self-efficacy, decision-making, and negotiation (exercise of choice). The WGE-SRH index was developed and tested across three sub-Saharan African country settings (Ethiopia, Nigeria, and Uganda).

The study results contribute to existing literature in three ways. First, the multidimensional empowerment construct encompasses different aspects of women's sexual and reproductive lives, particularly their experiences with sex, contraception, and pregnancy. This strengthens the current body of research on sexual and reproductive health (SRH) empowerment, which has been limited by lack of emphasis on sex and pregnancy, by empirically and qualitatively assessing the constructs' relationships with these three SRH outcomes. Second, it distinguishes between concepts of autonomy and self-efficacy that are independently related to SRH behaviors. Contrary to the previous literature, this distinction between *existence of choice* and *exercise of choice* is important, as we find that the concepts relate to SRH outcomes in unique ways and must be examined as such. Third, sub-scale results and the overall index have been validated for measurement of empowerment related to volitional sex and contraceptive use across four diverse geo-cultural contexts (two in Nigeria), providing comparative value. By including women from urban and rural communities, polygamous and non-polygamous unions, and different sociocultural backgrounds, we aimed to capture the diverse contexts in which women make SRH decisions.

Drawing on the qualitative results, we developed and pilot-tested items reflecting the proposed WGE-SRH conceptual framework. Through this process, we uncovered common internal and external motivations and pressures influencing women's decisions to engage in sexual activity, use contraception, and have children. In all settings, stigma related to female sexuality, perceptions of male sexual entitlement, and fear of relational sanctions strongly influenced women's sexual motivations. These findings are reflective of broader gender inequalities at the societal and couple levels. Social expectations regarding childbearing and widespread fear of infertility also constrained women's childbearing and contraceptive autonomy. These constraints, captured in our cross-site autonomy sub-scales, were significantly associated with volitional sex and use of contraception in most sites.

This study builds on existing measures by elucidating social pressures that extend beyond dyadic power relations to include internal motivations, such as health or economic concerns, which inform women's sexual and reproductive decisions. In addition, the results suggest that concepts of autonomy, self-efficacy, negotiation, and decision-making, which are often either conflated or combined in single indicators, should be considered separately as they are independently related to SRH behaviors. Indeed, we found that *women's SRH autonomy* and women's *SRH self-efficacy, decision-making, and negotiation* were independently associated with SRH behaviors in some sites, thereby supporting the conceptual distinction between *existence of choice* and *exercise of choice.*

While our study identifies several cross-culturally relevant constructs of SRH empowerment, it also acknowledges the importance of individual cultural contexts, apparent in the differences in factor loading solutions in each site and in the absence of cross-site solutions for pregnancy empowerment measures. Reports of sexual and reproductive coercion seem more universally shared across sites, except one, than internal motivations for sex, contraception, and childbearing. This may explain the absence of a cross-site sub-scale for pregnancy autonomy, which mostly featured elements of reproductive constraints in sites experiencing rapid fertility declines, while elucidating more positive internal motivations for spacing births in sites where high levels of fertility still prevail. Subsequent research should distinguish women's internal and external motivations to avoid pregnancy versus their motivations to have more children.

Given our study's reliance on cross-sectional data, it was not possible to explore the process of empowerment moving from *existence of choice* (autonomy) to *exercise of choice* (self-efficacy, decision-making, and negotiation) to *achievement of choice*. Since SRH empowerment is a dynamic process requiring growing self-awareness of choice, panel studies will be needed to elucidate the stability of these sentiments over time and their stages of transitions.

The items comprising the SRH *existence of choice* and *exercise of choice* sub-scales are presented in the list that follows.

The collaborating study teams gratefully acknowledge support from the Bill & Melinda Gates Foundation through a PMA Plus grant to the PMA2020 project at the Bloomberg School of Public Health, Johns Hopkins University.

Women and Girls Sexual and Reproductive Health Empowerment Index and Sub-scale Items for Sex, Contraception and Pregnancy

Existence of choice (autonomy) sub-scales
Sexual autonomy (4 items)—Cross-site Cronbach's alpha=0.76
If I refuse sex with my husband/partner, he may physically hurt me.
If I refuse sex with my husband/partner, he may force me to have sex.
If I show my husband/partner that I want to have sex, he may consider me promiscuous.
If I refuse sex with my husband/partner, he may stop supporting me.
Contraceptive autonomy (5 items)—Cross-site Cronbach's alpha=0.78
If I use family planning, my husband/partner may seek another sexual partner.
If I use family planning, I may have trouble getting pregnant the next time I want to.
There could be/will be conflict in my relationship/marriage if I use family planning.
If I use family planning, my children may not be born normal.
If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner.
Pregnancy autonomy (2 items-no sub-scale)—0.79 factor loading for each item
I wanted to complete my education before I have/had a child
If I rest between pregnancies, I can take care of my family.
Exercise of choice (self-efficacy (SE), decision-making (DM), negotiation (NG)) sub-scales
Sexual SE/DM/NG sub-scale (4 items)-Cross-site Cronbach's alpha=0.65
I am confident I can tell my husband/partner when I want to have sex.
I am able to decide when to have sex.
If I do not want to have sex, I can tell my husband.
If I do not want to have sex, I am capable of avoiding it with my husband.
Contraceptive SE/DM/NG sub-scale (3 items)-Cross-site Cronbach's alpha=0.77
I would feel/feel confident discussing family planning with my husband/partner.
I can decide to switch from one family planning method to another if I want to.
I feel confident telling my provider what is important for me when selecting a family planning method.
Pregnancy SE/DM/NG sub-scale (3 items)-Cross-site Cronbach's alpha=0.66
I could/can decide when I wanted to start/stop having children
I can decide when to start having/ have another child
I can negotiate with my husband/partner when to stop having children

*Items scored on the following scale: 1 (Strongly Disagree) to 10 (Strongly Agree)

INTRODUCTION TO THE WOMEN'S AND GIRLS' SEXUAL AND REPRODUCTIVE EMPOWERMENT MODULE

Over the past two decades, there has been growing international interest in the concept of empowerment for understanding the mechanisms that drive development outcomes. A particular locus of attention has been on women's empowerment, including sexual and reproductive empowerment, as a means of accelerating progress towards millennium and sustainable development goals (MDG; SDG).[1,2] Specifically, SDG-5 aims to achieve gender equality and empowerment of all women and girls through the elimination of violence and harmful practices, recognition of women's work, participation of women in decision-making, and guarantee of women's access to sexual and reproductive health (SRH) services.[3]

A growing body of literature exists on the relationship between women's empowerment and SRH outcomes to enhance these goals. Specifically, linkages between empowerment and SRH outcomes have focused on building collective empowerment at the societal level as the foundation to women's empowerment. This recognition of empowerment as a product and process of society is imperative to advocacy efforts that support changes within the social environment. Equally important, is the elucidation of cognitive and psycho-social processes occurring at the individual level, which foster empowerment and may inform individual SRH behaviors and outcomes. However, a lack of consensus on conceptualization and measurement of empowerment at the individual level limits the interpretability of findings and inhibits comparison across contexts.

We proposed to address this critical gap in research by developing a cross-cultural measure of SRH empowerment at the individual level. As a first step, we developed and grounded this measure in a Women's and Girls' Sexual and Reproductive Empowerment (WGE-SRH) conceptual framework. The framework recognizes the multilevel environment of sexual and reproductive decisions, shaped by community norms, family and partner interactions, as well as internal motivations. Informed by the World Bank's model, it also recognizes the dynamic nature of empowerment, that moves from *existence of choice* (autonomy) to *exercise of choice* (self-efficacy, decision making, and negotiation) to *achievement of choice*.[4] We centered the proposed framework on three outcomes most relevant to women's and girls' SRH decisions: sex, contraception, and pregnancy.

Goals and Objectives of the WGE-SRH Module

Building on existing literature and grounded in formative qualitative research we tested and revised our WGE-SRH conceptual framework, which in turn, informed the structure of our multidimensional quantitative instrument for exploring SRH empowerment cross-culturally.

We specifically aimed to:

1. Explore women's preferences regarding sex, contraception, and pregnancy, examine the motivations underlying these preferences, and assess strategies women used to achieve their preferences through the voices of women and men in Ethiopia, Nigeria, and Uganda

2. Develop, pilot, and psychometrically test SRH measures, which were grounded in the qualitative research, to assess the validity and reliability of empowerment constructs and relevant sub-scales across the four cultural contexts.

The full research process was organized as follows: (1) review the theoretical and empirical literature to identify domains; (2) develop the WGE-SRH conceptual framework; (3) conduct qualitative research in three countries (four diverse geographies in sub-Saharan Africa) to assess and adapt the proposed WGE-SRH framework; (4) construct a cross-cultural measure reflecting an updated WGE-SRH framework; and (5) pilot and test the psychometric properties of the WGE-SRH measure in the four sites to finalize sub-scales and the SRH empowerment index.

LITERATURE REVIEW

This section identifies existing definitions of empowerment, explores the overlap of empowerment and SRH, describes existing frameworks and measures related to empowerment, and highlights gaps in this literature.

Existing Definitions of Empowerment

In 2000, the United Nations identified the promotion of gender equality and the empowerment of women as one of its eight Millennium Development Goals (MDGs). This motivated a global focus on the concept of empowerment as fundamental to development, particularly in focal areas like education, economy, and health. In response to the MDGs, and later the SDGs, women's health research and programs have adopted an increasing emphasis on empowerment that has been guided by various definitions of this concept.

Three definitions of empowerment can be found in empowerment research and monitoring. The first of these definitions, proposed by Kabeer in 2001, defines empowerment as "the expansion of an individual's ability to make strategic life choices where this ability was previously denied."[5] Shortly following in 2002, the World Bank defined empowerment as "the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes."[6] This definition establishes empowerment as a process that involves choices, actions and outcomes among individuals who have gained the ability to take action. Most recently, in 2016, the Bill & Melinda Gates Foundation (BMGF) defined empowerment as "the expansion of choice and strengthening of voice through the transformation of power relations, so women and girls have more control over their lives and futures."[2,7] Similar to the World Bank's definition, the BMGF definition of empowerment highlights the growth in individuals' ability to act on their choices. It identifies empowerment as both a process and an outcome critical for women's and girl's ability to achieve their goals.

Despite variations in these definitions of empowerment, they share several unifying components that shape our understanding of this concept. First, empowerment is defined by the transition from one state of being to another; this transition involves the enhancement of one's ability to act on one's preferences. Specifically, empowerment involves individuals' preferences and the decisions they make to act on them. The majority of empowerment definitions focus specifically on agency, which represents an individual's ability to set goals and act on them, but also recognize the importance of external resources or opportunity structures in achieving preferred goals. Finally, current thinking recognizes that empowerment represents both a process for achieving specific development outcomes as well as a goal in itself. All of these definitions incorporate aspects of individual empowerment, though the World Bank and BMGF definitions additionally make specific reference to collective empowerment at the societal or community levels. Individual-level parameters of empowerment have guided the development of the WGE-SRH framework given the project's specific focus on individual outcomes and behaviors.

Empowerment for Sexual and Reproductive Health (SRH)

Recent literature recognizes the construct of SRH empowerment as an important dimension of women's empowerment, distinct from economic or social empowerment. For example, the International Center for Research on Women (ICRW) recently defined reproductive empowerment as "the outcome of a transformative process of change whereby individuals expand their capacity to make informed decisions about their reproductive lives, amplify their ability to meaningfully participate in public and private discussions related to reproduction, and act on their preferences and choices to achieve desired reproductive outcomes free of violence, retribution, or fear."[8] This definition was informed by prior research emphasizing the impact of increased empowerment on reproductive outcomes, including pregnancy timing and spacing, contraceptive decision-making and use,[9,10] and sexual negotiation.[11]

Frameworks for Empowerment

A rise in gender research and programming has necessitated more comprehensive frameworks surrounding women's and girl's empowerment. We outline one framework for the construct of empowerment more broadly (World Bank), as well as two frameworks specific to SRH empowerment (KIT/BMGF and ICRW) below.

The World Bank's framework, which is not exclusive to SRH empowerment, operationalizes Kabeer's widely used definition by conceptualizing empowerment at the individual level, as the progression from the *existence of choice* through *exercise of choice* to the *achievement of choice*.[6,12] Expanding on this framework, Donald and colleagues specify three stages of agency as: (1) the ability to set goals reflecting one's values (motivational autonomy), (2) the perception of one's ability to achieve these goals (self-efficacy), and (3) the ability to act on them (decision-making and negotiation).[13] These stages align with the process described above, relating *existence of choice* to the motivations underlying goal-setting, based on external pressures and personal values (motivational autonomy), and *exercise of choice* to the concept of self-efficacy which is "the belief that one can effectively act towards a goal."[14] Finally, the World Bank's Empowerment Framework recognizes the power relations that operate at multiple levels, starting at the couple level, and expanding to the family, community, and societal levels that inform the ways individuals set goals and act on them as well as their access to resources.[6]

While the World Bank framework was not specific to SRH empowerment, two recent frameworks for SRH empowerment developed by the BMFG and ICRW have been proposed. While these frameworks also recognize choice as a critical component of empowerment, they also explicitly acknowledge dimensions of voice and power as essential requisites for women to achieve their goals by challenging unequal gender systems. As such, choice, voice and power are the three pillars of The Royal Tropical Medicine Institute (KIT) and BMGF framework, which focuses less on the psychosocial processes leading to individual empowerment but rather on programmatic and advocacy goals to advance gender equality and promote women's empowerment at a societal level. The ICRW expands on KIT/BMGF's work to focus their framework on *SRH decision-making* (related to sexual relationships, reproductive control, life choices); *leadership in SRH* (leadership roles in communal decision-making processes around reproductive health); and *SRH collective action* (influence over policies and programming, ability to advocate for group

interests).[7,8] Additional work has focused specifically on social norms change and incorporated individual empowerment as part of the process, but their frameworks and measurement were not specific to empowerment.

