WOMEN'S EMPOWERMENT AND SEXUAL REPRODUCTIVE HEALTH IN

AFRICA

A Dissertation

by

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ABSTRACT

Women face significant health barriers and bear disproportionate burdens of disease, especially in areas of Sexual/Reproductive Health (SRH). The inequities and inequalities are more pronounced in Sub- Saharan African countries. Women's empowerment in Africa has been slowed down by a combination of multiple social and cultural factors. Some of these factors include poverty, illiteracy, conflicts, unhealthy social norms, gender inequality and gender violence. Literature suggests that empowered women have better SRH however. The purpose of this dissertation was to determine the relationship between women's empowerment and SRH outcomes among women in Nigeria.

The first study was a systematic literature review that explored the relationship between women's empowerment and SRH among women in Sub-Saharan Africa. The study reviewed the history, current status, and different dimensions of women's empowerment. It also reviewed the various methods used and challenges encountered when measuring women's empowerment. The study found that women's empowerment was associated with improved SRH. It also found a lack of uniformity in measuring women's empowerment across studies.

The second study assessed the status of women's empowerment among Nigerian women. It also tested the performance of the Survey-based Women's emPowERment index (SWPER) among a Nigerian population and found that Nigerian women's

empowerment was adequately measured by three factors (decision making, attitude to intimate partner violence and social independence).

The third study was a secondary data analysis of Nigerian Demographic Health Survey (2003-2013). The study investigated the relationship between women's empowerment and SRH (antenatal care, supervised birth attendance, sexually Transmitted infections, condom use, and HIV testing) among Nigerian women. Findings from this dissertation quantified the positive relationship between women's empowerment and SRH health.

I recommend that women's empowerment programs should be used as a tool towards achieving better SRH for women in Africa. I also recommend further research towards the development of a more harmonized tool for the measurement of women's empowerment in Africa.

DEDICATION

This dissertation is dedicated to my parents, Yusuf and Turai. Thank you for the love support and guidance. To my husband Munir Yahaya, I wouldn't have done it without your love and support. To my children, Hafsa and Yusuf for their encouragement, patience and love.

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NOMENCLATURE

AGDI	African Gender and Development Index
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
CEDAW	Convention on Elimination of All Forms of Violence Against Women
CDC	Centers for Disease Control and Prevention
DHS	Demographic and Health Survey
EGI	Environment and Gender Index
FMoH	Federal Ministry of Health
GDI	Gender and Development Index
GEI	Gender Equity Index
GEIE	Gender Equality Index, Erasmus
GEM	Gender Empowerment Measure
GII	Gender Inequality Index
HIV	Human Immunodeficiency Virus
MDG	Millennium Development Goal
NACA	National Agency for the Control of Aids
NPC	National Population Commission
OR	Odds Ratio
SBA	Skilled Birth Attendance

SDG	Sustainable Development Goal
SRH	Sexual and Reproductive Health
STIs	Sexually Transmitted Infections
UNAIDS	Joint UN Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
WHO	World Health Organization

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1. INTRODUCTION

Women experience a significant amount of health inequity and inequality (UN Women, 2017; World Health Organisation[WHO], 2018). The inequities and inequalities are more pronounced in Sub- Saharan African countries where it is driven by a combination of social, cultural and institutional factors. Some of these factors include poverty, illiteracy, conflicts, gender violence, gender inequality and disempowerment of women(Ahmed et al., 2010; Sen & Östlin, 2008; World Health Organisation[WHO], 2018). Sexual and Reproductive Health (SRH) problems account for one-third of the health issues faced by women between the ages of 15 and 44 years (WHO, 2019). The commonest SRH problems are attributed to unsafe sex and pregnancy related outcomes. WHO (2018) reports that unsafe sex is the 9th cause of morbidity and mortality in developed countries and the second cause in developing countries. Unsafe sex leads to increased prevalence of STIs including HIV and unwanted or unplanned pregnancies. Unintended pregnancies are most often as a result of unmet need for contraception. WHO (2018) reports that over 120 million people have an unmet need for contraception which resulted in over 80 million unintended pregnancies, 25 million unsafe abortions, 830 maternal deaths and over 350 million cases of STIs. Despite the burden of SRH problems 4·3 billion lack access to SRH services(Starrs et al., 2018).

Literature suggests that empowering women is associated with improved SRH outcomes, for example increased contraceptive use, safer birth outcomes, reduced sexually transmitted infections as well as an increase in uptake of SRH preventive and

treatment services(Beegle et al., 2001; Corroon et al., 2014; Fagbamigbe & Idemudia, 2015; James-Hawkins et al., 2018; Pratley, 2016; Singh et al., 2013; Upadhyay et al., 2014). Improving women's SRH will go a long way towards improving the general health of women thereby improving the health of their children and society as a whole (UNFPA, 2014).

1.1. Power and empowerment

Women's empowerment is the process by which "women gain power over their own lives in a context where this ability was previously denied to them."(EIGE, 2013; Kabeer, 2005; Malhotra & Schuler, 2005). Kabeer (2005) defines power "as one's ability to make choices." Power can be approached from two viewpoints. The first viewpoint regards power in a positive sense denoting a person's ability to make and act on life choices irrespective of opposition. The second viewpoint refers to power as a process of taking away the agency of others through means such as coercion, violence or the use of authority "power over"(Kabeer, 1999, 2005).

A significant proportion of African women are disempowered(Alsop & Heinsohn, 2005; Asaolu et al., 2018; Van Eerdewijk et al., 2017). The disempowerment of women usually occurs as a result of the social, cultural and institutional factors that encourage the subordination of women thereby limiting their agency and access to resources available to men(Kabeer, 2005; Malhotra & Schuler, 2005). At the Beijing Declaration and Platform for Action (1995), the world made a "global commitment to gender equality and women's empowerment. Twenty-four years later the world is yet to achieve these commitments (WHO, 2018). By the end of 2015, less than half of the

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countries in sub-Saharan Africa had achieved the 3rd Millennium Development Goal (MDG3) which sought to promote gender equality and empower women (United Nations, 2015). This led to the inclusion of gender equality and women's empowerment as one of the goals in the Sustainable Development Goals 2030 (Sachs, 2012).

The overarching objective of this dissertation is to examine the relationship between women's empowerment and SRH in Sub-Saharan Africa using Nigeria as a case study. The dissertation is made up of three studies. The first paper (chapter 2) is a systematic review that examines the relationship between women's empowerment and multiple components of Sexual and Reproductive Health (SRH) among women in Sub-Saharan African. It also explores various methods that have been used to measure women's empowerment in the existing literature. This study found that women's empowerment is positively associated with SRH. It also identified a lack uniformity in the measurement of women's empowerment. This finding highlights the need for a more uniform tool to measure empowerment in Africa.

The second study explored the status of empowerment of Nigerian women and tested the performance of the Survey-based Women's emPowERment index (SWPER) of empowerment in the Nigerian population. The study found that Nigerian women had a low level of empowerment in its three domains. It also found that women's empowerment in Nigeria is adequately measured by three factors (decision making "agency", attitude to intimate partner violence and social independence). These factors correspond to the three domains of empowerment described by Kabeer (2005) and Malhotra et al. (2002).

