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TITLE: Reconceptualizing empowerment for women's and girls' sexual and reproductive health (SRH): A cross-cultural index for measurement, monitoring, and progress toward improved SRH

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SHORT ABSTRACT: Lack of validated cross-cultural measures for women's sexual and reproductive health empowerment (WGE-SRH) compromises progress. We developed a cross-cultural WGE-SRH index by implementing qualitative research to inform a quantitative instrument. Conducted in 2017-2018 throughout Ethiopia, Nigeria, and Uganda, the WGE-SRH tool was piloted among 1,229 women aged 15-49. Qualitative research validated the WGE-SRH framework, which was applied to outcomes of sex, contraception, and pregnancy. Psychometric properties were explored and sub-scales of autonomy for sex (alphas 0.72-0.79), contraception (alphas 0.59-0.80), and pregnancy (alphas 0.61-0.80) emerged; alphas for self-efficacy sub-scales varied. Associations between WGE-SRH measures and SRH behaviors indicated increased odds of volitional sex with increased sexual autonomy and increased odds of contraceptive use with increased contraceptive autonomy. Combined measures of autonomy and self-efficacy yielded stronger associations with these outcomes. This innovative WGE-SRH index can be used to assess women's empowerment related to contraception and volitional sex across diverse geo-cultural contexts.

BACKGROUND: In 2000, the United Nations included women's and girls' empowerment (WGE) as a target for its Sustainable Development Goals, inciting international interest in WGE as a means of accelerating development. However, lack of harmonized definitions and an absence of validated cross-cultural measures compromise efforts to monitor global progress and measure WGE as a means for achieving development outcomes. Recent efforts have been made to consolidate the conceptualization of empowerment as a general construct, particularly the World Bank's Empowerment Framework, which defines empowerment as a dynamic process, moving from the *existence of choice* to the *exercise of choice* and resulting in *achievement of choice*. While this framework can be applied to many aspects of women's lives, its application to sexual and reproductive health (SRH) has yet to be explored. A major challenge is that SRH attitudes and behaviors are context-dependent, and may lack common processes determining women's SRH empowerment across diverse cultures. The present study aimed to identify common expressions of women's SRH empowerment in sub-Saharan Africa, and develop and test a cross-cultural measure (WGE-SRH) by adapting the World Bank's empowerment framework to the sphere of SRH.

RESEARCH QUESTIONS: The WGE-SRH research project investigated the following questions: 1) *How is reproductive and sexual empowerment conceptualized among women across diverse cultures in sub-Saharan Africa?* and 2) *How can we quantitatively measure WGE-SRH across diverse cultures?* This study focused on the development of a cross-cultural WGE-SRH index, an essential tool to monitor WGE-SRH and evaluate the impact of empowerment interventions.

METHODS: This project was conducted between March 2017 and June 2018 across four sites in sub-Saharan Africa: Ethiopia, Nigeria (Anambra and Kano States), and Uganda. A mixed-methods approach was applied for WGE-SRH scale development, starting with qualitative research to adapt our WGE-SRH framework to the qualitative findings and use these findings to inform the quantitative instrument.

Item development: The qualitative phase involved 120 in-depth interviews and 40 focus group discussions with women aged 15-49 and men aged 18 and older across the four sites. Interviews explored decision-making processes related to sex, contraception, and pregnancy. All were audio-recorded, transcribed, and translated by in-country teams for analysis in Atlas.ti. Inductive coding was applied to develop a cross-site codebook, and emerging themes were organized deductively to allow mapping of the codes to the WGE-SRH framework. Qualitative results were translated into items for the quantitative module. Specifically, country partners and Hopkins researchers reviewed major themes of the qualitative data and generated 61 items representative of WGE-SRH domains across sites. Items were organized according to the steps of the empowerment process: *existence of choice* (motivational autonomy—defined further as autonomy) and *exercise of choice* (self-efficacy, decision-making, and negotiation—defined further as self-efficacy), and were then applied to *achievement of choice* for three outcomes: sex, contraception, and pregnancy.

Administration of scale items: The WGE-SRH instrument was tested for face validity among 20 women per site, which resulted in wording changes and the elimination of ten items identified as redundant. 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 a random sample of households within enumeration areas. Women aged 15-49 within selected households were invited to participate after giving consent. Altogether 1,229 women were surveyed (Anambra n=318; Ethiopia n=334; Kano n=320; Uganda n=257). Based on preliminary analysis of data collected in Uganda and Ethiopia, six items were added to the WGE-SRH survey for Anambra and Kano to refine the WGE-SRH measure while allowing for cross-site comparisons with the original items.