While models differ, they all recognize choice and decision-making as pivotal to women's SRH empowerment and identify power relations as a key obstacle to women's achievement of their goals. The World Bank's distinctive contribution involves the internalization of these power structures at the individual level in an effort to describe how they contribute to individual goal-setting and actions. Conversely, the unique contributions of the KIT/BMGF and ICRW models are to highlight gender inequality as an institutional obstacle to women's SRH wellbeing. In that respect, we suggest the World Bank's framework is better suited to demonstrate the predictive effect of women's empowerment on individual behaviors, while the KIT/BMGF and ICRW models are better equipped to assess the role of *collective efficacy*, through voice, and representation to address the structural barriers to women's SRH wellbeing.

Gaps in Current SRH Empowerment Measures

In the process of developing SRH empowerment frameworks, researchers have highlighted a number of inconsistences and gaps in the literature. In addition to inconsistent definitions and theoretical frameworks guiding most empirical work on SRH empowerment, ICRW notes three areas of concern in their recent comprehensive review:

1. **Geographical disparities in the conceptualization and measurement of empowerment:** First, geographical disparities in the measurement of empowerment are evident. North American studies have largely focused on assessing women's self-efficacy to "express, negotiate, and carry out one's sexual and reproductive desires and outcomes."[8] Conversely, the few sub-Saharan African studies on women's SRH empowerment have concentrated on SRH decision-making, with the scope often limited to sexual violence.[8] Additionally, studies in sub-Saharan Africa have used Demographic and Health Survey (DHS) data on women's participation in household decisions regarding finances, care-seeking, and family matters to explore various elements of empowerment, which only include limited measures of contraceptive decision-making. These discrepancies in empowerment measures, particularly those specific to SRH, suggest a lack of conceptual framework to account for geo-cultural differences in social norms, interpersonal relationships, and societal organization that shape reproductive decisions and achievement.

2. **Framing sexual and reproductive empowerment outcomes:** A second limitation lies in the framing of empowerment outcomes. To date, studies on women's empowerment have been guided by researchers' desired outcomes such as pregnancy wantedness and intentions, birth spacing or modern contraceptive use, which may not reflect women's own SRH goals. These outcomes are often chosen to measure development goals, such as SDG progress, but do not necessarily align with women's desired SRH outcomes.

3. **Cross-sectional constraints:** A third limitation of the existing research is a lack of longitudinal studies to examine women's SRH empowerment over time. Most empowerment

definitions recognize its dynamic nature and diverse manifestations across a woman's reproductive life course, however, as both a process and outcome in itself, this dynamic process is poorly captured in the current research literature. A thorough understanding of the factors that influence and result from women's SRH empowerment will require longitudinal data.

DEVELOPMENT OF THE WGE-SRH FRAMEWORK

Building on the work described in the previous section, our proposed WGE-SRH framework is defined as follows.

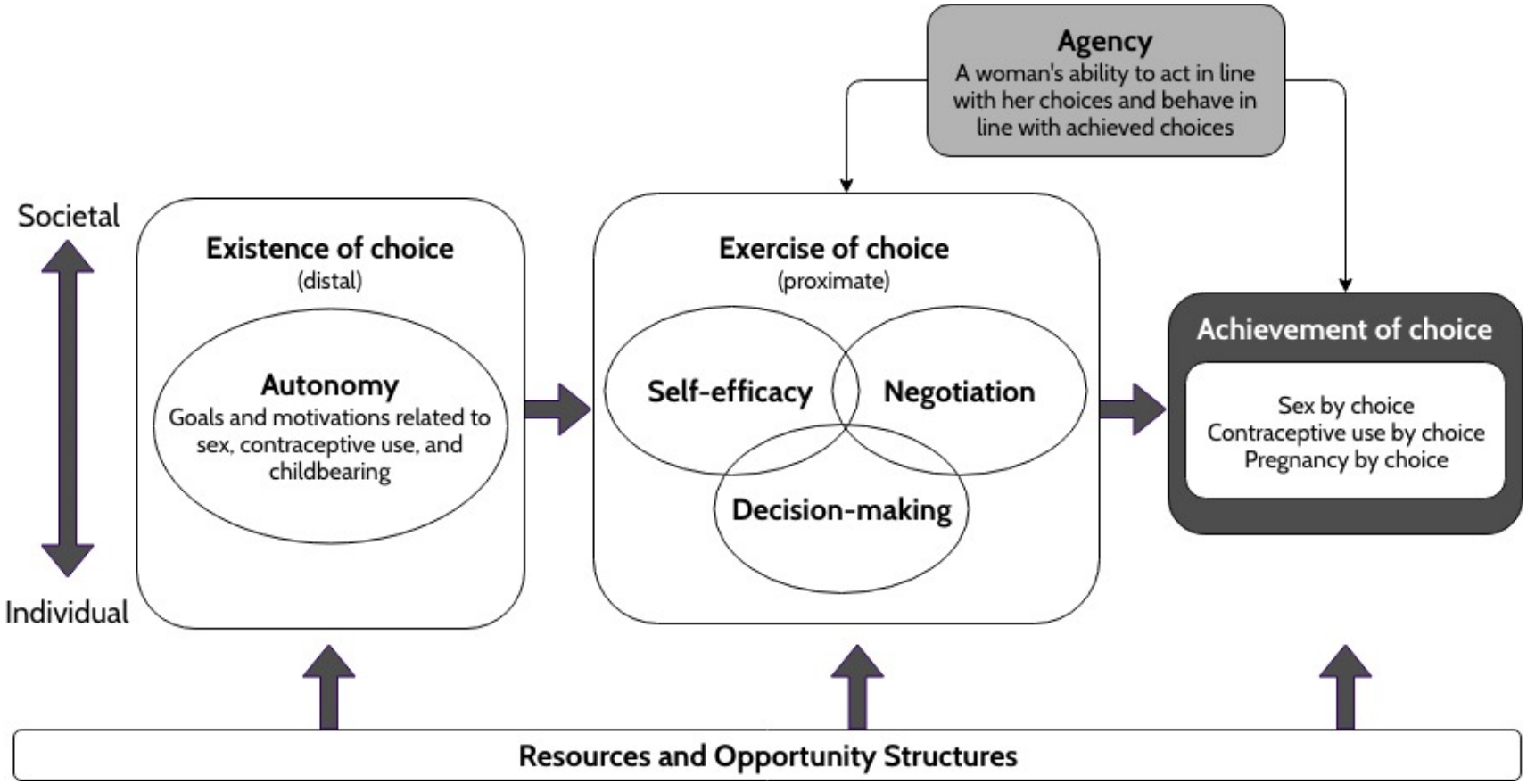
Our WGE-SRH framework builds on the World Bank's framework and is adapted to the domain of SRH. Accordingly, we define SRH empowerment as the progression from the *existence of choice* through *exercise of choice* to the *achievement of choice*.[6,12] We draw on Donald's work on agency to specify *existence of choice* as a woman's internal and external motivations underlying her sexual and reproductive goals (motivational autonomy). We also draw on Donald's work to specify *exercise of choice*, as encompassing a variety of skills, particularly a woman's level of confidence in acting on her choices (self-efficacy), her negotiating abilities with her partner (negotiation), and her ability to make decisions (decision-making). [14–16] This process leads to the *achievement of choice*, or the preferred SRH outcome defined as sex by choice, pregnancy by choice and contraceptive choice. More comprehensive definitions and examples of each term are outlined below.

Understanding the drivers of sexual and reproductive autonomy, self-efficacy, negotiation, and decision-making, specifically how women specify their preferences and act on them, is critical to comprehending sexual and reproductive behaviors and SRH service utilization. The proposed WGE-SRH framework adopts a woman-centered approach in an attempt to reflect desired SRH outcomes, most aligned with women's individual preferences. Through this framework, we aim to overcome some of the limitations of existing research, including the woman's internalization of macro-level and meso-level factors that shape individual preferences.[4,8] Therefore, our outcomes of interest, sex by choice, contraception by choice, and pregnancy by choice, reflect women's desired sexual and reproductive outcomes, rather than programmatic goals.

Although sexual and reproductive empowerment interacts with other dimensions of women's and girls' lives, particularly opportunity structures including educational rights, physical safety, and economic wealth, in this project, we focus our efforts on understanding and operationalizing women's ability to achieve their sexual and reproductive goals, in the format of a quantitative measure that can be used across different cultures. The measure, which covers three outcomes: sex by choice (sex); contraception by choice, including choice of method (contraception) and pregnancy by choice (pregnancy), is intended to be used alongside resource indicators (such as education, wealth, access the services, etc.) to inform individual behaviors and SRH outcomes.

Similar to KIT/BMGF and ICRW models, we view SRH empowerment as both a process and an outcome, and recognize individual empowerment as relational. While acknowledging the importance of *collective empowerment*, included frameworks, our WGE-SRH framework focuses on individual-level processes which shape choices and actions, to inform measures predictive of individual behaviors. Use of the term "individual" throughout incorporates our focus on the unique experiences of women and girls.

Figure 1. Women's and Girls' Empowerment for Sexual and Reproductive Health (WGE-SRH)



Existence of Choice (Motivational Autonomy)

Existence of choice is conceptualized as a woman's capacity to define her own sexual and reproductive goals based on internal motivations and external pressures. Related to the WGE-SRH framework, *existence of choice* may include a woman's desire to have sex or avoid sex with a partner (sex), intent to use a specific contraceptive method or not to use a method (contraception), or interest in avoiding or seeking a pregnancy (pregnancy).

While *existence of choice* may be internally motivated, it often reflects external systems of pressures and rewards that women internalize and activate to inform their SRH goals. Women may internalize external pressures and power relations, for example with partners or family members. External motivations also relate to broader community norms which inform women's SRH preferences. For example, community expectations of women to produce children soon after marriage may motivate young women's childbearing decisions. Women may prefer the rewards of conforming to societal expectations more than confronting the social sanctions for nonconformance. Beyond social and interpersonal motivations, women may also base their decisions on their personal circumstances, whether financial, professional, or educational.

Our measures of *existence of choice* account for these varying and sometimes conflicting factors that shape women's and girls' SRH goals. This process of considering internal and external factors to inform an individual's goal-setting underscores how women and girls recognize if and to what extent choices exist before acting on these choices.

Exercise of Choice (Self-efficacy, Decision-making, and Negotiation)

Once *existence of choice* is specified, a woman must recognize that she has the opportunity to act on her preferences. In this second step of the process, the empowerment focus shifts to an individual's self-efficacy, negotiation skills, and ability to make decisions, which together inform the woman's ability to exercise her preferences.

Exercise of choice span two levels: negotiation and decision-making skills (both couple-level and individual-level), and confidence measures (individual-level) to ensure that the woman is able to act on her SRH goals. Self-efficacy represents a woman's confidence in voicing or acting on her preferences, while an individual's negotiation skills reflect relational power dynamics, that are particularly salient for SRH outcomes involving dyadic behaviors. A woman's influence in the decision-making process and her willingness to be involved is related to self-efficacy and negotiation skills, yet is a distinctive construct that informs *exercise of choice*. For example, once a woman decides that she wants to prevent a pregnancy and believes this decision is within her locus of control, she can exercise her choice by negotiating with her partner to use contraception.

Achievement of Choice

When both *existence of choice* and *exercise of choice* are met, an individual is able to achieve the desired outcome. *Achievement of choice* is therefore the final step of the process, encompassing the woman's ability to act on her choices to achieve her desired outcome. In this

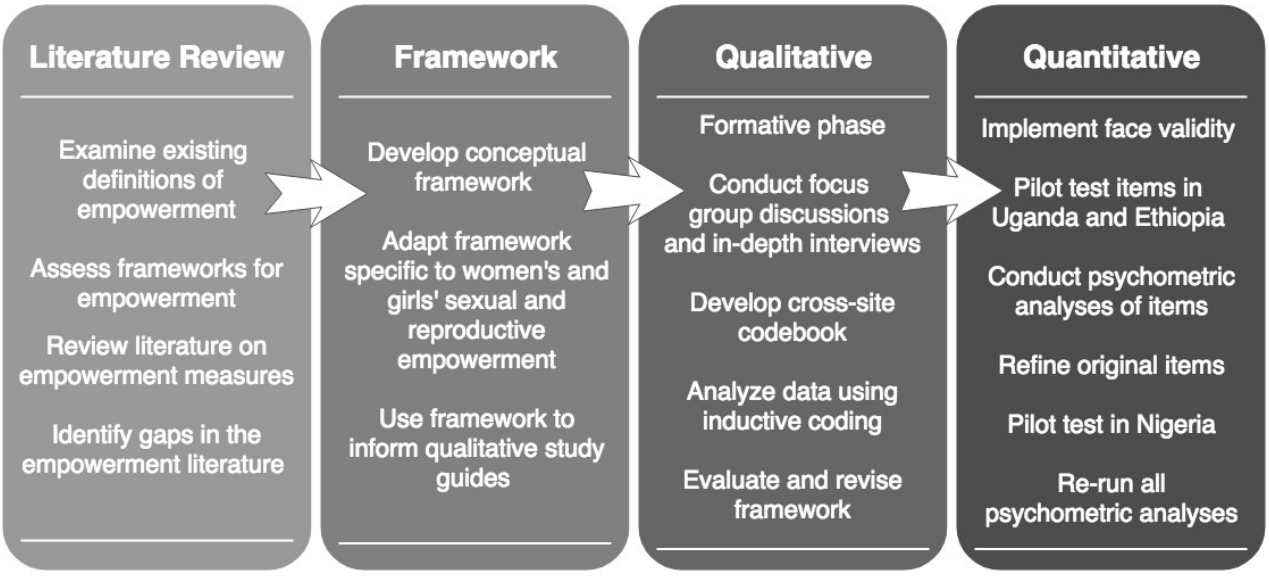
framework, our outcomes focus on the individual's actions: sex by choice, preferred contraceptive use by choice, and pregnancy by choice.

In the realm of the WGE-SRH study, empowerment is viewed as a continuous process that evolves throughout the life course. All three steps of the process, including existence, exercise, and achievement of choice, represent different dimensions of the empowerment spectrum and are critical to the empowerment process.

STUDY OVERVIEW

The WGE-SRH index construction effort was conducted from March 2017 to August 2018 in two phases—a qualitative phase (March to November 2017) and a quantitative phase (November 2017 to August 2018). It explored WGE-SRH in four diverse African contexts and translated findings into a WGE-SRH index. A cross-country team, including Performance Monitoring and Accountability 2020 (PMA2020) researchers from Baltimore, Ethiopia, Nigeria, and Uganda, collaborated to develop the aforementioned conceptual model and conduct the qualitative and quantitative studies. A cascade approach was followed in which the qualitative study informed the development of the quantitative survey items, which were translated into a quantitative WGE-SRH index. The index serves as a measurement tool for assessing women's and girls' sexual and reproductive empowerment as reflected in the WGE-SRH conceptual framework.