The third paper (chapter 4) examines the relationship between women's empowerment and five components of SRH (antenatal care, supervised birth attendance, sexually transmitted infections, condom use and HIV testing) among Nigerian women. This study found that empowering women is associated with an improvement in SRH, it also found that the social independence domain of empowerment is the strongest predictor of SRH in Nigeria. The social empowerment domain is made up of several historical life choice decisions that determines the level of empowerment a woman achieves. The life style choices include when to get married or start cohabiting, when to have children, level of education and access to media.

This dissertation demonstrates that higher levels of women's empowerment is associated with better SRH outcomes. I recommended that policy makers and implementers should target women's empowerment (socially, economically, legally and politically) as the low hanging fruit that would yield high returns in SRH and other aspects of women's health. This study also demonstrates the need for the harmonization of the measurement of women's empowerment while attending to the subtle differences in each country. I recommend that studies with more rigorous designs as well as qualitative components should be used for the development of a uniform tool to measure women's empowerment in a way that facilitates comparisons between and within countries.

2. WOMEN'S EMPOWERMENT AND SEXUAL/REPRODUCTIVE HEALTH (SRH) OUTCOMES IN AFRICA: A SYSTEMATIC LITERATURE REVIEW

2.1. Background

"One-third of all the health problems faced by women between the ages of 15 and 44 years are sexual/reproductive health issues" (WHO, 2019). In 2017, the World Health Organization (WHO) estimated that "308,000 women in developing countries will die from sexual reproductive health related causes" (WHO, 2018). Compared to the rest of the world, women in Africa have poorer sexual and reproductive health outcomes (WHO, 2012; 2018). Maternal mortality rates in this region are the highest in the world. About 830 women die from preventable causes related to pregnancy and childbirth every day, more than half of these maternal deaths occur in sub-Saharan Africa (WHO, 2018b). The lifetime risk of maternal death is 1 in 38 in sub-Saharan Africa, compared to the global average of 1 in 190 women (World Bank, 2019a). In Africa, only 56% of pregnant women deliver in a health facility, compared to 91% of pregnant women in Latin America and the Caribbean (World Bank, 2019a). Additionally, African women have the highest (21%) unmet need for contraception. Only 19% of married women aged 15–49 use a modern method compared to 88% of women in Eastern Asia. African women also account for the highest burden of sexually transmitted infections(UNFPA, 2018; World Bank 2019a). WHO (2018b), reports "18% of the global incidence of STI occurs in Africa, more than half of these infections occur in women". In 2012, Africa had 63 million new cases of curable sexually transmitted infections. Efforts to improve

sexual and reproductive health outcomes have been hampered by "poverty, illiteracy, conflicts, gender inequality, and gender-based violence (Gita and Piroska, 2010; UNDP, 2018; WHO, 2018a).

Sexual and Reproductive Health

Sexual and Reproductive Health (SRH) is defined "as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity in all matters relating to the reproductive system and its functions and processes" (ICPD, 2017; UNFPA, 2018). The state of physical, mental and social wellbeing in SRH encompasses "the capacity to enjoy and control sexual and reproductive behavior in accordance with a social and personal ethic; freedom from fear, shame, guilt, false beliefs and other psychological factors inhibiting sexual response and impairing sexual relationships; and freedom from organic disorder, diseases and deficiencies that interfere with sexual and reproductive functions"(Collumbien & Hawkes, 2000). In summary SRH comprises of contraception/family planning, antenatal care, delivery, post-natal care as well as STI prevention and treatment. In 1995, International Conference on Population and Development (ICPD) prioritized the provision of basic SRH care and services to all women. This includes "access to correct and timely information; access to safe, effective, affordable and acceptable contraception; access to antenatal care and safe delivery; protection and care for sexually transmitted infections" (UNFPA, 2018).

Empowerment

Empowerment is defined as the "the process where people acquire the ability to make strategic life choices in a context where this ability was previously denied to them"

(Kabeer, 1999). Wallerstein (1992) also defines "empowerment as a multilevel process of gaining understanding and control over personal, social, economic, and political forces in order to take action to improve one's life situation". Women's empowerment greatly differs from the empowerment of other disadvantaged groups because of the power relations between men and women, as well as household and familial dynamics (Malhotra & Schuler, 2005; Mosedale, 2005). For example, in several African societies women are not only subordinates to men, but they must also defer to the mother in-laws and religious leaders.

Empowerment is a difficult concept to study, since it has several facets and nuances associated with it (Richardson, 2018). Several frameworks for empowerment exist, but the most relevant framework for this study is that proposed by Kabeer (2005). This framework posits that women's empowerment is made up of three components. The components are agency, resources, and achievements. Figure 2.1 depicts the flow of the women's empowerment framework.

Adapted from Kabeer, 2005

Figure 2.1. Women's empowerment framework

Agency is the "ability to make choices and act upon those choices"(Kabeer, 1999a, 2005; Malhotra & Schuler, 2005). Yount et al. (2016), also defined agency as "the ability to formulate one's own strategic decisions, to control resources and to make attitudinal changes under evolving constraints." Agency is often used interchangeably with autonomy and power. In women's empowerment literature, agency is typically measured by assessing a woman's ability to make certain life choices (Kabeer, 1999a, 2005; Richardson, 2018). The commonest measures found in the literature are those related to women's day-to-day decision-making and their attitude towards gender roles (Blackstone, 2017; Kishor & Subaiya, 2008; Pratley & Sandberg, 2018; Richardson, 2018). Decision-making includes household decision making; sexual and fertility decision making; economic and employment decision making; health-related decision making; mobility and social interaction decision making(Kabeer, 1999a, 2005; Richardson, 2018). Attitude to gender roles includes justification of gender violence and justification of a woman's inability to refuse sexual intercourse with her partner (Blackstone, 2017; ICF, 2011; Kishor and Subaiya, 2008; Pratley, 2016). Other measures of agency include community and political involvement. (Kabeer, 1999; Richardson, 2017).

Resources are defined as "the medium through which agency is exercised". They are the "pre-conditions" or "opportunity structures" that enable agency (Alsop & Heinsohn, 2005; Kabeer, 1999a, 2005). Resources can be either material resources such as money, properties, and education or human/social resources such as social capital and

media (Kabeer 1999; Malhotra and Schuler, 2005; Richardson, 2017). Resources provide the enabling conditions in which agency can be exercised (Kabeer, 1999; 2005). Achievements are the "outcomes of agency" such as educational attainment or gainful employment (Kabeer, 1999). Resources and achievements are indirect measures of empowerment(Kabeer, 1999a; Kishor, 2000; Malhotra & Schuler, 2005).

 In summary, women's empowerment is all about "women's decision making, their economic self-reliance, their legal rights to gender equality, protection against all forms of discrimination and abuse, as well as barriers to education and access to information" (Germain & Kyte, 1995).

Relationship between empowerment and SRH

Empowerment has been identified as an effective approach towards improving women's health, the health of their children and the community as a whole (Basu & Koolwal, 2005; Corroon et al., 2014; Fapohunda & Orobaton, 2013; Hindin, 2000; James-Hawkins et al., 2018; Prata et al., 2017; Pratley, 2016; K Singh et al., 2011; Taukobong et al., 2016; Upadhyay et al., 2014). Women's empowerment is positively associated with several SRH components. It is associated with greater fertility choices and an increase in the use of contraception (Hogan et al., 1999; James-Hawkins et al., 2018; Prata et al., 2017; Upadhyay et al., 2014). It is also associated with increased uptake of antenatal service and hospital delivery(Beegle et al., 2001; Pratley, 2016). Empowering women is associated with a reduction in the rates of HIV transmission and other sexually transmitted infections(Conroy et al., 2016; Pulerwitz & Barker, 2008).