Data analysis of the scale: In each site, we explored the psychometric properties of the multidimensional scale and subsequently identified a common set of items that scaled across sites. Psychometric criteria, including eigenvalues, Scree plots, and Parallel Components Analysis were used to determine the number of factors and Exploratory Factor Analysis guided the selection of a more parsimonious set of items.

Concurrent validity: After computing summary scores (from 1 to 10) for each sub-scale by averaging scores across items belonging to each sub-scale in each site, we transformed each sub-scale into tertiles. We then evaluated the associations between WGE-SRH measures and two SRH outcomes of interests: volitional sex at last intercourse and current use of contraception. We assessed domain specific associations: sexual autonomy and self-efficacy in relation to volitional sex and contraceptive autonomy and self-efficacy in relation to current use of contraception. Associations were assessed in each site, using multivariate logistic regression, adjusting for area of residence (as samples were stratified by rural/urban areas). All analyses were conducted using STATA Version 14.2, StataCorp LLC, TX.

RESULTS: The cross-cultural qualitative analysis produced a total of six domains: three related to autonomy, including sexual, pregnancy autonomy, and contraceptive autonomy, and three related to self-efficacy, including sexual, contraception, and pregnancy self-efficacy.

Qualitative results: Male sexual entitlement was apparent in all sites, leading women to "accept" sex for fear of relationship dissolution. While some women found indirect ways to exercise their sexual preferences, many lacked the autonomy to choose when and if to engage in sex. Motivations for pregnancy were also informed by gender expectations. Women were motivated to have children to increase or maintain social status and prevent partners' external relations. Many, however, chose to forgo pregnancy given economic considerations. Many women did not discuss these decisions with partners, exposing them to retaliation or reproductive coercion. Related to pregnancy decisions, motivations to use or avoid contraception were also driven by community norms and misconceptions.

Quantitative results: Across all sites, we identified SRH autonomy measures, including a four-item sexual autonomy sub-scale (Chronbach α=0.72-0.79) and a five-item contraceptive autonomy sub-scale (eigenvalue range=1.8-3.1; Chronbach α=0.59-0.81) (Table 1). While no cross-site factor solution reflecting pregnancy autonomy was identified, site specific solutions emerged in all sites except Uganda (Chronbach α=0.50-0.76). Analyses also identified cross-site measures of SRH self-efficacy. A four-item sexual self-efficacy sub-scale loaded on a single factor in all sites, but yielded low Cronbach alphas, with the exception of Anambra (alpha=0.72). A four-item contraceptive self-efficacy measure was also identified, with Cronbach alphas ranging from 0.41 to 0.86 (not presented). Finally, a three-item pregnancy self-efficacy measure was identified with Cronbach alphas ranging from 0.48 to 0.66. Increases in sexual autonomy increased the odds of volitional last intercourse in Ethiopia and Anambra (Table 2). Sexual self-efficacy was also related to increased odds of volitional last intercourse in the same two sites, but was inversely associated with volitional sex in Kano. Combining sexual autonomy and self-efficacy in a single measure strengthened the association with reported volitional sex in Anambra, but weakened associations in Kano as autonomy and self-efficacy had opposite effects. Contraceptive autonomy increased the odds of contraceptive use in Uganda and Ethiopia, but not in Anambra (Table 3). 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 the sites. A single combined index of contraceptive empowerment increased the probabilities of contraceptive use in Ethiopia and Anambra.

Conclusion: The WGE-SRH index, revised through an iterative process, was grounded in women's voices across four diverse contexts. This innovative, cross-cultural measure demonstrates high reliability for women's autonomy related to relevant SRH domains and should be used for monitoring and evaluation of key SRH outcomes. Furthermore, results demonstrate the process of empowerment by increased odds of volitional sex and contraceptive use with combined autonomy and self-efficacy measures, as opposed to either measure singularly. Future research, using a longitudinal design should examine how women's SRH autonomy (*existence of choice)* translates to *exercise* of their SRH preferences to inform *achievement* of desired SRH outcomes over time; the WGE-SRH tool would be a useful instrument for such investigation.