Figure 2. Study Process



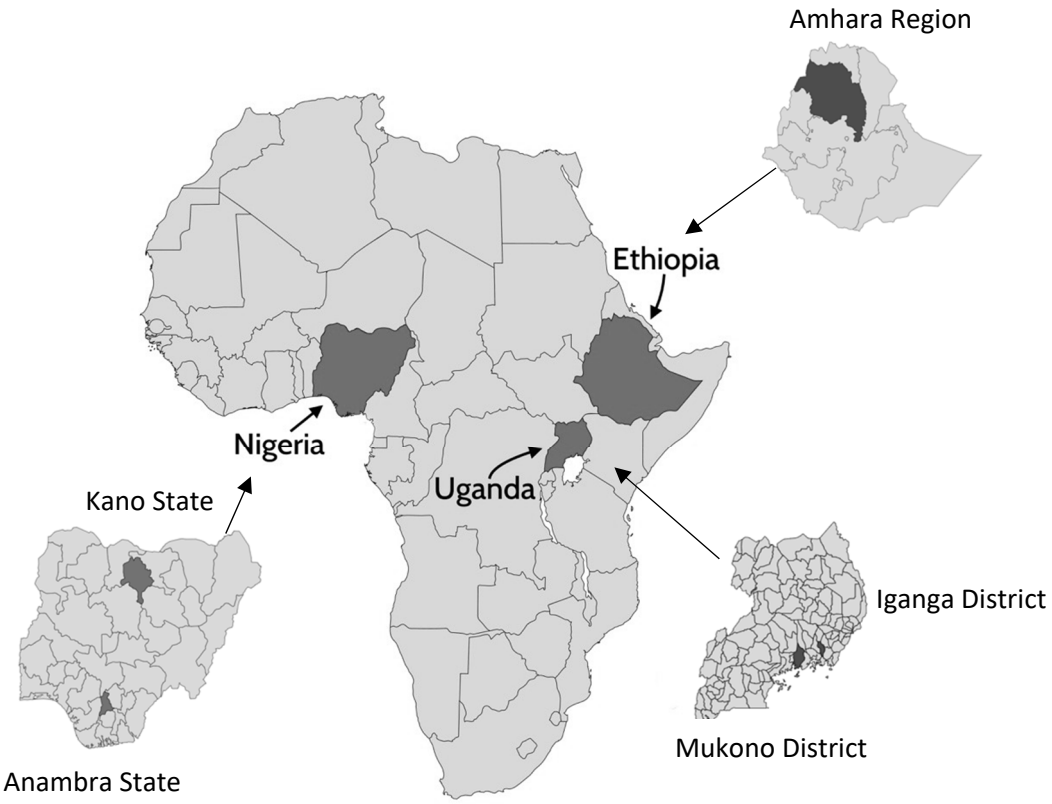
Study Settings

Both qualitative and quantitative phases were implemented in four sites across three sub-Saharan African countries (Ethiopia, Nigeria, and Uganda). These countries represent a diversity of East and West African cultures at different stages of modernization. The diversity of sites is further exemplified by their distinct stages of fertility transition: Nigeria and Uganda are two high fertility countries with total fertility rates (TFR) of 5.5 and 5.6 respectively, while Ethiopia is experiencing a steady fertility decline, with the TFR decreasing from 5.4 in 2005 to 4.2 in 2016.[17]

Data for the WGE-SRH study were collected in Amhara Region of Ethiopia, Anambra and Kano States of Nigeria, and Mukono and Iganga Districts of Uganda. Given the significant geographical and cultural differences between Northern and Southern Nigeria, Kano and Anambra States, were

each treated as independent sites for this study. Within each of the four sites, we included urban and rural areas to account for the internal diversity of contexts informing WGE-SRH processes.

Figure 3. Map of Geographies for the WGE-SRH Project



FORMATIVE PHASE: QUALITATIVE METHODS

The qualitative phase was implemented from March to November 2017. A total of 440 women aged 15-49 and men aged 18 and older across four sites in Ethiopia, Nigeria, and Uganda were interviewed through 120 in-depth interviews (IDIs) and 40 focus group discussions (FGDs; n=320 participants). A common cross-country research protocol was developed and implemented following qualitative research training in each site. In-country PMA2020 data collection teams carried out all recruitment, data collection, transcription, translation, and coding activities. Institutional Review Board approval was obtained at both JHSPH and in-country through Addis Ababa University, Anambra Ministry of Health, Bayero University Kano, and Makerere University School of Public Health.

Qualitative Instrument Development

Semi-structured interview guides were developed following the development of the WGE-SRH conceptual framework. These guides explored the three WGE-SRH empowerment outcomes: practicing volitional sex, using a preferred contraceptive method if wanted, and having an intended pregnancy or no pregnancy if not wanted. FGD guides focused specifically on community perspectives of these topics rather than asking about personal experiences. In contrast, IDI topics focused on the personal experiences, perspectives, and narratives of women, girls, and their male partners related to sex, contraception, and pregnancy. The Baltimore and in-country teams collaborated in preparing questions and structuring the guide to ensure questions were acceptable and probed into cross-cultural norms and practices. Interview guides can be found in Appendices 1-7.

Qualitative Training

Comprehensive training on and refinement of the qualitative guides was key to high-quality interviews. In July 2017, two Baltimore researchers led weeklong qualitative trainings for the teams in Ethiopia, Nigeria, and Uganda. Each training included an overview of qualitative methods, in-depth review of the interview guides, and multiple opportunities to practice and refine interviewing skills through mock interviews and community-based pilot-testing. The principal investigators (PIs) from each site, as well as all interviewers, transcribers, and coders, participated in the trainings and contributed to interview guide revisions, in order to adapt the guides to the local context and language, while maintaining consistency across sites. Guides were translated into five languages per site specification: Luganda and Lusoga (Uganda), Amharic (Ethiopia), Igbo (Anambra), and Hausa (Kano). Following the training, qualitative data was collected from July through August 2017.

Qualitative Procedures

Preparatory activities were critical to successful community engagement throughout the study activities. One week prior to data collection, the in-country WGE-SRH teams visited the study sites to meet with gatekeepers and confirm support referrals for women who reported experiences of intimate partner violence. Furthermore, community health teams, village leaders, and local organizations were essential for disseminating study purposes and information and identifying eligible households and participants. In-country teams used purposive sampling (by age, marital

status, and area of residence) within each site to recruit women and men for both FGDs and IDIs. Once households were identified, gatekeepers within the communities provided initial information to participants to introduce women to the study objectives and sensitive interview topics. Potential participants were then given the opportunity to contact the in-country study team with any questions or concerns. Once interest was expressed, the trained interviewers conducted eligibility screening and consent with each woman privately. Eligibility criteria included women aged 15-49 (or men whose wife was 15-49) who resided within the study region. All consent procedures were consistent with in-country IRB guidelines (verbal/oral); head of household consent and/or child assent was sought for women age 15-17 per in-country guidelines.

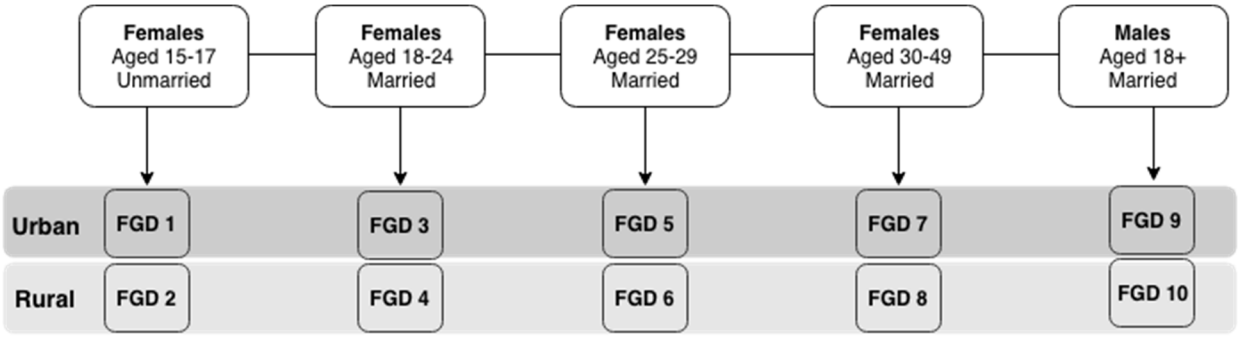
Trained interviewers conducted IDIs and FGDs in local language. Snacks, refreshments, small grocery items, and travel reimbursements were provided to participants in lieu of monetary incentives. FGDs were conducted in a private setting at a convenient community center or facility; IDIs took place in a private setting at the local partner's offices or of the participant's selection. Two field team members were present during data collection, one as the moderator and one as the notetaker and monitor of the surrounding area to ensure privacy and safety. Each FGD and IDI took approximately 60 to 90 minutes.

All discussions and interviews were digitally recorded with the permission of each participant. Upon conclusion of each session, the research team individually and privately administered a universal upset screener and provided participants with a list of local resources should they require additional support services. All participants also completed a brief survey following the FGD or interview regarding their background characteristics; survey responses allowed us to disaggregate themes by demographic characteristics.

Focus Group Discussions

A total of ten sex- and age-specific FGDs were conducted in each site. Each FGD consisted of up to eight eligible, consented women or men (40 FGDs and n=320 total participants across four sites). Male and female FGDs were not linked and eligibility criteria did not necessitate partner inclusion. We stratified the ten FGDs per site to fulfill the following sampling characteristics in order to allow for heterogeneity of responses, as well as allow for maximum comfort and participation. For each urban/rural sub-site, the composition of FGDs was as follows:

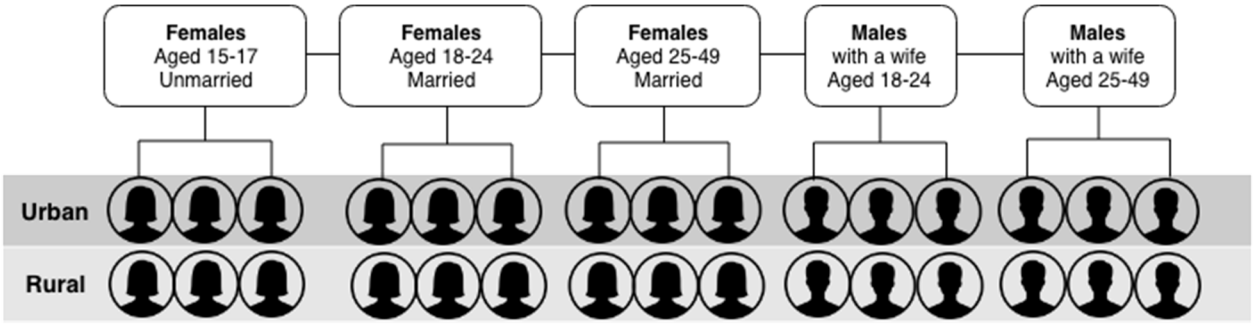
Figure 4. Breakdown of Focus Group Discussions (FGDs) per Site (Urban/Rural)



In-Depth Interviews

IDIs were conducted with individual partners from twelve couples (men and women), as well as six additional single women per site (n=30 per site for a total of n=120 IDIs across four sites). Given the potentially sensitive nature of interviewing couple dyads, IDI consent to participate was first obtained from the female partner and then allowing her to decide after her interview whether or not she wanted to permit her husband to be approached for an interview. By consenting the female first and then obtaining permission to approach her partner for an IDI, we minimized the risk of negative spouse reactions. No female partner declined to have her male partner interviewed. Couples were stratified by area of residence (urban/rural) and female age group to allow for a diverse representation of women and men by age and residence. Six additional unmarried women across the 3 age categories (15-17, 18-24, 25-49 years) were interviewed to assess empowerment outside of marriage:

Figure 5. Breakdown of In-depth Interviews (IDIs) per Sub-site (Urban/Rural)



Qualitative Analysis

Upon completion of data collection, audio files of IDIs and FGDs were simultaneously translated and transcribed into English in-country with regular quality checks by the Baltimore and in-country teams. While transcription was ongoing, preliminary themes emerging from the data were shared across the sites. These themes informed the development of a cross-site codebook and coding schemes. This cross-site codebook was inductive, centering around themes that emerged from the transcripts themselves, but was structurally organized in a deductive manner to allow mapping of the codes to the WGE-SRH framework. Given the vast differences in the communities interviewed across the four sites, each site created additional site-specific codes that were used for analysis of themes that arose exclusively in that site. The cross-site codebook development involved an iterative process of multiple reviews and revisions by in-country teams to capture all relevant themes, particularly those that addressed the core components of WGE-SRH empowerment outlined in the conceptual framework.

In-country coding teams, comprising the interviewers themselves or utilizing the interviewers as consultants, applied the core set of codes to individual transcripts. The Baltimore and in-country teams communicated regularly to resolve any coding issues and address any challenges. From September to October 2017, in-country teams coded a sample of transcripts in preparation for

the WGE-SRH Qualitative Workshop, which served as the first opportunity for analysis of cross-site themes related to WGE-SRH empowerment. Coding discrepancies within and across sites were discussed at this workshop; codebook revisions were made prior to final coding revisions of all transcripts and cross-site analyses by code and WGE-SRH framework dimension.

The primary analysis of qualitative data focused on the transferability of qualitative results to the quantitative module. Therefore, primary matrices were organized by codes thought to be most relevant when mapped to a dimension of the framework (*existence of choice*, *exercise of choice*, and *achievement of choice*) across the three outcomes (sex, contraception and pregnancy). Quotes from relevant codes were then categorized and organized by theme, sub-theme, and site for within- and cross-site analyses. Additional codes that emerged inductively through the qualitative work, but were not mapped specifically to the framework, were analyzed as secondary findings (e.g., covert use, reproductive coercion, infertility).