Research gap

In the available literature, I found a lack of systematic reviews on the relationship between women's empowerment and SRH in Africa where the highest burden of SRH is found. Although some of the available reviews included studies from Africa, most of the studies are from South Asia and other middle-income countries (Upadhyay et al., 2014; Upadhyay & Karasek, 2012).

Secondly, most of the available reviews focus on the relationship between women's empowerment and a single component of SRH. To the best of my knowledge, there is no study that holistically reviews the relationship between women's empowerment and all the different components of SRH (contraception, STI, ante-natal care, delivery and post-natal care) together. Furthermore, the reviews focus mainly on contraception and fertility. I identified four existing reviews. The first review (Upadhyay et al., 2014) investigated the relationship between women's empowerment and fertility. This study found that overall women's empowerment was associated with lower fertility, longer birth intervals, and lower rates of unintended pregnancy. The second review (Hawkins et al., 2016) looked into the relationship between women's agency and current use of contraceptives. The study also found an overall positive relationship with contraceptive use. The third review (Pratley et al., 2016) investigated the relationship between empowerment and maternal and child health, where it found that empowering women is positively associated with both maternal and child health. The fourth review (Prata et al., 2017) investigated the relationship between empowerment and family planning, this study also found a positive relationship between

women's empowerment and family planning. Although all four reviews found positive

relationships, the authors reported some inconsistencies in the findings across different

studies. They attributed these inconsistencies to the lack of a common scale for

measuring empowerment. Most of the other published reviews on empowerment are

studies investigating how to measure the construct (Cyril et al., 2016; Mandal et al.,

2017). The rest of the available studies investigating the relationships between women's

empowerment and SRH are cross-sectional studies.

Study goal

The goal of this review was to understand the relationship between the various

components of women's empowerment and women's sexual/reproductive health

outcomes in Africa. This study aimed to answer the following research questions.

Research questions

1. What is the relationship between empowerment and SRH among women in
   Africa?

2. How is women's empowerment measured in the literature?

Hypothesis 1: Empowered women have better SRH outcomes.

Hypothesis 2: SRH outcomes are affected differently by each dimension (agency,

resources and achievements) of women's empowerment.

Hypothesis 3: The measurement of women's empowerment varies substantially between

studies.

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2.2. Methods

Study inclusion and exclusion criteria

Study inclusion and exclusion criteria were set before commencing the data base search. The inclusion criteria were: (1) the study reported a quantitative or qualitative measure of women's empowerment (at least one dimension of empowerment), (2) the study reported at least one SRH outcome including contraception (hormonal and barrier), ante-natal care (ANC); supervised delivery, HIV and other STIs, (3) the study was conducted on women in reproductive age 15 years and above, (4) the study was conducted in Africa, (5) the study was published in a peer-reviewed journal or is a report from a globally recognized organization such as World Health Organization (WHO), Centers for Disease Control(CDC), World Bank and Demographic Health Surveys (DHS) ; (6) the study was written in English or an English translation is available. Studies were excluded if (1) the study did not report the relationship between any of the of the dimensions of women's empowerment and an SRH outcome, (2) the study was not focused on women in Africa, (3) the study only reported on girls younger than 15 years old, (4) the study was a review or theoretical study only.

Search Strategy

Search, data extraction, and reporting were conducted in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. These guidelines helped to ensure the validity and reliability of the systematic literature review. Relevant studies were identified through an electronic database search. The main databases searched included PubMed (Medline), Ovid

(EMBASE), psych INFO, EBSCO, and Cochrane's library. Related articles were also searched for in African databases (Africa Index Medicus (AIM), African Journals Online (AJOL), and Global Health). Additional articles were identified by searching the references of articles identified by the initial search. The searches took place from May 2018 to August 2018. Search was limited to articles published between 1990 and 2018, because most studies on women's empowerment took place after 1994 following the International Conference on Population and Development in 1994 (UNFPA, n.d.). Duplicates were removed. Search was conducted using the following keywords and Boolean operators: Empowerment-related keywords include women, woman, sex, empowerment, power, gender equality, autonomy, agency, gender role, gender inequality, status and decision-making. SRH outcome-related keywords include reproductive health, sexual health, women's health, maternal health, obstetric, antenatal, perinatal, contraceptive, family planning, condom use, STDs, STIs, and HIV. The initial search yielded 3,085 studies after removing duplicates. Screening of studies for this review took place in three phases. The first and second phase involved screening of the titles and abstracts while the third phase involved the reading of the full texts. Forty one full text articles were read, out of which 12 articles met the inclusion and exclusion criteria. The reference sections of all included studies were reviewed. This additional search yielded 14 more articles. A total of 26 articles were included the review. Figure 2.2 depicts the flow of information throughout the search and selection process of the literature review.
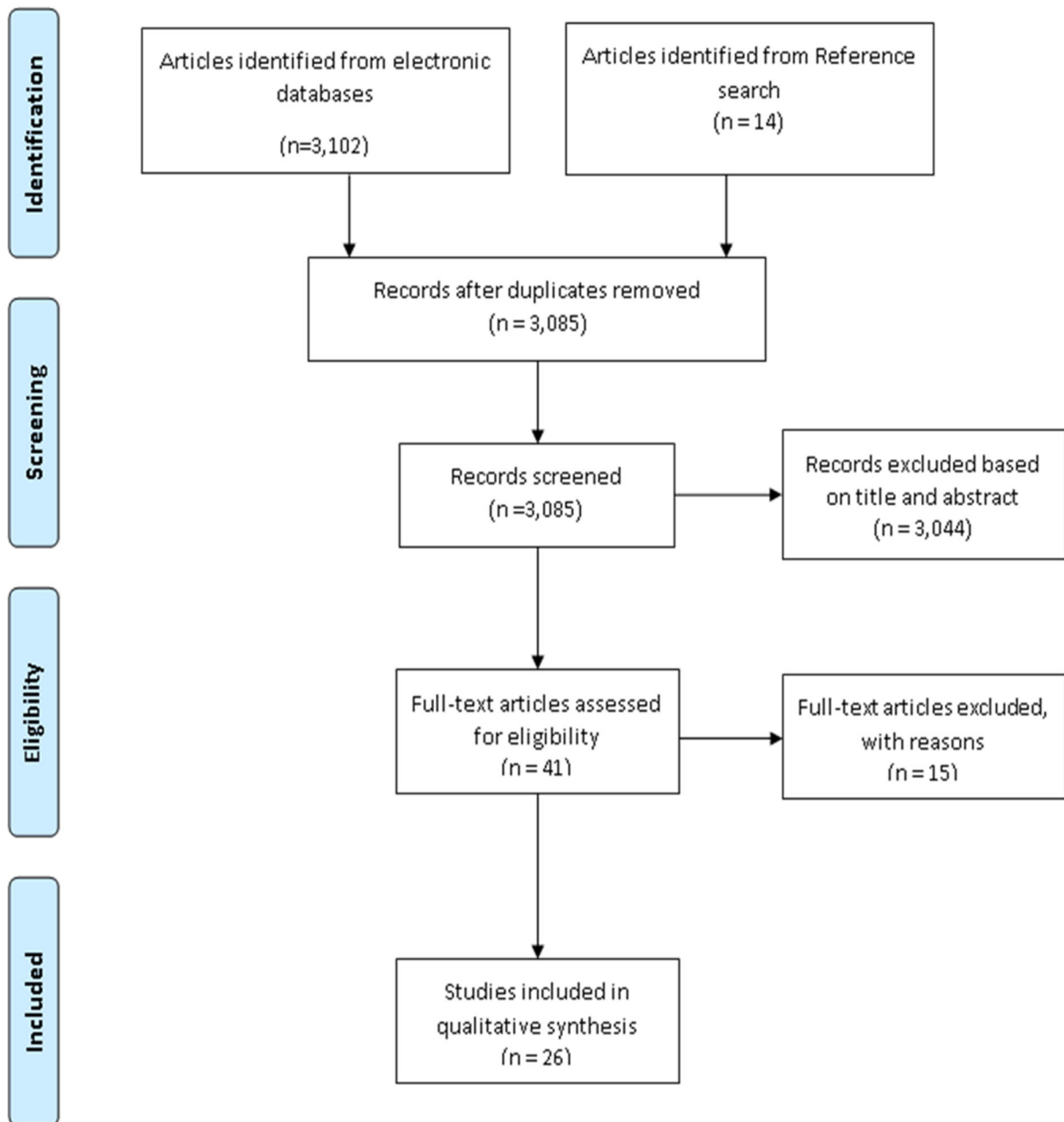
Figure 2.2. PRISMA flow chart for article selection