Table 1. Factor loading on sexual, contraceptive, and pregnancy autonomy sub-scales										
	Ethiopia		**Uganda**		**Nigeria: Anambra**		**Nigeria: Kano**		**All Sites**	
	Loading	Unique	Loading	Unique	Loading	Unique	Loading	Unique	Loading	Unique
Sex										
If I refuse sex with my husband/partner, he may physically hurt me	0.79	0.37	0.69	0.52	0.86	0.26	0.79	0.38	0.80	0.36
If I refuse sex with my husband/partner, he may force me to have sex	0.69	0.52	0.76	0.42	0.76	0.43	0.72	0.48	0.75	0.43
If I show my husband/partner that I want to have sex, he may consider me promiscuous	0.64	0.59	0.46	0.79	0.63	0.61	0.62	0.62	0.58	0.67
If I refuse sex with my husband/partner, he may stop supporting me	0.71	0.49	0.56	0.69	0.60	0.64	0.45	0.79	0.58	0.67
Eigenvalue	***2.02***		***1.58***		***2.07***		***1.73***		***1.87***	
Cronbach Alpha	***0.76***		***0.72***		***0.79***		***0.72***		***0.76***	
Contraception										
If I use family planning, my husband/partner may seek another sexual partner	0.46	0.79	0.47	0.77	0.66	0.57	0.40	0.84	0.55	0.70
If I use family planning, I may have trouble getting pregnant the next time I want to	0.46	0.79	0.52	0.73	0.66	0.57	0.67	0.55	0.62	0.61
There could be/will be conflict in my relationship/marriage if I use family planning	0.42	0.83	0.55	0.70	0.70	0.51	0.45	0.80	0.56	0.68
If I use family planning, my children may not be born normal	0.42	0.82	0.68	0.54	0.60	0.64	0.78	0.40	0.67	0.56
If I use family planning, my body may experience side effects that will disrupt my relations with my husband/partner	0.53	0.72	0.67	0.54	0.63	0.60	0.75	0.43	0.70	0.51
Eigenvalue	***1.05***		***1.72***		***2.10***		***1.97***		***1.94***	
Cronbach Alpha	***0.59***		***0.70***		***0.78***		***0.80***		***0.78***	
Pregnancy										
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	0.34			0.58	0.66				
I wanted to complete my education before I have/had a child	--	--			--	--	0.73	0.47	0.44	0.80
If I space or limit my pregnancies, I will improve my relationship with my husband	--	--	0.66	0.56	--	--	0.75	0.44	0.57	0.67
I would have felt pressured if it had taken a long time for me to get pregnant after marriage	0.52	0.72	--	--	0.58	0.66	--	--		
I will have no one to take care of me when I am old if I do not produce enough children	0.54	0.70	--	--			--	--		
If had gotten pregnant before marrying, I would have brought shame to my family	--		0.66	0.56			--	--		
If I rest between pregnancies, I can take better care of my family	--						0.47	0.78	0.74	0.44
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***		***0.88***		***1.96***		***1.08***	
Cronbach Alpha	***0.65***		***0.59***		***0.59***		***0.76***		***0.58***	

Note: Unique=Uniqueness, Uniqueness values <0.4 presented in the table as "--", Items not tested in site represented by empty cell.

Table 2. Concurrent validity regression analysis of volitional sex on sexual empowerment sub-scales and current contraceptive use on contraceptive empowerment sub-scales

Last sex volitional	Ethiopia (n=235)			Uganda (n=232)			Nigeria: Anambra (n=250)			Nigeria: Kano (n=2010)			Full sample (n=927)		
	ME	AOR	p- value	ME	AOR	p- value	ME	AOR	p-value	ME	AOR	p- value	ME	AOR	p- value
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

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.

Table 3. Concurrent validity regression analysis of volitional sex on sexual empowerment sub-scales and current contraceptive use on contraceptive empowerment sub-scales

Current use of contraception	Ethiopia (n=223)			Uganda (n=193)			Nigeria/Anambra (n=206)			Nigeria/Kano (n=53)			Full sample (n=800)		
	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

Note: ME=Marginal effect; AOR=Adjusted Odds Ratio; Single covariate controlled = residence; Boldfaced values have statistical significance at p<0.10 or better; **=If not currently pregnant and ever had sex in past year.