FORMATIVE PHASE: FINDINGS

Key Findings

- Women's sexual autonomy is constrained by gender norms promoting male sexual entitlement.
- Few women discussed sexual pleasure as a reason for engaging in sexual activity; rather, it was thought of as a marital obligation
- Women preferred to exercise their preferences to have or abstain from sex non-verbally
- Women faced pressure to conceive soon after marriage and to have children to preserve their marriages
- Women's contraceptive decisions were informed by the necessity to preserve their reproductive capacity
- Despite limited conversation and sometimes high opposition from partners surrounding contraceptive use, some women exercised their reproductive

Empowerment in Sexual Decisions

Across all sites, sex was primarily thought of as a marital obligation and for procreation purposes. Both men and women described being taught marital responsibility prior to marriage, including how to be a good spouse and fulfill sexual obligations. Conjugal rights, sexual fulfilment, and responsibility were commonly discussed from both a religious and cultural perspective and held for both men and women within the confines of marriage:

> *None of us has the right to deny the other sex. Why are we man and wife and what is the binding factor in a marriage, is it not sex? So why will you have a choice? You are asking for trouble if you deny your partner sex. So, for me, I don't have choice to do that neither does my wife have a choice. You are an Igbo man so use your tongue to count your teeth and tell me how many they are? It is not possible.*
>
> *-Anambran Urban Male, Age 41, Married, IDI*

Although sexual responsibility as discussed for both partners was seen as a means to strengthen the union, male sexual entitlement prevailed across sites, leading women to "accept" sex for fear of partnership dissolution or in order to "keep the peace." Entitlement was further reinforced by community norms and religion, with participants citing both Christian and Muslim religious teachings as justification for women "accepting sex:"

> *God gave this as a commandment in marriage. And it is a sin for a man to desire his wife and she refuses him. Till the break of dawn, angels will put curses on her. If she is well mannered, whether she wants to or not, she will have to endure like that. In order to obey God. Even just to please God she has to do it. Even if she desires the man and he refuses her, she has to endure. Just for peace to reign*
>
> *-Kano Rural Female, Age 18+, Married, FGD*

She can't even refuse him because the bible says sex is the man's right. As long as she is physically fit, there's no need to say no. Even if the woman doesn't have the strength, she should try and do it. So that there will be peace. In my community refusal of sex by a married woman is seen as a bad thing. She should try and do it. No matter what.

-Anambra Urban Female, Age 30-49, Married, IDI

Given the emphasis of sex as an obligation, sexual pleasure was often an afterthought; although several women noted sexual enjoyment increased relationship fulfilment or discussed the desire for increased sexual pleasure within their relationship.

He gets angry when I say no sometimes. I believe it is a two-way thing it should not be automatic. I don't believe a man should always dictate when to have sex. A woman should also be in control. Personally, I feel sex should be enjoyed not just something you do because someone wants you to do it.

-Anambran Urban Female, Age 38, Married, IDI

FGDs revealed that community norms deemed it more acceptable for men to have premarital sex than for women, although it was not widely sanctioned for either partner in Anambra, Kano, and Ethiopia. As sex was meant for reproduction, sex outside of marriage was seen as wasteful. The only site for which this not the case, was Uganda, where both men and women were legitimized in seeking external partners if not financially supported:

Sometimes my husband might be poor and I might get another man with money. At times my husband might be disabled that will drive me to get another man. Then there are times when you have a man with a small dick so you find another partner.

-Ugandan Urban Female, Age 25-29, Married, FGD

Well you might be married but have an alcoholic husband, the community will support your move to have an extra marital affair, and the man is just a shadow in the home, spends most of the time taking alcohol yet there is no money.

-Ugandan Urban Female, Age 25-29, Married, FGD

In Anambra, Kano, and Uganda, however, men were also encouraged to seek other partners if their wives could not produce children. However, among men and women who reported multiple partners, faithful relationships were still expressed as the ideal.

Within and across sites, there was mixed feedback on sexual decision-making among partners. Women wanted to be actors in the sexual decision-making process; men, however, often used coercive or forceful means if there was disagreement.

In my opinion it's the man who decides anytime he wants. Because, even if the woman refuses to have sex, I think, they might have the power to force her as there is a coercion,

and also, he can't control his feeling so that even if you don't want to have sex, he will do it if he has to.

-Female, Age 26, Married; FGD, Ethiopia

While few women stated that they were confident in verbally communicating their desire for sex, most women did not feel that this was appropriate, even within the confines of marriage. Both women and men described how overtly communicating desire for sex could ignite mistrust and lead men to believe that their wives had sought sex from another partner or discussed their relationship with someone else.

…I keep silent even if I have sexual desire since I am afraid of him. We live in different places so if I express my sexual feeling he might suspect that as I could have sex with somebody else at working place.

-Ethiopian Urban Female, Age 27, Married, IDI

Instead, different non-verbal tactics (e.g., singing, touching, cooking) were mentioned across sites to initiate sexual activity. Examples included singing, wearing revealing clothing, cooking partners' favorite meals, and sensually touching.

When I realize that you are not responding then I sing love songs until when you gradually respond.

-Ugandan Urban Female, Age 25-29, Married, FGD

R1: Let me use myself as an example. I do not ordinarily ever want to have sex except when I am seeking to get pregnant. So, it is men that want this sex of a thing more than a woman. The woman can entice him when she wants it. At that time when I want to get pregnant I employ many methods to get him to meet with me. I can cook delicious meals without asking him for the money. And so many other things.
R2. She can dress in such a way that the man will be enticed. Sexy dresses or transparent ones.
R3: I will pet him.
R5: Women do not naturally demand for sex so that they will be termed as promiscuous. So, if she gives her husband a special sign it must be special indeed. I used to say that I am not feeling well and when he comes to pet me I will hold him…So we do many things.
R6: For me, before he comes back I will powder myself so that when he comes back the smell of the powder will attract him to me.

-Anambran Urban Females, Age 20-29, FGD

Similarly, non-verbal tactics (e.g., beginning arguments, feigning menstruation, wearing restrictive clothing) were also reported for avoiding having sex:

I will tell him that I am sick. I will try to explain my health condition to him. I will also tell him stories that could withdraw his attention from sex and I will not sleep in the same room with him.

-Anambran Urban Female, Age 43, Married, IDI

I would tell him that it was a fasting day and also some days where it is a holiday. I did not want to have sex during those periods. God has permitted us to live and it is because of him that we are alive so we shouldn't disappoint God by violating his rules. He accepted me when I told him this.

-Ethiopian Urban Female, Age 25-29, Married, IDI

Empowerment in Pregnancy Decisions

Reproductive goals were internally and externally motivated through pressures and rewards from husbands, families and communities. Women were expected to bear children soon after marriage, however, premarital childbearing was negatively sanctioned.

As long as you are married and don't have a child, people start commenting why you don't have a child. You are seriously challenged, you find women stressed and end up resorting to witchcraft because they do not have a child in that home. Friends and family view her negatively and the in-laws are worse towards the woman if she has not given birth, they feel something is missing.

-Ugandan Urban Female, Age 18-24, Married, IiDI

It would be a pleasant experience to become a mother, if you are a mother, when you go out and when you return your children will be running out to welcome you. However, becoming a mother is pleasant when you are legally married. If you have children you will enjoy them but if you are not properly married or have an accidental birth you will not be proud of your child, you will be hiding the child.

-Anambran Rural Female, Age 16, Unmarried, IDI

In northern Nigeria, motivations to bear more children were particularly prevalent in polygamous families, where wives secured their family positions of influence and children's inheritance through childbearing.

Yes, the women in polygamy don't want to use family planning. They just want to give birth to as many children as possible. You will see some of the women having up to 30 children (general laughter). The woman will say that why would she use family planning when the other wife is not using it. So the wives will just be competing among themselves to give birth to as many children as possible (respondents still laughing). But if it is a nuclear family, you will see the woman resting for up to 4 years after having about 4 children.

-Kano Urban Female, Age Unknown, Married, FGD

Economics represented the largest constraint on pregnancy autonomy across sites. Outside of northern Nigeria, large families no longer equated with social status, but instead were considered

in the context of the couple's economic capacity. Generally, both men and women recognized the restraint on childbearing imposed by economic circumstances.

> *Main reason for deciding to have only two children is economic situation, if you have better income, you may make it three, but not too much, making too much is not good.*
>
> *-Ethiopian Urban Male, Age 29, Married, IDI*

In line with changing economic capacity, respondents discussed changing social expectations surrounding childbearing, which emphasized quality of children over quantity.

While some women discussed these childbearing decisions with their partners, many did not, exposing them to retaliation or reproductive coercion.

> *It could be caused by men where by the woman is avoiding domestic violence, a man can tell a woman that if you do not want to produce for me children I will get another woman so the woman will be put on pressure to produce many children to please the man and keep her marriage.*
>
> *-Ugandan Urban Female, Age 18+, Married, FGD*

While women's reproductive autonomy was constrained, they nonetheless found strategies to avert back-to-back pregnancies with or without their partners' knowledge.

> *There are safe periods when the probability of conception is very low; I think this option can be used.*
>
> *-Kano Urban Female, Age Unknown, Married, FGD*

> *I will talk about this first. Who decides when? In our culture here the man decides and says what happens in the home. Where the woman tends to lead, even if she is the bread winner, the man will intimidate her into accepting his own decision. So, she ends up not having a decision of her own. In the case where she takes a pill, and the man waits for her to be pregnant and it is not forth coming, she definitely will be under serious threat from her husband as to what has been happening to all he has been doing. So, most time you find that the man follows his decision with action, threat, intimidation and the likes and the woman, not wanting to lose her husband or home, will give in to his pressures. Then coming to when they normally should decide to have the next child, in our culture it is not discussed. There is no time at which a couple will sit and discuss such. Children just come when they will, as long as the couples are mating and having sex. Thereby, fulfilling their conjugal obligations. It is never planned, but they can choose when to stop.*
>
> *-Anambran Urban Male, Age 18+, Married, FGD*

Empowerment in Contraceptive Decisions

Contraceptive use decisions were intertwined with childbearing decisions, although also driven by community norms and misconceptions. Relational pressures, including fear of conflict, marital discord, dissolution and competition, shaped contraceptive autonomy according to partner fertility desires.

My friends view is that of they want to take it if they can, and if they do not it is up to them, but they have to get the consent of their husband before they can do such thing. Because a friend cannot advice you to take it, isn't it? A friend cannot advice you to take it, if you want to have peace in your home, because it is not the friend the husband is married to... if she will like to take it, she will have to tell her husband about it.

-Kano Rural Female, Age 18-24, Married, FGD

Women considered factors at multiple levels to assess contraceptive acceptability and restraints on contraceptive choice. Providers were mentioned as influencers of contraceptive decisions, and coercive contraceptive experiences at both the provider- and couple-level were frequent.

I told the doctor to make me stop producing and he told me that he was going to get me a family planning that was not permanent though for me I wanted a permanent method. I had told the doctor to do a tuba-ligation on me though he refused that I am still a young woman. He told me that he would do something to me to stop producing.

-Ugandan Urban Female, Age 26, Married, IDI

Discussions surrounding modern method side effects, particularly fear of infertility, and fear of relationship dissolution were discussed prominently as reasons for non-use. Misconceptions and perceptions of peers' side effects often drove these fears, rather than actual experience of side effects.

Furthermore, in Ugandan, women discussed higher-level fears surrounding the purpose of contraception. These fears included coercion by both white and rich people to limit births.

Most of them don't support it they know that its God who plans the family – what they say is that the whites introduce systems to destroy should I say Africans. They think those whites put something in Africans so that they get to a point when they cannot some have any children because of these family planning methods. That's why most people have one child, ten years have passed and someone was using family planning which she stopped after four years then after six years when the child has failed to come. So they got to learn that these whites have some chemicals they add in these contraceptives, because they are the manufacturers.

-Ugandan Urban Female, Age 18-24, Married, IDI

I think the rich have upper hand. So, we the poor we fear to talk about it because all the time we are dependent on the man but this one who has the money will not fear talking about it because she has the money. She will not get worried because she can look after children, but we the poor you just give in to whatever the man says.

-Ugandan Urban Female, Age 30-49, Married, FGD

To exercise choice, across sites, women relied on non-verbal communication to exercise their contraceptive preferences; covert use of contraception was pervasive in participants' discourse. Some women used contraception covertly due to known opposition of the partner, whereas others preferred to exercise contraceptive decisions on their own without any previous discussion:

I will not say no to him to avoid his sadness and quarrel. But I will use the family planning method without him. I will delay like that. (Laughter)

-Ethiopian Female, demographics unspecified, IDI

Conversely, male interviews and focus groups highlighted men's knowledge that wives were using contraception covertly. In these discussions, men highlighted the benefits of joint decision-making, while often acknowledging their restriction of women's choice if disagreement arose. Additionally, some women were able to garner partner support after sharing their experience using covertly.

If they have both decided to use the contraception together, it has a big benefit. But if the woman decided on it on her own, she is the one who is benefited because he doesn't know anything. If one day he wants a child and if she is using without his knowledge, he may not like it when he finds out later. But if the two decided together to do that, I think it's

-Ethiopian Rural Male, Age 18+, FGD

Direct communication about contraception generally involved classmates, friends, or family members (particularly sister and aunties). When conversations did occur with partners, women emphasized economic constraints to justify their choices:

What we have here is the main thing is discussion, about their economy. First a woman can convince a man in so many ways. With the support of our economy let's raise the children we have peacefully, let's help them to reach to higher level or other things.

-Ethiopian Urban Female, Age 25-29, Married, FGD

Despite perceived risks of using modern contraception at the individual- (infertility, health concerns) and couple-levels (discord and separation), participants recognized women's primacy over contraceptive decisions, whether concerted or not.

Being the ones that go through the pain at times and are the ones that go through the hardships, they are meant to make the decisions since when pregnant they go through the various hardships of pregnancy

-Ugandan Rural Female, Age 25-29, Married, FGD

If a person decides to use a specific family planning method you must accept whatever comes after since it was your decision to use it like some swallow tablets and other use implants when they get pregnant in the due course, they produce children with deformities. So, if you decide to use a method you should not regret using it because by the time you use it you are preventing something.

-Ugandan Urban Male, Age 28, Married, ID

WGE-SRH QUANTITATIVE INSTRUMENT DEVELOPMENT

The quantitative phase of the WGE-SRH study aimed to develop, pilot, and test the psychometric properties of a multidimensional measure of WGE-SRH. As described below, the formulation of final quantitative items was an iterative process that took place over the course of several months (October 2017-May 2018).