Quality assessment

The articles were assessed for quality using the NIH National Heart Lung and Blood institute's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies(NHLBI, 2014).

Data extraction

Data were extracted from the 26 identified studies using a predesigned data extraction/coding form. Data extracted include 1) study period and location; 2) study population and sampling; 3) study design and analysis; 4) component of women's empowerment measured; 5) type of SRH outcome; 6) study outcomes.

2.3. Results

Study period

All the studies were published between 1999 and 2018. The bulk (19) of the studies were published after 2010. A surge in publications (n=16) is observed from 2012-2014. Although more than half of the studies (14) were published between 2013 and 2017, most of them (80%) were conducted before 2012. Typically, the articles showed a gap of more than 4 years between the survey and publication dates. The gap is larger in the earlier studies published before 2014. Four studies (Asaolu et al., 2018; Blackstone, 2017; Conroy et al., 2016; Viswan et al., 2017) were conducted between 2013 and 2014. Figure 2.3 shows the distribution of publications by study period.
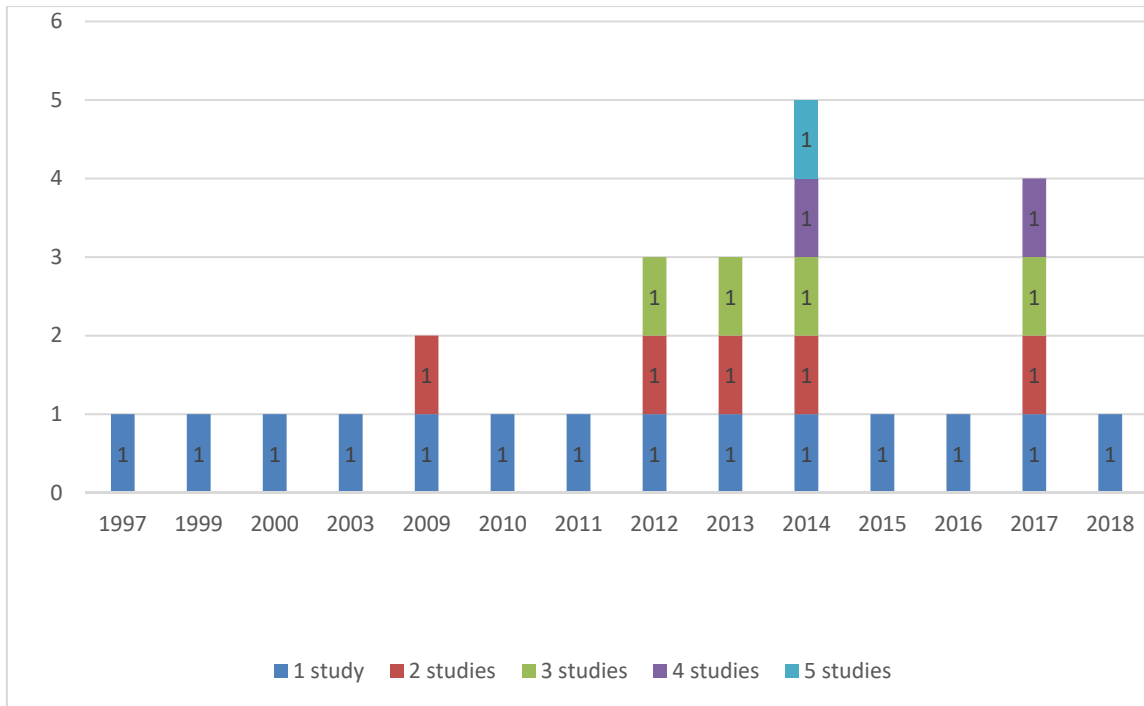
Figure 2.3. Number of Publications by study period

Study location

Studies in this review were not uniformly distributed across the continent. The majority (90%) of the studies were from East and West Africa. Fourteen studies were from West Africa, 12 studies from East Africa, 3 studies from South Africa and 2 from North Africa. Although more studies appeared to have been conducted in West Africa, the spread is limited to only two countries, Nigeria (n=7) and Ghana (n=7). A wider distribution is seen across the East African region where 4 studies were done in Ethiopia and the rest were distributed across Eritrea, Kenya, Namibia and Uganda. Of the remaining five studies, 2 were conducted in North Africa (Egypt) and 3 in South Africa