Translation of Qualitative Results to Quantitative Items

Results from the qualitative phase were used to develop items for the quantitative module and revise the WGE-SRH framework through a series of activities, which involved direct engagement with stakeholders from ministries of health and gender and study teams in the participating sites.

WGE-SRH framework revisions centered specifically around the *exercise of choice* domain. Prior to analysis of the qualitative phase, this domain focused exclusively on self-efficacy. Qualitative findings highlighted covert tactics that women used to exercise their desired choices, rather than more overt traditional self-efficacy measures, such as standard "confidence in one's ability to" statements. Therefore, the teams collectively decided to incorporate decision-making and negotiation into the framework to further describe ways that women may exercise their choices without confidence in voicing their desires. The *existence of choice* domain remained the same within the framework, though findings affirmed the external pressures and internal motivations driving women's *existence of choice.* The *achievement of choice* domain also remained the same. We only present the final framework in this report, but want to highlight the iterative process surrounding its revisions based on the qualitative findings.

A central activity to launch the translation of qualitative findings into quantitative module items was the WGE-SRH Qualitative Workshop held from October 29-31, 2017 in Cape Town, South Africa. This workshop served as a platform for presentation of qualitative results from each site, informing revisions of the WGE-SRH framework. Building on the revised framework, cross-site qualitative findings were then translated into quantitative items to constitute the WGE-SRH index module for piloting. Country PIs identified representatives from the Ministry of Health and/or Gender in their countries to attend the meeting. Core members of in-country qualitative teams worked together throughout the workshop in mixed-site groups to review the qualitative data, deduce major themes, and generate items that were representative of WGE-SRH for the core SRH outcomes across sites.

The workshop's summary session provided a key opportunity to review the index items' implications. This summary session encouraged external expert review of the qualitative results, revised WGE-SRH and proposed quantitative items. Attendees included colleagues from the BMGF, ICRW, Population Council, and Emory and Harvard universities, who have extensive experience in women's empowerment and reproductive health research. The session provided the WGE-SRH team with a unique opportunity to garner input on the WGE-SRH framework and quantitative items reflecting the framework, before they were piloted in-country.

Original Items

Following the summary session, the WGE-SRH team incorporated the expert input, clarifying the concept of autonomy as a reflection of external and internal motivations for future presentations and written dissemination. Suggested items for each domain and outcome were circulated to all sites. The in-country PIs then selected the items that they thought were most applicable to their context. The 51 items which were selected most frequently across sites were then tested in each site during the face validity stage (see below). An additional five items (indicated by ET in item wording), thought to be more appropriate for the Ethiopian context were added for a total of 56 items. Table 1 shows the original items used for the face validity test. Items were organized in a random order across the three domains (sex, contraception, and pregnancy).

Table 1. Original Items for Face Validity Testing

Item	Description
AUT001	My children will have a good future no matter how many children I have
AUT002	If I refuse sex with my husband/partner, he may seek another wife or find a girlfriend
AUT003	I would be considered infertile If I did not get pregnant soon after marriage
AUT004	I have sex with my husband/partner because I enjoy it
AUT005	I want /wanted to complete my education before I have/had a child
AUT006	I will remain healthy even if I do not rest between pregnancies
AUT007	I will be healthier if I avoid using modern family planning (contraception)
AUT008	If I ever refuse sex with my husband/partner, he may beat me
AUT009	I would feel pressured if it took a long time for me to get pregnant after marriage
AUT010	I can choose what to do about family planning regardless of what my husband/partner tells me to do
AUT011	I would be forced to stop using family planning if my husband/partner found out I was using it
AUT012	My husband understands when I don't feel like having sex.
EFF_SE002	I am confident I can tell husband/partner when I want to have sex
EFF_SE003	I do not feel confident discussing with my husband/partner when to have another child
EFF_DM004	I can decide when to have another child
EFF_DM005	I can/could decide when I want/wanted to start having children
EFF_NEG006	I can/could negotiate with my husband/partner when to start a family.
EFF_SE008	I feel confident telling my husband/partner if I want to stop using family planning
AUT013	If I use family planning, my husband/partner may seek another wife or find a girlfriend
AUT014	I have sex with my husband/partner for the sake of our marriage or family
AUT015	If I use family planning, I may have trouble getting pregnant the next time I want to
AUT016	I am more willing to have sex with my husband/partner when he treats me well
AUT017	If I use family planning, my children will have better opportunities for education.
AUT018	If I use family planning, my husband/partner will be happier
AUT019	Having sex is important for me to feel loved.
AUT020	I will have no one to take care of me when I am old if I do not produce enough children
AUT021	If I have sex with a partner who is not my husband, I will be shamed
AUT022	I do not need to use family planning because it does not matter if I get pregnant
AUT023	If I refuse sex with my husband/partner, he may force me to have sex
AUT024	If I have few children, people will think I have done well in life

EFF_DM009	I am able to make a decision about FP but only if I have my husband's support
EFF_SE010	I feel confident discussing family planning with my husband/partner
EFF_NEG011	I can negotiate with my partner if I do not want to have sex
EFF_DM012	I can decide to switch methods if I experience side effects with the family planning I am using
EFF_SE013	I feel confident telling my provider what is important for me when selecting a family planning method
EFF_NEG014	I can negotiate with my husband/partner when to stop having children
EFF_SE015	I do not feel confident discussing with my husband/partner when to start a family
EFF_DM016	I am able to decide when to have sex
AUT025	If I get/had gotten pregnant before marrying, I will bring/would have brought shame to my family
AUT026	If I rest between pregnancies, I can take better care of my husband/partner and children
AUT027	There will be conflict in my marriage if I use family planning
AUT028	My choice of a family planning method will depend on what the provider tells me to do
AUT029	Anytime my husband/partner wants sex, I must give in to him
AUT030	I can/could only start a family when it is/was affordable
AUT031	I will have as many children as I am meant to have
AUT032	If I use family planning, my children may not be born normal
AUT033	If I get (had gotten) pregnant before marrying, it will not harm (would have harmed) my future
AUT034	If I show my husband/partner that I want to have sex, he may consider me promiscuous
AUT035	I cannot have all the children I want because of my economic situation
AUT036	If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner
AUT037	If I refuse sex with my husband/partner, he may stop supporting me
ET-Au1	If I use family planning, I will regain strength before I get pregnant again.
ET-Au2	If I use family planning, people will think I am promiscuous.
ET-Au3	If I have/had sex before marrying, I will be/would have been shamed.
ET-Au4	If I use family planning, People will think I am managing my life wisely.
ET-Au5	If I space my pregnancies, I will improve my relationship with my husband.

Item Refinement Process (Face Validity and Training of Trainers)

Prior to the training of trainers, in January 2018, the quantitative module was tested for face validity in each site to inform item wording and adjust the total number of items. Per site, face validity testing occurred with 20 women aged 15-49 (total n=80) using convenience sampling. Each site then prepared a summary of their face validity experience and suggested item revisions to be discussed in the training session that occurred in Kampala in February 2018.

While specific changes to item wording were also made, there were also a number of organizational revisions suggested in the summary reports on the face validity results. Organizational suggestions included reorganizing the items by domain to ensure fluidity. All sites agreed that the ordering revision would also help women distinguish between similar items and assist interviewers in explaining these differences. Skip patterns were also added, specifically for the sexual empowerment section. Sites noted that respondents felt uncomfortable answering

questions about sex if they had never had sex themselves; therefore, a skip pattern was added to ensure that these questions were only asked to women with sexual experience. Relevancy statements were also added for pregnancy items to alter item wording for nulliparous versus parous women. These relevancy statements allowed further differentiation between empowerment surrounding first pregnancy (nulliparous women) and subsequent pregnancies (parous women).

Several items were deemed similar to respondents. As such, redundant items were eliminated through group consensus at the training session. Undergoing item revision and cutting redundant items through a consensus process provided assurance that the remaining items were applicable across sites. Though a subset of items was intended to be more applicable to the Ethiopian context, at this meeting, the other teams voted in favor of replacing some of their items with three of the Ethiopian items. After the final vote, five items were eliminated for a total of 51 items to be piloted in Uganda (March 2018) and Ethiopia (April 2018).

Piloted Items

The 51 items piloted in Uganda and Ethiopia are listed in Table 2. Teams noted that participants were generally able to respond to the items and no major issues occurred during data collection. However, preliminary analyses showed the pregnancy items did not load on a single factor.

The teams reviewed and felt that the wording of some of these items were ambiguous and did not indicate clear directionality of empowerment. In addition, some items needed clarification of relevancy statements. A total of ten items where revised before additional piloting in Anambra and Kano states of Nigeria in May-June 2018.

Revisions for Anambra and Kano included six new items and four revised relevancy statements. The six new items are outlined in Table 3, for which we detail the original wording, revised wording, and rationale. The 6th item was not a word revision, but rather an additional item to complement an existing item on family planning decision-making that was previously conditioned on partner approval.

Four *exercise of choice* items were also revised to allow for clearer relevancy statements for women who had previously had a pregnancy and women who did not.

A total of 57 items were piloted in Kano and Anambra, including both the original items to ensure comparability across the four sites, as well as the six new items to also assess the psychometric properties of the revised set.

Table 2. Items Piloted in Uganda and Ethiopia by Outcome

Pregnancy	
AUT001	My children will have a good future no matter how many children I have
AUT003	I will be/would have been considered infertile If I do not/did not get pregnant soon after marriage
AUT005	I want /wanted to complete my education before I have/had a child
AUT009	I would feel/have felt pressured if it took/had taken a long time for me to get pregnant after marriage
ET-Au5	If I space or limit my pregnancies, I will improve my relationship with my husband.
AUT020	I will have no one to take care of me when I am old if I do not produce enough children
AUT025	If I get/had gotten pregnant before marrying, I will bring/would have brought shame to my family
AUT026	If I rest between pregnancies, I can take better care of my family
AUT031	I will have as many children as I am meant to have
AUT033	If I had gotten/get pregnant before marrying, it would not have harmed/will not harm my future
AUT035	My economic situation prevents me from having all of the children I want
EFF_DM005	I can decide when I want/wanted to start having children
EFF_SE015	I feel confident discussing with my husband/partner when to start having children
EFF_NEG006	I can/could negotiate with my husband/partner when to start a family
EFF_DM004	I can decide when to have another child
EFF_SE003	I feel confident discussing with my husband/partner when to have another child
EFF_NEG014	I will be able to/can negotiate with my husband/partner when to stop having children
Contraception	
AUT010	I will be able to/can choose what to do about family planning regardless of what my husband/partner tells me to do
AUT011	If my husband/partner found out that I was using family planning, he would force me to stop using it
AUT013	If I use family planning, my husband/partner may seek another sexual partner
AUT015	If I use family planning, I may have trouble getting pregnant the next time I want to
AUT022	I do not need to use a family planning method because it does not matter if I get pregnant
AUT027	There could be/will be conflict in my relationship/marriage if I use family planning
AUT028	My choice of a family planning method will depend on what the provider tells me to do
AUT032	If I use family planning, my children may not be born normal
AUT036	If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner
ET-Au1	If I use family planning, I will regain strength before I get pregnant again
ET-Au2	If I use family planning, people will think I am promiscuous
ET-Au4	If I use family planning, people will think I am managing my life wisely
EFF_DM009	I am only able to decide about using family planning if I have my husband/partner's approval

EFF_SE010	I would feel/feel confident discussing family planning with my husband/partner
EFF_DM012	I can decide to switch from one family planning method to another if I want to
EFF_SE013	I feel confident telling my provider what is important for me when selecting a family planning method
Sex	
AUT019	Having sex is important for me to feel loved.
AUT002	If I refuse sex with my husband/partner, I fear he may seek sex from another partner
ET-Au3	If I have/had sex before marrying, I will be/would have been shamed.
AUT012	My husband/partner understands when I don't feel like having sex
AUT014	I have sex with my husband/partner for the sake of our marriage or family
AUT037	If I refuse sex with my husband/partner, he may stop supporting me
AUT023	If I refuse sex with my husband/partner, he may force me to have sex
AUT016	I am more willing to have sex with my husband/partner when he treats me well
AUT029	Anytime my husband/partner wants sex, I must give in to him
AUT004	I have sex with my husband/partner because I enjoy it
AUT008	If I refuse sex with my husband/partner, he may physically hurt me
AUT034	If I show my husband/partner that I want to have sex, he may consider me promiscuous
EFF_SE002	I am confident I can tell my husband/partner when I want to have sex
EFF_DM016	I am able to decide when to have sex

Table 3. Items Refined Prior to Pilot Testing in Nigeria

Original Wording	Revised Wording	Rationale for Revision
My children will have a good future no matter how many children I have.	I cannot have all of the children I want because if I did, they would not have all of the opportunities I want them to have.	While ensuring a prominent future for children was an aspect of childbearing decisions revealed during the qualitative phase, the original item did not reflect clear directionality of empowerment.
I will be/would have been considered infertile If I do not/did not get pregnant soon after marriage.	I cannot delay having children after marriage or else I will be considered infertile (*for women who had never been pregnant*); I could not delay having children after marriage or else I would have been considered infertile (*for women who had been pregnant and married*); I could not delay having children or else I would have been considered infertile (*for women who had been pregnant but had never been married*)	Wording was added to internally reflect the pressure that women may have felt around conceiving soon after marriage. As originally stated, the item reflected a community norm, rather than how that norm influenced their choice.
If I space or limit my pregnancies, I will improve my relationship with my husband.	I cannot delay or stop having children even if I want to or it will hurt/spoil my relationship with my husband/partner (*for women in current partnerships*); I could not delay or stop having children even if I want to or it will hurt/spoil my relationship with my husband/partner (*for women not in current partnerships*)	The focus on both spacing and limiting in the original wording was confusing to women. This wording was simplified to "delay" and "stop." There was also ambiguity around what "improving" a relationship entailed and women appeared to better understand when phrased in a negative manner.
If I rest between pregnancies, I can take better care of my family.	I want to rest between pregnancies so I can take better care of myself.	The focus on family in the original item was deemed too vague, as all women wanted to take good care of their families. Therefore, it was suggested to focus on women's desire to rest between their pregnancies as internally motivated by improving their own health.
If I had gotten/get pregnant before marrying, it would not have harmed/will not harm my future	If I get pregnant before marrying, I will still be able to achieve my life goals (*for women in current partnerships*); If I had gotten pregnant before marrying, I would have still been able to achieve my life goals (*for women not in current partnerships*)	The wording "harm my future" was deemed too vague, as many external factors could have harmed a woman's future. The original wording also did not indicate clear directionality of empowerment. Therefore, it was deemed more appropriate to focus on the achievement of life goals.
NA	I am able to decide about using family planning on my own	The item complements a previous item which focuses on decision-making for family planning use conditional on husband approval: "I am only able to decide about using family planning if I have my husband/partner's approval." This new item was added to reflect individual decision-making without a focus on partner influence.

PILOT PHASE: QUANTITATIVE MEASURES

The development the WGE-SRH index followed a common protocol developed by the cross-site collaborative team. JHSPH team organized a training of trainers (ToT) in Uganda in February 2018 that included two key researchers from each site. This session focused on training in-country researchers and field coordinators on reviewing the WGE-SRH quantitative study instrument, revising the statements as appropriate, understanding data collection procedures, and organizing and implementing the survey activities. Following the ToT, the key in-country researchers led five-day trainings for the interviewers to collect the WGE-SRH pilot data in each of the four sites. In-country data collection utilized PMA2020 trained resident interviewers and enumeration areas (EAs) near to where to WGE-SRH qualitative phase was conducted.[18]

Quantitative Sampling

The WGE-SRH instrument was subsequently pilot-tested in the four sites, using PMA2020's survey platform. Specifically, urban and rural households were sampled using PMA2020 sampling frames (random sample of households within EA).[18] Women aged 15-49 from selected households were invited to participate after providing consent or assent, as appropriate. Altogether 1,229 women were surveyed (Ethiopia n=334; Uganda n=257; Anambra n=318; Kano n=320) by trained PMA2020 interviewers.

Quantitative Data Collection

As described above, the final quantitative instrument contained 57 statements about autonomy, self-efficacy, negotiation, and decision-making specific to sex, contraception, and pregnancy. For each item, women were asked to indicate if they agreed or disagreed using a visual sliding scale. WGE-SRH teams collaborated to program a sliding scale feature for smartphone data collection using Open Data Kit (ODK), such that the respondent could slide her finger across a scale horizontally on the mobile phone screen to indicate her level of agreement with each statement. The outcome scale for each statement ranged from 1 (Strongly Disagree) to 10 (Strongly Agree); This non-numeric approach aimed to improve on the use of Likert scale ratings, which can be difficult to comprehend, especially in low-literacy settings, by providing the respondent a visual frame to anchor her responses.

Following the ToT, the instrument was then piloted in Uganda (March-April), Ethiopia (April-May), and Nigeria (May-June). After giving informed consent, all eligible women completed an in-person, interviewer-administered survey with a trained interviewer, who recorded survey responses on a phone equipped with ODK software and for the scale items, read each (if needed) and then let the respondent slide and select her response. Data were uploaded onto a secure server and reviewed by data managers onsite and at JHSPH to verify data quality and completeness.

Measures and Outcomes

This study constructed two outcome measures related to *achievement of choice* with respect to women's sexual behavior and use of contraception.

- **Sex:** To assess sexual behavior, a binary variable for volitional sex (yes/no) was adopted from the Demographic and Health Survey questionnaire and defined as reporting that last sex was (1) wanted, (2) not forced, (3) not pressured by her partner, and (4) not at risk of physical violence if declined. For a woman to be classified as having *volitional sex*, a positive response to each of the items was required.
- **Contraception:** To examine use of contraception, a binary variable for current use of contraception (yes/no) was constructed, defined as reporting use of any contraceptive method, including barrier and traditional methods, at the time of the survey. We assessed current use of contraception among exposed women, that is those with a potential current need for contraception (sexually active in the last 12 months, not pregnant or wanting to become pregnant).

Due to the cross-sectional nature of the empowerment subscale items, we did not assess the *achievement of choice* with respect to pregnancy. Although this limitation applies also to sex and contraception outcomes, both are reported for more recent behaviors, whereas the last pregnancy could be several years prior to the pilot survey. Longitudinal designs will provide a more rigorous opportunity to test the predictive utility of the WGE-SRH measure on pregnancy outcomes.

We framed some of our *exercise of choice* items to align with a set of four items that were included in a 2017 round of PMA2020 surveys (Ethiopia and Uganda Round 5). We expanded the WGE-SRH *exercise of choice* items to systematically cover negotiation with partner, decision-making, and confidence (self-efficacy). The four items were later included in the WGE-SRH quantitative survey and the factor analysis. For consistency with *existence of choice* and *exercise of choice* items, all response options were scored 1 (Strongly Disagree) to 10 (Strongly Agree) to the following questions:

1. If I didn't want to have sex, I could tell my husband/partner.
2. If I don't want to have sex, I am capable of avoiding it with my husband/partner.
3. If I want to use contraception, I can tell my husband/partner I am using it.
4. If I want to use contraception, I am capable of using it when I want.

Existence of choice and *exercise of choice* items have been previously described in the "Index Construction" section.

Analysis

After assessing patterns of missingness (<5% for each item), we explored the distribution of each item per site and converted the continuous responses into categorical responses (from 1 to 10) in order to conduct factor analysis. Appendix 9 provides the histograms for each item by site to show the nature of the response distributions. We conducted psychometric analysis by domain (autonomy and self-efficacy) and outcome (sex, contraception, and pregnancy) first, before combining both domains and outcomes to reflect the conceptual framework.

At each step of the process, we began with site-specific analysis and subsequently identified an optimal set of common items that scaled across sites. Psychometric criteria, including eigenvalues, Scree tests and parallel analysis criteria were applied to determine the number of

factors to retain for each domain and each outcome. We also conducted exploratory factor analysis (EFA) to retrieve factor loadings and select a more parsimonious set of items that loaded on a single factor per domain and outcome (based on a minimum 0.40 factor loading criteria). We computed Cronbach's alpha to assess the internal reliability of the final item sets for each domain per outcome.

Construction of the cross-site WGE-SRH index
While the site-specific loadings were important, the goal was to determine a common set of items across geo-culturally diverse sites to combine into an index. The items were chosen to reflect the best cross-site solutions based on previous psychometric analysis.

Throughout the quantitative index and sub-scale analysis, we will refer to *existence of choice* as the autonomy sub-scale. Moreover, though our *exercise of choice* measure also encompasses decision-making and negotiation, we will hereafter refer to it as the self-efficacy sub-scale to help distinguish related concepts.

To further explore the relationship of empowerment concepts, we combined autonomy and self-efficacy items per outcome into single scores of empowerment (i.e., sexual empowerment, contraceptive empowerment).

Next, we constructed two multidimensional measures: a SRH autonomy sub-scale and a SRH self-efficacy sub-scale by combining autonomy measures for sex, contraception, and pregnancy into one indicator; the same process was followed for self-efficacy measures. The multidimensional SRH autonomy sub-scale comprised eleven items: four related to sexual autonomy, five related to contraceptive autonomy, and two related to pregnancy autonomy. The multidimensional SRH self-efficacy sub-scale was composed of 10 items: four related to sexual self-efficacy, three to contraceptive self-efficacy, and three to pregnancy self-efficacy.

SRH autonomy and self-efficacy ultimately made up the WGE-SRH index. All indicators were defined as continuous variables from 1 to 10, as well as transformed into tertile groups for ease of interpretation and application.

Spearman rank correlation coefficients between the ten-point rankings of the autonomy subscales for sex, contraception and pregnancy and their counterpart self-efficacy subscales are presented in Table 4. Across the sites, correlations for sex and contraceptive outcomes (0.12 and 0.30) were positive and statistically significant. These positive correlations indicate that the progression from existence of choice to exercise of choice aligns with the study's conceptual framework. However, correlations were generally low (below 0.30), with one exception in Kano where contraceptive autonomy and self-efficacy were more strongly correlated (0.60). Note, that for the pregnancy correlations, only two items each comprised autonomy and self-efficacy, and therefore, these were technically not sub-scales.

Table 4. Spearman Correlation Coefficients between Autonomy (Existence of Choice) and Self-Efficacy/Decision-making (Exercise of Choice) Subscales

	Site				
Outcome	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	Cross-Site
Sex	**0.25***	**0.22**	**0.27**	0.04	**0.12**
Contraception	**0.12**	**0.18**	**0.28**	**0.60**	**0.30**
Pregnancy	-0.07	0.02	0.03	**0.22**	0.06

*Bold-faced coefficients are statistically significant at $p<0.05$.

Concurrent validity the WGE-SRH instrument

The final step of our analysis evaluated the associations between each WGE-SRH measure's tertiles and our two outcomes of interests: volitional sex at last intercourse and current use of contraception. Outcome-specific associations, sexual autonomy and self-efficacy in relation to non-volitional sex and contraceptive autonomy and self-efficacy in relation to current use of contraception, were assessed.

Outcome-specific associations were examined in each site, using multivariate logistic regression, adjusting for area of residence (as samples were stratified by rural/urban areas). Models assessed associations with autonomy and self-efficacy measures separately as well as associations with combined empowerment indicators (i.e. autonomy and self-efficacy combined). The same analysis was conducted substituting the outcome-specific WGE-SRH measures with the SRH multidimensional combined index. Estimates for marginal effects were run to examine the change in probability of each outcome measure when the WGE-SRH score moved between tertiles. All analyses were conducted using Stata Version 14.2, StataCorp LLC, TX.

QUANTITATIVE SCALE: RESULTS

Demographics

The characteristics of the women participating in each site are displayed in Table 5. The mean age of respondents ranged from 27 years in Kano to 30 years in Anambra. Between two-thirds and three-quarters of women were in union and 54% to 77% had ever been pregnant. Mean number of children ranged from 2.6 in Ethiopia to 4 in Kano. Educational attainment of women varied substantially by site, with 44% of women who had never attended school in Kano as compared to less than 1% in Anambra. Polygamy ranged from 1% in Ethiopia to 47% in Kano.

Table 5. Percent Distribution of Sample Composition Characteristics Across Pilot Sites

	N (%)			
Characteristic	Ethiopia (n=334)	Uganda (n=257)	Nigeria/Anambra (n=318)	Nigeria/Kano (n=320)
Age				
15-19	24.2	16.7	14.5	30.0
20-24	18.3	19.8	19.2	18.8
25-34	30.8	37.7	33.0	25.3
35-49	2.7	25.7	33.3	25.9
Schooling level				
None	32.3	4.3	0.9	44.4
Primary	34.4	43.2	61.3	44.7
Secondary or higher	33.2	52.5	37.7	10.9
Marital status				
Never married	32.6	24.9	42.1	33.8
Currently in partnership, not married	1.2	34.6	1.6	0.0
Currently married	53.9	18.3	46.2	58.1
Widowed or divorced	12.3	22.1	10.1	8.1
Union is polygamous	1.1	37.4	6.6	46.8
Residence				
Urban	55.4	51.0	51.6	50.9
Rural	44.6	49.0	48.4	49.01
Ever pregnant	55.1	77.0	54.4	59.4
Number of pregnancies				
0	2.7	3.9	3.1	1.6
1-2	27.3	26.9	18.9	13.4
3-4	15.9	21.0	18.2	13.8
5 or more	54.2	48.3	59.7	71.3
continuous (mean(SD))	1.8	2.7	2.0	3.0
Currently pregnant	4.2	8.9	6.3	6.9
Currently use of contraception	44.4	43.6	31.2	5.0
Ever had sex	72.5	91.8	83.0	65.9
Volitional sex at last sex, among ever sex	46.7	65.2	62.7	91.4

Sexual and Reproductive Autonomy (Existence of Choice)

In each site, a sexual autonomy scale emerged illustrative of the social pressures that women faced from husbands and society related to sexual decisions. Site-specific measures ranged from four items in Kano to six in Uganda and Ethiopia, with Cronbach alphas varying from 0.73 to 0.79 (Table 6a). Four common items were identified across sites and loaded on a single factor in each site with corresponding Cronbach alphas ranging from 0.72 to 0.79 (Table 6b).

Table 6a. Site-specific Factor Loadings for Sexual Autonomy

	Ethiopia	**Uganda**	**Nigeria: Anambra**	**Nigeria: Kano**	**All Sites**
Items	Factor Loadings				
If I refuse sex with my husband/partner, I fear he may seek sex from another partner		0.46	0.47		0.43
I have sex with my husband/partner because I enjoy it					
If I have/had sex before marrying, I will be/would have been shamed			0.42		
If I refuse sex with my husband/partner, he may physically hurt me	0.73	0.65	0.85	0.78	0.77
My husband/partner understands when I don't feel like having sex					
I have sex with my husband/partner for the sake of our marriage or family	0.44	0.42			
I am more willing to have sex with my husband/partner when he treats me well					
I am more willing to have sex with my husband/partner when he treats me well					
Having sex is important for me to feel loved					
If I refuse sex with my husband/partner, he may force me to have sex	0.64	0.73	0.75	0.73	0.75
Anytime my husband/partner wants sex, I must give in to him	0.58				
If I show my husband/partner that I want to have sex, he may consider me	0.69	0.45	0.62	0.61	0.56
If I refuse sex with my husband/partner, he may stop supporting me	0.75	0.65	0.63	0.47	0.62
Eigenvalue	***2.51***	***1.96***	***2.44***	***1.97***	***2.04***
Cronbach Alpha	***0.75***	***0.73***	***0.79***	***0.74***	***0.76***

Table 6b. Retained Items and Factor Loadings for Sexual Autonomy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loadings				
If I refuse sex with my husband/partner, he may physically hurt me	0.79	0.69	0.86	0.79	0.80
If I refuse sex with my husband/partner, he may force me to have sex	0.69	0.76	0.76	0.72	0.75
If I show my husband/partner that I want to have sex, he may consider me promiscuous	0.64	0.46	0.63	0.62	0.58
If I refuse sex with my husband/partner, he may stop supporting me	0.71	0.56	0.60	0.45	0.58
Eigenvalue	***2.02***	***1.58***	***2.07***	***1.73***	***1.87***
Cronbach Alpha	***0.76***	***0.72***	***0.79***	***0.72***	***0.76***

The contraceptive autonomy measure captured the constraints women faced when making decisions about using contraception (Table 7). The internal reliability (based on the Cronbach alpha value) of site-specific subscales was above 0.70 in all sites except Ethiopia (alpha=0.56) (Table 7a). A five-item cross-site contraceptive autonomy measure, based on items common to site-specific analyses, loaded on a single factor in each site, with Cronbach alphas above 0.70 in all sites except Ethiopia (alpha=0.59) (Table 7b).