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(South Africa, Zambia and Zimbabwe). There appears to be a lack of publications from countries in central Africa. Figure 2.4 is a map of Africa showing the distribution of the studies.
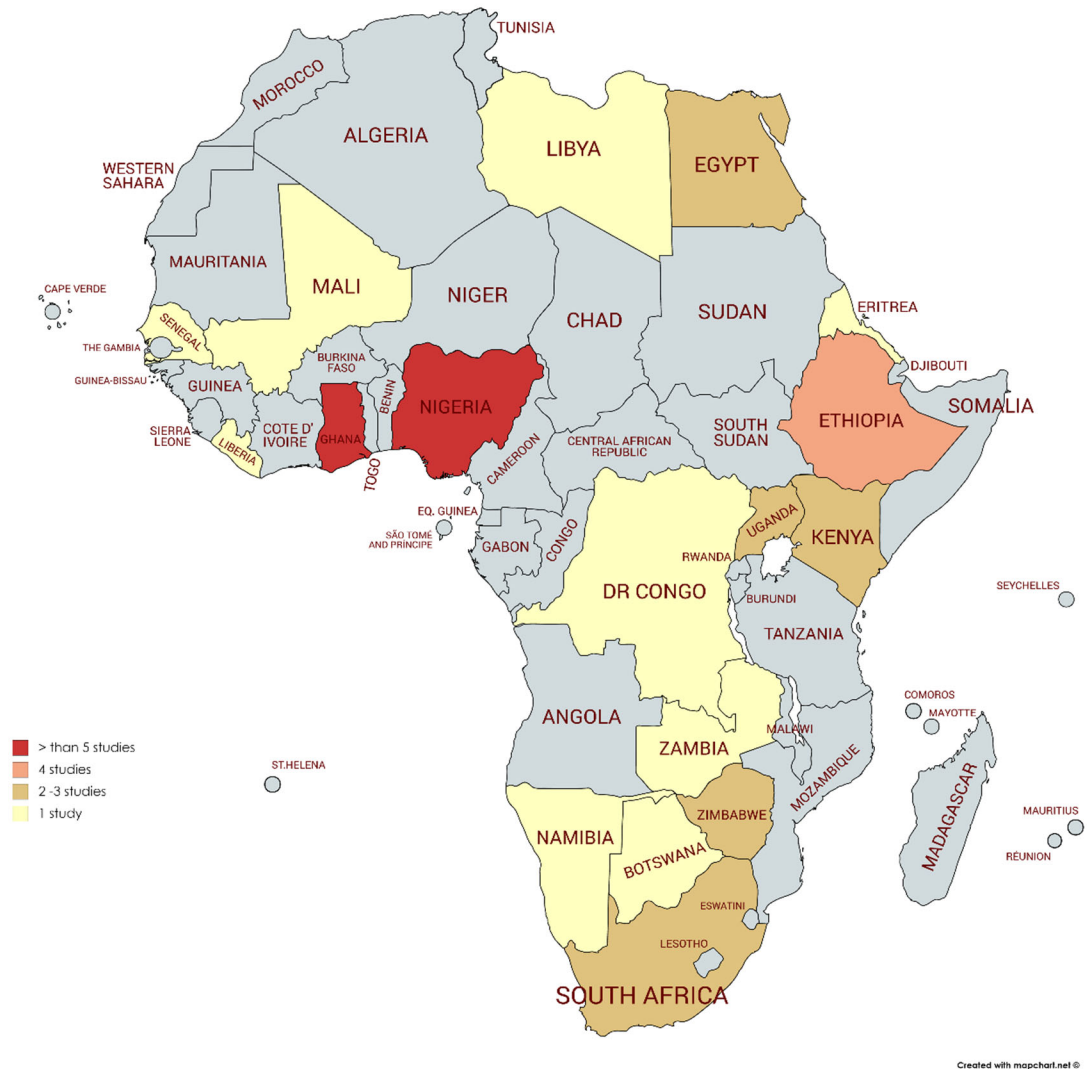
Figure 2.4. Study locations: Women's empowerment and SRH outcomes in Africa

Target population and participant characteristics

The target population for this review is made up of women in their reproductive age. World Health Organization (WHO) defines women's reproductive age as 15-49 years old. Twenty one studies (80%) were focused on women aged 15-49 years old. One study (Fotso et al., 2009), included women aged 12-54. Two other studies (Mutowo et al., 2014; Stephenson et al., 2012) were focused on women aged 18-49 years old. One study (Sipsma et al., 2014) did not provide an age range but reported the mean age of participants as 30.6 years. Twenty of the studies surveyed women who were married or currently cohabiting with a partner. Five studies (Conroy et al., 2016; Mutowo et al., 2014; Stephenson et al., 2012) did not report the marital or cohabiting status of participants. Conroy et al., (2016) and Stephenson, Bartel & Rubardt, (2012) reported data on heterosexual couples.

Sampling technique and sample size

Twenty (80%) of the studies used data from Demographic Health Surveys (DHS). DHS surveys are national surveys which collect data using a multi-staged stratified cluster sampling technique to obtain a nationally representative sample of women (NPC, 2014). The remaining four studies also used multi-staged stratified cluster sampling techniques. Sample sizes ranged from 80 to 47,545 women. All the studies except two (Greig & Koopman, 2003; Mutowo et al., 2014) had sample sizes greater than 400 women. Sixteen of the studies had sample sizes greater than 5,000 women. The very large studies were either multi-country studies or studies that analyzed data spanning multiple rounds of surveys. The multi country studies are Mai Do & Kurimoto

(2012) and Ahmed et al. (2010), both of these studies had samples sizes greater than 15,000 women. Three studies (Asaolu et al., 2018; Corroon et al., 2014; Samari, 2018) analyzed data from multiple years of surveys. Asaolu et al., 2017(n= 47, 545,) and Corroon et al., 2014 (n=35, 633) both analyzed Nigerian Demographic Health Survey data for 2003, 2008 and 2013, while Samari, 2018(N=16,144) analyzed Egyptian Demographic Health Survey data for 2005, 2008 and 2014. The small studies (Greig & Koopman, 2003 n=99 and Mutowo et al., 2014 n=80) were surveys that engaged in primary data collection from convenient samples. Mutowo et al. (2014) was a hospital-based survey that used a systematic sampling method to recruit a convenient sample of women who came to the hospital.

Study design and analysis

All the studies were observational cross-sectional surveys. None of the studies had longitudinal design, although three of the studies analyzed data from multiple rounds of DHS in the same country. None of the studies identified was a qualitative or mixed method study. Two studies (Mutowo et al., 2014; Sipsma et al., 2014) reported primary data collection. Twenty of the studies were secondary data analysis of national surveys. All studies reported multivariate regression analysis, each reporting either Odds Ratios (OR) or Risk Ratios (RR). One study (Ahmed et al., 2010) pooled data from 33 different countries, the study reported both individual country odds ratios and the pooled odds ratios. One study (Shimamoto & Gipson, 2017) used structural equation modelling.

SRH outcomes measures

Four SRH outcomes were reported in the studies. These outcomes are contraceptive use, ante-natal care (ANC), supervised delivery, and sexually transmitted infections (STIs). The most commonly reported SRH outcome was contraceptive use. Seventy seven percent (n=20) of the studies reported contraception as SRH outcome of interest. Fifteen of these studies (Ahmed et al., 2010; Asaolu et al., 2018; Crissman et al., 2012; Do & Kurimoto, 2012; Govindasamy & Malhotra, 1996; Hindin, 2000; Kritz et al., 2001; Palamuleni & Adebowale, 2014; Samari, 2018; Stephenson et al., 2012; Tadesse et al., 2013; Viswan et al., 2017; Wado, 2018; Woldemicael, 2009) reported contraceptive use as the only outcome of interest, while 3 studies (Ahmed et al., 2010; Corroon et al., 2014; Ibrahim et al., 2015) reported contraceptive use as part of a group of SRH outcomes. Contraception was measured either as current use of contraception or ever used contraception. Eight studies (Do & Kurimoto, 2012; Govindasamy & Malhotra, 1996; Hindin, 2000; Stephenson et al., 2012; Tadesse et al., 2013; Viswan et al., 2017; Wado, 2018; Woldemicael, 2009) reported current use of contraception while the remaining studies reported ever used contraception. Two studies (Palamuleni & Adebowale, 2014; Samari, 2018) classified contraception as long-acting reversible contraception (LARC) and short-acting (SARC). One study (Mai Do & Kurimoto, 2012) classified contraception as male and female contraceptive use while another study (Mutowo, Kasu & Mufunda, 2014) reported on condom use and dual protection. Four studies (Fapohunda & Orobaton, 2013; Fotso et al., 2009; Shimamoto & Gipson, 2017; K Singh et al., 2011) reported on supervised delivery. Supervised delivery was

measured either as supervised/assisted delivery or delivery in a health facility. Two studies(Ahmed et al., 2010; Sipsma et al., 2014) reported ante natal care (ANC). These studies measured ANC as a dichotomous variable of either attending a minimum of four ANC visits or not. Two studies (Conroy et al 2016; Greig and Koopman, 2003) reported on STI as the outcome of interest. Both studies focused on HIV risk behavior. None of the studies reported the results of a bio-marker test.