Table 7a. Site-specific Item Loadings for Contraceptive Autonomy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loadings				
I will be able to/can choose what to do about family planning regardless of what my husband/partner tells me to do	--	--	--	--	
If my husband/partner found out that I was using family planning, he would force me to stop using it	0.46	0.51	0.51	--	
If I use family planning, my husband/partner may seek another sexual partner	0.46	0.53	0.66	0.40	0.56
If I use family planning, I may have trouble getting pregnant the next time I want to	0.42	0.52	0.71	0.65	0.63
I do not need to use a family planning method because it does not matter if I get pregnant	--	--	0.51	0.72	
There could be/will be conflict in my relationship/marriage if I use family planning	0.42	0.56	0.67	0.44	0.40
My choice of a family planning method will depend on what the provider tells me to do	--	--	--	--	
If I use family planning, my children may not be born normal	--	0.68	0.57	0.83	0.55
If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner	0.52	0.62	0.59	0.66	0.69
If I use family planning, I will regain strength before I get pregnant again	--	--	--	0.63	
If I use family planning, people will think I am promiscuous	--	0.43	0.55	0.77	0.66
If I use family planning, people will think I am managing my life wisely	--	--	--	0.66	0.57
Eigenvalue	***1.05***	***2.16***	***2.9***	***3.83***	***2.40***
Cronbach Alpha	***0.56***	***0.74***	***0.81***	***0.86***	***0.78***

Table 7b. Retained Items and Loadings for Contraceptive Autonomy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loadings				
If I use family planning, my husband/partner may seek another sexual partner	0.46	0.47	0.66	0.40	0.55
If I use family planning, I may have trouble getting pregnant the next time I want to	0.46	0.52	0.66	0.67	0.62
There could be/will be conflict in my relationship/marriage if I use family planning	0.42	0.55	0.70	0.45	0.56
If I use family planning, my children may not be born normal	0.42	0.68	0.60	0.78	0.67
If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner	0.53	0.67	0.63	0.75	0.70
Eigenvalue	***1.05***	***1.72***	***2.1***	***1.97***	***1.94***
Cronbach Alpha	***0.59***	***0.70***	***0.78***	***0.80***	***0.78***

Unlike the sexual and contraceptive autonomy analyses, the pregnancy autonomy analysis yielded different solutions in each site (Table 8a). In Uganda and Ethiopia, which were the first two sites to pilot the WGE-SRH instrument, no factor solution for pregnancy autonomy was found in Uganda (Eigenvalue below 1.0) and a one-factor solution was found in Ethiopia (alpha=0.65). After adding items for pilot-testing in the two sites in Nigeria, a pregnancy autonomy construct emerged only in Kano with an Eigenvalue of 1.95 and Cronbach's alpha of 0.76 (Table 8b). While the pregnancy autonomy scale reflected social constraints on childbearing decisions in Ethiopia, it mostly captured internal motivations, such as educational attainment and health concerns in Kano. Due to these discrepancies, there was no optimal cross-site solution yielding one single factor.

Nevertheless, two items were identified that loaded consistently across sites—completing schooling before having a child and spacing between pregnancies. While these two items did not constitute a scale (Eigenvalues below 1 with the exception of Kano (Eigenvalue=1.27)), we retained these items for our overall WGE-SRH index. These two items and cross-site loadings are presented in Table 8c.

Table 8a. Site-specific Item Loadings for Pregnancy Autonomy (Original Items)

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Item	Factors loadings				
My children will have a good future no matter how many children I have	--	--	--	--	
I would have been considered infertile If I do not/did not get pregnant soon after marriage	0.81	--	0.58		
I wanted to complete my education before I have/had a child	--		--	0.73	0.44
If I space or limit my pregnancies, I will improve my relationship with my husband	--	0.66	--	0.75	0.57
I would have felt pressured if it had taken a long time for me to get pregnant after marriage	0.52	--	0.58	--	
I will have no one to take care of me when I am old if I do not produce enough children	0.54	--		--	
If had gotten pregnant before marrying, I would have brought shame to my family	--	--	--	--	
If I rest between pregnancies, I can take better care of my family	--	0.66	--	0.47	0.74
I will have as many children as I am meant to have	--	--	--	--	
If I had gotten pregnant before marrying, it would not have harmed/will not harm my future	--	--	--	--	
My economic situation prevents me from having all of the children I want	--	--			
Eigenvalue	***1.23***	***0.88***	***0.68***	***1.96***	***1.08***
Cronbach's Alpha	***0.65***	***0.59***	***0.5***	***0.76***	***0.58***

Table 8b. Site-specific Item Loadings for Pregnancy Autonomy (With New Items)

	Nigeria: Anambra	Nigeria: Kano
items	factor loadings	
My children will have a good future no matter how many children I have	--	--
I would have been considered infertile If I do not/did not get pregnant soon after marriage	--	--
I wanted to complete my education before I have/had a child	--	0.67
If I space or limit my pregnancies, I will improve my relationship with my husband	--	0.69
I would have felt pressured if it had taken a long time for me to get pregnant after marriage	--	
I will have no one to take care of me when I am old if I do not produce enough children	--	--
If had gotten pregnant before marrying, I would have brought shame to my family	--	--
If I rest between pregnancies, I can take better care of my family	--	--
I will have as many children as I am meant to have	--	--
If I had gotten pregnant before marrying, it would not have harmed/will not harm my future	--	--
My economic situation prevents me from having all of the children I want		-0.51
I cannot have all of the children I want because if I did, they would not have all of the opportunities I want them to have	0.72	-0.64
I cannot delay having children after marriage or else I will be considered infertile	0.72	
I want to rest between pregnancies so I can take better care of myself	--	0.76
Eigenvalue	***1.04***	***2.2***
Cronbach's Alpha	***0.61***	***0.8***

Table 8c. Cross-site Item Loadings for Pregnancy Autonomy (Not a Sub-scale)

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor loadings				
I wanted to complete my education before I have/had a child	0.49	0.66	0.51	0.79	0.79
If I rest between pregnancies, I can take better care of my family	0.49	0.66	0.5	0.79	0.79
Eigenvalue	***0.48***	***0.88***	***0.52***	***1.27***	***1.27***
Cronbach's Alpha	***0.34***	***0.59***	***0.39***	***0.79***	***1***

Sexual and Reproductive Self-Efficacy (Exercise of Choice)

The WGE-SRH questionnaire included 14 items exploring women's confidence in their ability to decide on and negotiate sexual, contraceptive, and pregnancy matters. Four items related to sexual self-efficacy, loaded on a single factor in all sites, but yielded low Cronbach alphas, with the exception of Anambra (alpha=0.72) (Table 9a, 9b). A four-item contraceptive self-efficacy measure also emerged in all sites, with Cronbach alphas ranging from 0.41 to 0.86 (Table 10a, 10b). Finally, a three-item pregnancy self-efficacy measure was identified with Cronbach alphas ranging from 0.48 to 0.66 (Table 11a, 11b).

Table 9a. Site specific *Sexual* Self-efficacy *(Among Women Who Ever Had Sex)*

	Ethiopia	**Uganda**	**Nigeria: Anambra**	**Nigeria: Kano**	**All Sites**
Items	Factor Loading				
I am confident I can tell my husband/partner when I want to have sex	0.66	0.33	0.54	0.73	0.62
I am able to decide when to have sex	0.61	0.59	0.61	0.54	0.68
If I do not want to have sex, I can tell my husband	0.48	0.35	0.68	0.93	0.63
If I do not want to have sex, I am capable of avoiding it with my husband	--	0.42	0.40	--	
Eigenvalue	***1.04***	***0.76***	***1.29***	***1.69***	***1.24***
Cronbach Alpha	***0.61***	***0.46***	***0.63***	***0.77***	***0.67***

Table 9b. Cross-site *Sexual* Self-efficacy *(Among Women Who Ever Had Sex)*

	Ethiopia	**Uganda**	**Nigeria: Anambra**	**Nigeria: Kano**	**All Sites**
Items	Factor Loading				
I am confident I can tell my husband/partner when I want to have sex	0.63	0.33	0.54	0.72	0.58
I am able to decide when to have sex	0.54	0.59	0.61	0.50	0.64
If I do not want to have sex, I can tell my husband	0.57	0.35	0.68	0.98	0.71
If I do not want to have sex, I am capable of avoiding it with my husband	0.37	0.42	0.40	0.37	0.36
Eigenvalue	***1.16***	***0.76***	***1.29***	***1.86***	***1.40***
Cronbach Alpha	***0.60***	***0.46***	***0.63***	***0.72***	***0.65***

Table 10a. Site-specific Contraceptive Self-efficacy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loading				
I am only able to decide about using family planning if I have my husband who approves					
I would feel/feel confident discussing family planning with my husband/partner	0.58	0.37	0.61	0.67	0.65
I can decide to switch from one family planning method to another if I want to	0.58	0.33	0.65	0.91	0.74
I feel confident telling my provider what is important for me when selecting a family planning method	0.74	0.68	0.71	0.91	0.81
If I want to use contraception, I can tell my husband				0.49	0.43
If I want to use contraception, I am capable of using it when I want				0.69	
Eigenvalue	***1.22***	***0.71***	***1.30***	***2.82***	***1.81***
Cronbach Alpha	***0.64***	***0.41***	***0.69***	***0.86***	***0.74***

Table 10b. Cross-site Contraceptive Self-efficacy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loading				
I would feel/feel confident discussing family planning with my husband/partner	0.58	0.37	0.61	0.70	0.65
I can decide to switch from one family planning method to another if I want to	0.58	0.33	0.65	0.96	0.74
I feel confident telling my provider what is important for me when selecting a family planning method	0.74	0.68	0.71	0.86	0.79
Eigenvalue	***1.22***	***0.71***	***1.30***	***2.14***	***1.61***
Cronbach Alpha	***0.64***	***0.41***	***0.69***	***0.73***	***0.77***

Table 11a. Site-specific Pregnancy Self-efficacy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loading				
I could decide when I wanted to start/stop having children	0.50			0.51	0.52
I can/could decide when to start having/ have another child	0.62	0.62	0.63	0.85	0.73
I can negotiate with my husband/partner when to stop having children	0.74	0.62	0.63	0.48	0.65
Eigenvalue	***1.18***	***0.77***	***0.80***	***1.21***	***1.23***
Cronbach Alpha	***0.63***	***0.55***	***0.56***	***0.63***	***0.66***

Table 11b. Cross-site Pregnancy Self-efficacy

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loading				
I could decide when I wanted to start/stop having children	0.50	0.27	0.34	0.51	0.52
I can/could decide when to start having/ have another child	0.62	0.51	0.97	0.85	0.73
I can negotiate with my husband/partner when to stop having children	0.74	0.75	0.41	0.48	0.65
Eigenvalue	***1.18***	***0.91***	***1.23***	***1.21***	***1.23***
Cronbach Alpha	***0.63***	***0.48***	***0.52***	***0.63***	***0.66***

Table 11c. Site-specific Pregnancy Self-efficacy (Including New Items)

	Ethiopia	Uganda	Nigeria: Anambra	Nigeria: Kano	All Sites
Items	Factor Loading				
I could decide when I wanted to start/stop having children		0.60		0.51	
I can/could decide when to start having/ have another child	0.61		0.79	0.95	
I can negotiate with my husband/partner when to stop having children	0.75	0.68	0.68	0.79	
I could decide when I wanted to start/stop having children	0.63	0.71	0.47		
I could/can negotiate when to start a family	0.63	0.71	0.47		
Eigenvalue	***1.60***	***1.33***	***1.30***	***1.80***	
Cronbach Alpha	***0.70***	***0.70***	***0.68***	***0.79***	

Concurrent Validity of the WGE-SRH Index

To examine the concurrent validity of the WGE-SRH subscales, we modelled volitional sex outcome (binary) as a function of the sexual autonomy and self-efficacy subscales, as well as of a sexual empowerment sub-scale that combined both. The same approach was used to examine concurrent validity of contraceptive autonomy, self-efficacy and empowerment subscales in relation to volitional contraceptive use (binary). The sub-scales were classified into tertiles (low, medium, high) with the lowest serving as the reference category.

Multivariate logistic regression analyses, adjusting for area of residence (rural/urban) demonstrated that an increase in sexual autonomy was associated with increased odds of reported volitional sex at last intercourse in Ethiopia and Anambra (Table 12). Sexual self-efficacy was also related to increased odds of volitional sex at last intercourse in Ethiopia and Anambra, but was inversely associated with volitional sex in Kano. Combining sexual autonomy and sexual self-efficacy into a single index of *sexual empowerment* resulted in a stronger association of sexual empowerment being positively associated with the odds of increased volitional sex in Anambra. However, this was unrelated to volitional sex in Uganda and not significantly associated with volitional sex in Kano, where autonomy and self-efficacy had opposite effects than in other sites.

Table 12 also provides the marginal effect (ME) values for the tertiles showing the predicted probabilities of volitional sex by subscale tertile in each site, adjusting for area of residence. As an example, the predicted probabilities of volitional sex ranged from 0.27 to 0.65 from the lowest to highest tertiles on sexual autonomy in Ethiopia, while those for sexual self-efficacy's tertiles were 0.41, 0.46 and 0.53, showing a smaller spread. The ME values for the combined sexual empowerment subscale ranged from 0.21 to 0.61, while use of the overall SRH index showed a slightly lower spread ranging from 0.23 to 0.56. In Anambra, probabilities of volitional sex were equally spread over sexual autonomy tertiles (0.48 to 0.77) and self-efficacy tertiles (0.45 to 0.77), with probabilities of volitional sex ranging from 0.45 to 0.80 using the combined sexual empowerment measure. In the two other sites, Uganda and Kano, analysis indicated low differentiation (which was also nonlinear. Furthermore, lower probabilities of volitional sex were found among women in the two highest self-efficacy tertiles relative to women in the lowest sexual self-efficacy tertile in Kano.