Some of the studies (n=4) reported multiple SRH outcomes, for example Ahmed et al. (2010) measured three SRH outcomes (contraceptive use, antenatal care and skilled birth attendance), while Ibrahim et al.(2015) and Corroon et al.(2014) both reported on contraception and skilled birth attendance/supervised delivery. Figure 2.5 shows the distribution of studies by SRH outcomes.
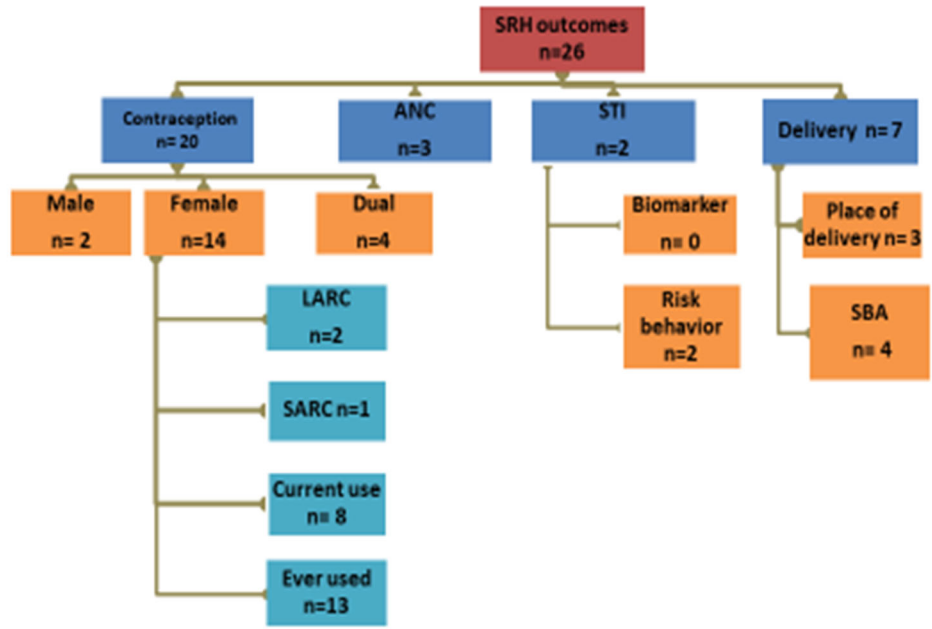
Figure 2.5. Distribution of studies by SRH outcomes

Empowerment measurement

All 26 studies clearly defined women's empowerment and described how the
construct was measured although, none of the studies used the same measurement scale.
They all measured empowerment using different combinations of the components. Some
of the studies (N=12) created indices to measure empowerment, while other studies
simply reported the relationship between individual empowerment indicators and the

SRH outcomes of interest. For example, Mutowo, Kasu &Mufunda (2014), created a summative index that awarded 35 points. Women were scored as lowly empowered (0-17 points), moderately empowered (18-24 points) and highly empowered (>25 points). The most common component of empowerment measured was agency (n=23). Twenty of these studies measured agency alone while 3 studies (Ahmed et al., 2010; Blackstone, 2017; Palamuleni & Adebowale, 2014) measured both agency and resources. Agency was measured either as decision making or attitude to gender roles. Fifteen studies measured house-hold decision making (Blackstone, 2017; Corroon et al., 2014; Darteh et al., 2014; Do & Kurimoto, 2012; Fotso et al., 2009; Ibrahim et al., 2015; Mutowo et al., 2014; Palamuleni & Adebowale, 2014; Samari, 2018; Shimamoto & Gipson, 2017; K Singh et al., 2011; Sipsma et al., 2014; Tadesse et al., 2013; Wado, 2018; Woldemicael, 2009). Nine studies measured women's economic decision making. Economic decision making was measured in terms of woman's employment status (n=9) and who decides how to spend the family's earnings (n=7). Four studies(Crissman et al., 2012; Kritz et al., 2001; Shimamoto & Gipson, 2017; Woldemicael, 2009) measured sexual or family planning decision making.

The second most common measure of agency was women's attitude toward intimate partner violence. Fifteen studies (Blackstone, 2017; Corroon et al., 2014; Darteh et al., 2014; Do & Kurimoto, 2012; Fotso et al., 2009; Ibrahim et al., 2015; Mutowo et al., 2014; Samari, 2018; Shimamoto & Gipson, 2017; Sipsma et al., 2014; Tadesse et al., 2013; Wado, 2018; Woldemicael, 2009) reported this measure. Eleven of these studies measured attitude towards violence in combination with other indicators, while one

study (Sipsma et al., 2014) measured IPV alone as a proxy for empowerment. Two studies (Sipsma et al., 2014; Viswan et al., 2017)(Viswan et al., 2017 Sipsma et al., 2014) reported the actual experience of IPV.

Lastly, five of the studies (Corroon et al., 2014; Ibrahim et al., 2015; Palamuleni & Adebowale, 2014; Viswan et al., 2017; Wado, 2018) measured women's attitude towards refusing sex with partner. For example, both Corroon et al. (2014) and Ibrahim et al. (2015) measured a woman's attitude towards refusing sex if her husband has other sexual partners or if he has an STI. None of the studies reported on political or legal dimensions of women's empowerment. Figure 2.6 shows the distribution of studies by empowerment measures.

Only about a third (9) of the studies described how they developed the instrument used to measure empowerment, its validity and reliability. Three studies(Kritz et al., 2001; Mutowo et al., 2014; Samari, 2018) reported Cronbach's alpha while six studies (Ahmed et al., 2010; Corroon et al., 2014; Hindin, 2000; Tadesse et al., 2013; Viswan et al., 2017; Wado, 2018), reported using either principal or confirmatory factor analysis (PCA or CFA). One study Shimamoto & Gipson, (2017) used Structural equation modelling to visualize the relationship and pathways between empowerment and SRH, The remaining 17 studies did not include information on how they selected the empowerment indicators used.

Several studies adjusted for socio-demographic factors. The commonest factors adjusted for were age, urban/rural residence and educational attainment. For example

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Mutowo, Kasu & Mufunda, (2014) adjusted for age, marital status, religion and place of residence.
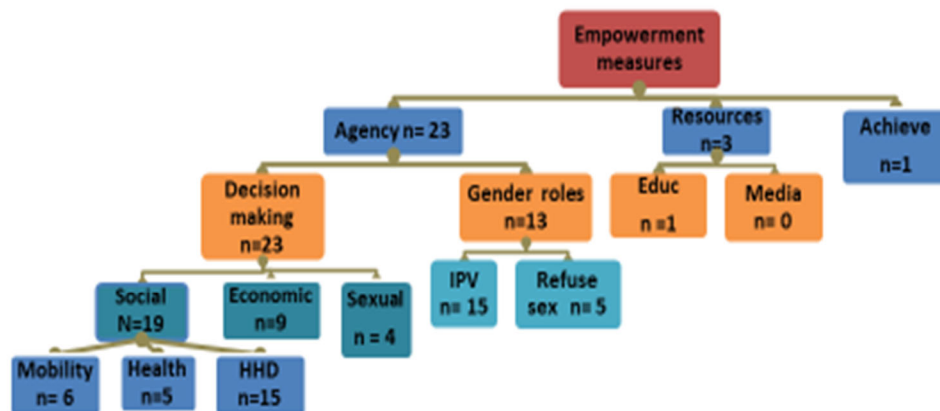
Figure 2.6. Distribution of studies by empowerment domain

Study outcomes

Typically, the studies in this review reported significant positive relationships between women's empowerment and SRH outcomes although, three studies (Asaolu et al., 2017; Hindin, 2000, Woldemicael, 2009) reported mixed results. Woldemicael

(2009) found that some domains of decision making (sexual and mobility) were associated with increased uptake of contraception while others (household purchases) were negatively associated with contraception. He reported that women who make the final decision on large household purchases alone are less likely to have used modern contraception compared to women whose husbands made the decisions (OR 0.58). Hindin (2000) found weak and non-significant relationships between empowerment and condom use while Asaolu et al. (2017) found that decision-making had a non-significant relationship with contraception in 2003 and 2008 but, the relationship became highly significant in 2013 (OR 1.6). However all three studies concluded an overall positive relationship between women's empowerment and contraception. The remaining 12 studies that reported contraceptive use as the SRH outcome of interest found a positive relationship with empowerment. Odd ratios ranged from 1.046 (Ibrahim et al., 2015) to 3.69 (Kritz and Makinwa – Adebusoy, 1997).

Seven studies reported on supervised delivery. All the studies found a positive relationship between empowerment and supervised delivery. For example, Singh, Bloom & Brodish (2011), found that empowered women were more likely to deliver in a facility (OR 1.66). Two studies (Ahmed, et al., 2010 and Sipsma et al., 2014) reported ante-natal care as the SRH outcome. Ahmed, et al., (2010) reported that "women with high empowerment score were likely to attend four or more ANC visits compared to those with low empowerment scores (OR=1.29). Sipsma et al. (2014) also reported that empowered women (who had not experienced IPV) were more likely to receive ante-natal care (OR =5.12). Finally, 2 studies (Conroy et al., 2016; Greig and Koopman,

2003) also found a positive relationship between empowerment and HIV protective behaviors. Conroy et al. (2016) reported that females who had power in a relationship are associated with HIV protective behaviors like condom use.

Overall all studies found a positive relationship between women's empowerment and SRH. The differences among study outcomes were mainly found when looking at the strength of relationship between individual components of empowerment and SRH outcomes. For example, Ahmed, et al. (2010), reported that empowered women were 1.29 times more likely to attend 4 ANC visits while, Sipsma et al. (2014) reported that empowered women were 5.12 times more likely to attend 4 ANC visits. Table 2.1 provides the characteristics of selected studies.

Table 2.1. Study characteristics

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Samari, 2018	Egypt 2005, 2008 & 2014.	DHS survey Married/ cohabiting women 15-49 years (n=**47,545**)	CS study Multinomial regressions (RRR)	No index used, Agency, Decision-making (5 items), Attitudes to IPV (5 items)	Contraceptive use (LARC, SARC)	Positive relationship. HHD associated risk SARC (4%) & LARC5%.
Viswan et al., 2017	Nigeria 2008 & 2013	DHS survey Married/ cohabiting women 15-49 years (n= **51,228**).	CS study /logistic regression OR	No index used. Agency, Decision-making (6 items), Experience IPV (3 items), Attitude to refusing sex (1 items)	Contraceptive use (current use)	Positive relationship. Contraception use is 2.8 and 2.6 times higher among women with high sexual autonomy in 2008 and 2013.
Shimamoto & Gipson, 2017	Senegal	DHS survey Married/ cohabiting women 15-49 years (n= **7, 451**).	SEM/T-Tests P-Values	Index used. decision-making (3 items), attitudes to IPV (5 items), attitudes to sex negotiation (2 items)	Skilled Birth Attendance	Positive relationship. Age at first marriage, attitude to sexual negations associated with SBA (P-values ranging from 1.95-3.122)
Asaolu et al., 2017	Nigeria 2003,2008 & 2013	DHS survey Married/ cohabiting women 15-49 years (n= **35,633**)	CS study /logistic regression OR	No index used. Agency Decision-making (3 items)	Contraceptive use (modern)	Mixed findings. Decision making is associated with higher odds of using contraceptive use. Large household purchases (OR 1.60); Health care (OR 1.39); Family visit (OR 1.58). Nonsignificant findings in 2003 and 2008
Blackstone, 2017	Ghana 2014	DHS survey Married/ cohabiting women 15-49 years (n= **1,828**).	CS study /logistic regressions OR	Summative index 14 Agency& resources Decision making (9 items), Attitude to IPV (5 items) status of women	Contraception (current use & unmet need)	Positive relationship Women's number of household decisions is positively associated with contraceptive use (β = 0.149***)
Conroy et al., 2016	South Africa 2012-2014	18-year-old women in a sexually active relationship (n= 448)	CS study.	No index, Power, female power, norms, and shared power	HIV preventive behaviors	Female power in a relationship is associated with HIV protective behaviors.

Table 2.1. Continued

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Ibrahim et al., 2015	Nigeria 2008	DHS survey Married/ cohabiting women 15-49 years (n= **23,954**).	CS study Factor analysis /logistics regressions. OR	No index, Agency Decision making (5 items) Attitude to IPV (5 items), Attitude to refusing sex (3 items)	1)Contraceptive use (modern) 2) Skilled birth attendant 3) Place of delivery	Positive relationship Empowerment indicators are associated with contraceptive use, supervised delivery and institutional delivery. Household decision (OR=1.829*, 1.421* & 1.258* respectively). Attitude to IPV (OR= 0.9173*, 0.867* & 0.918* respectively). Attitude toward refusing sex (OR= 1.046*, 1.272* & 1.082* respectively).
Mutowo, Kasu & Mufunda, 2014	Zimbabwe Study year is not reported	n=80 Systematic sampling women aged **18-49** years.	Non-experimental descriptive correlational study/Coefficient	Summative index Agency & Resources Decision making (4 items), Attitude to IPV (1 item) Resources (2 items)	Contraception (condom use/dual contraception) STI/HIV prevention	Positive relationship A weak positive significant correlation existed between women empowerment and use of dual protection (r= **.242**)
Corroon et al., 2014	Nigeria 2010-2011	Married/ cohabiting women 15-49 years. (n=**16,144**)	CS survey /Regressions OR	No index used Agency, Decision making (5 items) Attitude to IPV (7 item) Attitude to refusing sex (1 item)	1)Contraception use (current use) 2)Delivery in a health facility 3)Skilled birth attendance	Empowerment is positively associated with contraception use, hospital delivery & supervised delivery. Economic decision (OR1.16**, 1.30**; 1.95** respectively). Attitudes against domestic violence (OR=1.09*; OR=1.18***; OR1.95***). Decision making is associated with contraception use (OR 1.21***) but not significant supervised delivery. Freedom of movement not significant for all outcomes
Palamuleni & Adebowole, 2014	Malawi 2010	DHS survey Married/ cohabiting women 15-49 years (n=**5,958**).	CS study /logistic regressions OR	Summative index, Agency, Decision making (8items) Attitude to refusing sex (1 item)	Contraceptive use (current use LAPCM)	The odds of LAPCM use increases as empowerment rises (Fair empowerment OR =1.33** High empowerment OR = 1.58**)
Darteh, Teye-Doku & Esia-Donkoh, 2014	Ghana 2008	DHS survey Married/ cohabiting women 15-49 years (n=**3,124**).	CS study /logistic regressions OR	Summative index (Agency& achievement) Decision making (5 items), Attitude to IPV (5 item) women status (4 item)	Condom use	Women with primary level education were 1.3 times more likely to use condom compared to women with no education (primary education OR 1.3**) (secondary education OR 1.7***)