Table 12. Concurrent Validity Regression Analysis of Volitional Sex on Sexual Empowerment Sub-scales

Outcome/Scale	Ethiopia (n=235)			Uganda (n=232)			Nigeria/Anambra (n=250)			Nigeria/Kano (n=210)			Full sample (n=927)		
	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value
Last sex volitional															
Sexual autonomy*															
Lowest tertile	**0.27**	ref		**0.62**	ref		**0.48**	ref		**0.88**	ref		**0.58**	ref	
Medium tertile	**0.44**	2.01	0.09	**0.61**	1.0	0.90	**0.66**	**2.1**	0.03				**0.60**	**1.1**	0.67
Highest tertile	**0.65**	**4.9**	0.00	**0.74**	1.7	0.13	**0.77**	**3.5**	0.00	**0.96**	3.2	0.11	**0.77**	**2.4**	0.00
Sexual self-efficacy															
Lowest tertile	**0.41**	ref		**0.62**	ref		**0.45**	ref		**0.98**	ref		**0.59**	ref	
Medium tertile	**0.46**	1.24	0.51	**0.70**	1.37	0.38	**0.67**	2.**43**	0.01	**0.88**	0.2	0.13	**0.69**	**1.5**	0.02
Highest tertile	**0.53**	1.63	0.13	**0.69**	1.35	0.36	**0.77**	**4.07**	0.00	**0.88**	**0.2**	0.05	**0.70**	**1.6**	0.01
Sexual empowerment															
Lowest tertile	**0.21**	ref		**0.65**	ref		**0.45**	ref		**0.93**	ref		**0.65**	ref	
Medium tertile	**0.58**	**5.05**	0.00	**0.60**	0.83	0.59	**0.64**	**2.1**	0.02	**0.92**	0.9	0.838	**0.60**	**1.79**	0.00
Highest tertile	**0.61**	**5.80**	0.00	**0.74**	1.55	0.25	**0.80**	**4.9**	0.00	**0.93**	1.0	0.983	**0.74**	**2.56**	0.00
Overall SRH empowerment score															
Lowest tertile	**0.23**	ref		**0.63**	ref		**0.48**	ref		**0.98**	ref		**0.56**	ref	
Medium tertile	**0.56**	**4.24**	0.00	**0.67**	1.21	0.59	**0.59**	1.58	0.16	**0.88**	0.1	0.07	**0.68**	1.**62**	0.01
Highest tertile	**0.56**	**4.26**	0.00	**0.67**	1.22	0.60	**0.80**	**4.33**	0.00	**0.91**	0.2	0.22	**0.75**	2.**05**	0.00

Results from multivariate analysis also that contraceptive autonomy increased the odds of current use of contraception in Uganda and Ethiopia, but not in Anambra (Table 13). Associations were not evaluated in Kano as the prevalence of contraceptive use (5%) was too low to carry out the analysis. Contraceptive self-efficacy was not related to current contraceptive use in any of our sites. A single combined measure of contraceptive empowerment increased the odds of current contraceptive use in Ethiopia and Anambra.

Table 13 also shows the predicted probabilities of contraceptive use by sub-scale tertile in each site, adjusting for area of residence. The predicted probabilities of contraceptive use ranged from 0.48 to 0.72 from the lowest to highest tertiles on contraceptive autonomy in Ethiopia, while those for contraceptive self-efficacy's tertiles were 0.58, 0.46 and 0.70, showing a smaller spread. The same was true in Uganda while little differentiation in probabilities of contraceptive use by autonomy or self-efficacy were noted in Anambra. The ME values for the combined contraceptive empowerment sub-scale indicated low differentiation in Anambra (which is also nonlinear), with more granularity among the tertiles in Ethiopia and Uganda.

As stated previously, concurrent validity analyses were not run for pregnancy empowerment.

Table 13. Concurrent Validity Regression Analysis of Current Contraceptive Use on Contraceptive Empowerment Sub-scales

	Ethiopia (n=223)			Uganda (n=193)			Nigeria/Anambra (n=206)			Nigeria/Kano (n=53)			Full sample (n=800)		
Current use of contraception	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value	ME	AOR	p value
Contraceptive autonomy **															
Lowest tertile	**0.48**	ref		**0.41**	ref		**0.36**	**ref**			**--**		**0.31**	ref	
Medium tertile	**0.62**	1.8	0.10	**0.40**	0.9	0.83	**0.47**	1.6	0.19		**--**		**0.40**	1.5	0.02
Highest tertile	**0.72**	**2.7**	0.01	**0.65**	**2.7**	0.01	**0.41**	1.3	0.49		**--**		**0.54**	2.6	0.00
Contraceptive Self efficacy															
Lowest tertile	**0.58**	ref		**0.45**	ref		**0.39**	ref			**--**		**0.38**	ref	
Medium tertile	**0.60**	1.80	0.09	**0.51**	1.3	0.41	**0.43**	1.4	0.33		**--**		**0.44**	1.3	0.12
Highest tertile	**0.70**	1.50	0.26	**0.50**	1.3	0.50	**0.44**	1.3	0.44		**--**		**0.43**	1.3	0.19
Contraceptive empowerment															
Lowest tertile	**0.50**	ref		**0.47**	ref		**0.31**	ref			**--**		**0.34**	ref	
Medium tertile	**0.61**	1.9	0.06	**0.35**	0.5	0.10	**0.49**	1.9	0.08		**--**		**0.39**	1.2	0.23
Highest tertile	**0.72**	**2.4**	0.01	**0.61**	1.9	0.09	**0.45**	**2.1**	0.05		**--**		**0.51**	**2.0**	0.00
Overall SRH empowerment score															
Lowest tertile	**0.50**	ref		**0.46**	ref		**0.24**	ref			**--**		**0.33**	ref	
Medium tertile	**0.65**	**1.9**	0.08	**0.32**	0.6	0.12	**0.44**	2.3	0.08		**--**		**0.37**	1.2	0.38
Highest tertile	**0.72**	**2.6**	0.01	**0.63**	1.9	0.07	**0.46**	**2.3**	0.03		**--**		**0.49**	**2.0**	0.00

Note: ME=Marginal effect; AOR=Adjusted Odds Ratio; Single covariate controlled = residence; Boldfaced values have statistical significance at p<0.10 or better.

*If ever had sex

**If not currently pregnant and ever had sex in past year

SUMMARY OF THE WGE-SRH MODULE

Key Findings

This cross-cultural study identifies and measures constructs of women's *existence of choice* (autonomy) and *exercise of choice* (self-efficacy, decision-making, and negotiation) in three sub-Saharan African country settings. These constructs reflect the World Bank Empowerment Framework with respect to SRH. Our results contribute to the existing literature in three ways. First, our multidimensional empowerment construct encompasses different aspects of women's sexual and reproductive lives, including their experiences with sex, contraception, and pregnancy. This strengthens the current body of research on SRH empowerment by empirically assessing the constructs' relationships with three important SRH outcomes. Second, it distinguishes between concepts of autonomy and self-efficacy that are independently related to SRH behaviors. Unlike previous literature, this distinction between *existence of choice* and *exercise of choice* is important, as we found that the concepts relate to SRH outcomes in unique ways and must be examined as such. Third, these subscale results and the overall index have been validated across four diverse geo-cultural contexts in three sub-Saharan African countries with comparative value. By including women from urban and rural communities, polygamous and non-polygamous unions, and different sociocultural backgrounds, this study aimed to capture the diversity of the SRH empowerment experiences across these contexts.

Drawing on the qualitative results, we developed the pilot-tested items to be rooted in the voices of women from the different geographies. In this process, we uncovered common social expectations motivating and inhibiting women from engaging in sex, childbearing, and contraceptive use. In all settings, stigma related to female sexuality, perceptions of male sexual entitlement, and fear of relational sanctions strongly influenced women's SRH motivations. This study's findings are reflective of broader gender inequalities at the societal and couple levels.[21] Social expectations regarding childbearing and the fear of infertility also constrained women's childbearing and contraceptive autonomy. These constraints, captured in our cross-site autonomy subscales, were significantly associated with volitional sex and use of contraception in most sites.

Our measures of SRH autonomy complement existing measures, such as the widely used Sexual Relationship Power Scale,[22] the Sexual Pressure Scale,[23] and the Sexual Assertiveness Scale[24] used in the United States. Our measures also resonate with the recently developed Reproductive Autonomy Scale[19] developed in the US to explore concepts of reproductive coercion, communication, and decision-making. Our work builds on these existing measures, by elucidating social pressures that extend beyond dyadic power relations to include internal motivations, such as health or economic concerns, which inform women's sexual and reproductive decisions. In addition, our results suggest that concepts of autonomy, self-efficacy, negotiation and decision-making, which are often either conflated or combined in single indicators, should be considered separately as they are independently related to SRH behaviors. Indeed, we found that *exercise of SRH choice* contributed additional information to *existence of* SRH *choice* to predict SRH behaviors in some settings (Anambra or Ethiopia). These findings thereby support the conceptual distinction between the *existence of choice* (autonomy) and the *exercise of choice* (self-efficacy,

negotiation, and decision-making) proposed by the World Bank Empowerment Framework. As stated previously, these results were not consistent across sites. In Kano, which has a strong traditional culture, very little non-volitional sex and contraceptive use was reported. While sexual, contraceptive, and pregnancy empowerment measures could be constructed, any relation with current non-volitional sex and contraceptive use could not be validated.

While we have identified a number of cross-culturally relevant constructs of SRH empowerment, we also acknowledge the importance of individual cultural contexts, apparent in the differences in factor loading solutions in each site and in the absence of unique cross-site solutions for pregnancy empowerment measures. Interestingly, reports of sexual and reproductive coercion seem more universally shared across sites than internal motivations for sex, contraception, and childbearing, with the exception of Kano. This may explain the absence of a cross-site subscale for pregnancy autonomy, which mostly featured elements of reproductive constraints in sites experiencing rapid fertility declines (Anambra and Ethiopia), while elucidating more positive internal motivations for spacing births in Kano, where high levels of fertility still prevail.

Strengths

A foremost strength of this study is that all measures are grounded in the voices of women across geo-culturally diverse sites. Distinct cultural practices emerged in the qualitative data to highlight differences across sites, urban/rural areas, and composition of marriages. However, these differences were managed through a consensus process among the site study teams to identify items that would be applicable to the vast majority of women. The process of translating the qualitative findings into quantitative items is a major strength of this study.

The rich qualitative data within itself was a major strength of this study. This data imparts valuable insight into themes within and across settings specific to sex, contraceptive use, and pregnancy. Qualitative interviews and FGDs revealed situations and reasons for covert use, decision-making dilemmas surrounding modern method use, and fears and solutions for infertility. Further analysis of all of these data are underway and offer unique insight into SRH behaviors captured in the WGE-SRH index.

The in-country PIs and team members were active and full contributors throughout the entire data collection process and remained engaged through the quantitative analysis. They were particularly critical throughout the iterative quantitative item selection process. The revision and selection of quantitative items lasted several months from November 2017 to May 2018. After WGE-Workshop in Cape Town, teams pilot tested the items to allow for additional revisions. Further revisions were then made at the ToT. After Ethiopia and Uganda piloted the items, the Nigeria teams incorporated revised items for additional comparisons in the two pilot sites.

Limitations

This study is not without limitations. First, by adopting a multidimensional scope for the study, including two domains of empowerment across three outcomes, the number of available items per domain and outcome was constrained in order not to overburden respondents with excessive items for ranking. This may explain our inability to identify cross-site solutions for pregnancy

exercise of choice and low internal reliability of SRH *exercise of choice* sub-scales. Although our pilot study initially included thirteen pregnancy autonomy items, extended to 16 items in Nigeria, we were unable to identify a cross-site pregnancy *existence of choice* subscale. However, these items covered a range of internal and external motivations for engaging or avoiding childbearing at different stages of the reproductive life course, including decisions to start or delay a family, decisions to space, and decisions to limit childbearing. Our number of items and sample sizes may have been too limited to account for all of these configurations, including the exploration of how these items operate differently with nulliparous and parous women. The complexity of these decisions is unlikely to be captured in a single construct of pregnancy autonomy, as suggested in the differences in factor loadings per site.

Subsequent research should distinguish women's internal and external motivations to avoid pregnancy versus their motivations to have more children. Our sample size was also limited in assessing construct validity by outcome measures in Kano, as the relevant behaviors or outcomes were relatively rare there. For example, non-volitional sex and contraceptive use were rare 6% and 5%, respectively, in Kano. Another limitation of this study is the focus on items representing constraints rather than on positive motivations for sex and contraception, which may influence women's SRH outcomes in distinct ways. Factor analyses indicated low factor loadings of internal motivations in all sites, with the exception of Kano. Specific examples included, "I want to rest between pregnancies so I can take better care of myself."

Finally, this cross-sectional study does not allow an exploration of the process of empowerment moving from *existence of choice* (autonomy) to *exercise of choice* (self-efficacy, decision-making, and negotiation) to achievement of choice. The seeming paradoxical association between sexual self-efficacy and volitional sex observed in Kano may reflect the fact that women who are more empowered, are more likely to voice their aspirations and opposition to unwanted sexual activity. Since SRH empowerment is a dynamic process requiring stages of growing self-awareness of choice, panel studies are required to elucidate the stability of these sentiments and their transitions.

Proposed Next Steps

The WGE-SRH multi-dimensional index, in whole or its parts, was developed through the PMA Plus project, one in the suite of Performance Monitoring and Accountability 2020 projects. PMA2020 is expected to transition to PMA2.0 which will conduct regular annual panel surveys with a national sample of households and eligible female respondents. The baseline surveys with the female cohorts offer a potential platform to incorporate the sub-scales and test their predictive validity with volitional sex, contraceptive use and desired pregnancy to rigorously inform the field's understanding of SRH empowerment.

A full list of current products and dissemination strategies is outlined in Appendix 10.

Significance and Innovation

The WGE-SRH multidimensional index, revised through an iterative process, is grounded in women's voices across four diverse sub-Saharan national contexts. As cross-culturally tested

measures, the autonomy and self-efficacy sub-scales, and their combined empowerment score, can be used to monitor women's sexual and contraceptive behavioral outcomes. A longitudinal study design, however, is needed to assess how these constructs inform the achievement of desired SRH outcomes over time.

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