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Table 2.1. Continued

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Sipsma et al., 2014	Ghana 2009	Stratified clustered samples (n= 418)	CS cohort study/logistic regressions OR	Summative index Agency, Experience of IPV (4 items)	Uptake of four or more ANC	Women who had not experienced physical abuse are more likely to attend ANC (OR = 5.12)
Fapohunda & Orobaton, 2013	Nigeria 2008	DHS survey Married/cohabiting women 15-49 years (n=**33,385**).	CS study /logistic regressions OR	No index Agency, Decision making (2 items) Attitude (1 item)	Supervised delivery (NOP)	Empowerment was protective against delivery with no one present (NOP)
Tadesse et al., 2013	Ethiopia 2011	DHS survey Married/ cohabiting women 15-49 years (n=**10,204**).	CS study Factor analysis /logistic regressions OR	Index from factor analysis Agency & Resources Decision making (4 items), Attitude to IPV (5 item) Resources (2 items) Knowledge (4 items)	Contraception use (current use Male & female)	Positive relationship Empowerment indicators are associated with current contraceptive use. (AOR ranged from 1.20 – 1.34).
Wado, 2013	Ethiopia 2005	DHS survey Married/ cohabiting women 15-49 years (n=**14,070**).	CS study Factor analysis /logistic regressions OR	No Index Agency & Resources Decision making (4 items HHD 4 items sexual, 2 items health), Attitude to IPV (5 item)	Contraception use (current use) ANC	Positive relationship Sexual and health decision making are associated with current contraceptive use and ANC. (AOR ranged from 1.20 – 1.41).
Stephenson, Bartel & Rubardt, 2012	Ethiopia & Kenya 2009	18-49 Results Initiative Baseline Data	CS study /logistic regressions OR	Summative index perceived balance of power scale (7 items)	Contraception use (current use Male & female	Positive relationship Higher equitable attitudes are associated with contraceptive use (OR= 2.18 Ethiopian women & 2.35 Kenyan women)

Table 2.1. Continued

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Mai Do & Kurimoto , 2012	Namibia, Zambia & Uganda 2006-2008	DHS survey Married/cohabiting women 15-49 years (n=**15,571**).	CS study /logistic regressions RR	No index, Agency, Decision making (5 items), Attitude to IPV (1 item)	Contraception use (current use Male & female)	Empowerment is positively related to both female only and couple contraceptive use **(**Relative Risk ratios range from 1.1–1.3)
Crissman Adanu, & Harlow, 2012	Ghana 2008	DHS survey Married/cohabiting women 15-49 years (n= **2,129**).	CS study /logistic regressions OR	Summative index Agency, Decision Making (5 items)	Contraception use	Women with high empowerment scores are between 1.31 and 1.82 times more likely than those with a null empowerment score to use modern contraception.
Singh, Bloom & Brodish, 2011	Egypt, DRC, Ghana, Mali Liberia, Nigeria Uganda Zambia (2006-2009)	DHS survey Married/ cohabiting women 15-49 years (n=**50,412**).	CS study /logistic regressions OR	Summative index Decision making (4 items), Attitude to IPV (5 item), Attitude to refusing sex (3 item)	Facility delivery (supervised)	Positive relationship Measures of empowerment are significantly associated with facility delivery. Wife beating not justified (Ghana OR1.44**; Nigeria OR 1.16*). Household decision making Nigeria OR 1.66). Attitude to refusing sex (Nigeria OR=0.77**; Uganda OR=0.83*).
Ahmed, et al., 2010	Ghana, Namibia, Uganda and Zambia	DHS survey Married/ cohabiting women 15-49 years. No sample size	CS study Pooled adjusted OR	No index, Agency and resource s Decision-making (5 items), Economic Status (1 item) Education attainment (1 item)	1)Contraception use 2) Uptake of four or more ANC iii) supervised delivery (SBA)	Women with the highest empowerment score are more likely use contraception (OR 1.49), attend ANC (OR 1.29) and have a supervised delivery (OR 1.19).

Table 2.1. Continued

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Woldemicael, 2009	Eritrea 2002	DHS survey Married/ cohabiting women 15-49 years (n=**8,754**).	CS study /logistic regressions OR	Autonomy/Agency Decision-making(5items) Attitude to IPV (1 item)	Contraception use (ever used)	Mixed relationships Sole decision-making is associated with increased likely hood of contraception use. (Day-to-day household purchases OR 0.55**; visitation decision making OR 0.75*; attitude to IPV OR 0.79**; sexual decision making OR 0.3***. Contradictory effects. Women with sole decision making for large household purchases are least likely to use contractive (OR 1.48***)
Fotso, Ezeh & Essendi, 2009	Kenya 2004-2005	DHS survey Married/ cohabiting women 15-49 years (N=**1,927**).	CS study / ordered logistic regressions OR	Summative index Agency Decision-making (17 items)	Place of delivery	Women's overall autonomy, decision-making and freedom of movement were not significantly associated with utilization of obstetric care services.
Greig and Koopman, 2003	Botswana 2001	Convenient sampling n=**99**	Study B, Beta and Adjusted R^2	Agency and resource Cultural Norms Scale (4 items). Economic Independence scale (8 item). Abuse Scale (2 items)	HIV prevention (condom use)	Increase in women's negotiating power is significantly associated with condom use. (B=0.93; SE 0.14; Beta 0.61; *R*2 0.47) Economic decision making and education not significant
Hindin, 2000	Zimbabwe 1995	DHS survey Married/ cohabiting women 15-49 years (N=**3,701**).	CS study logistic regression OR	No index 1 Components measured (autonomy/agency) Decision making (3 items)	Contraception (ever used, current use & plan to use)	Empowerment variables show weak or non-significant associations with condom use **Plan to use contraception:** No say over major purchases (OR= 0.63**), Wife works (OR= 0.78*), Any household decisions OR=0.0.52** **Ever used contraception:** No say over major purchases OR = 0.70**, Wife works (OR= 0.83*), Any household decisions OR= 0.68* **All variables not significant for current use**

Table 2.1. Continued

Source	study time location	Study population &sampling	Study design & analysis	Empowerment measure (scale)	SRH measure	Key findings
Kritz & Makinwa – Adebusoy, 1997	Nigeria 1991	A two-stage, stratified, cluster-sample of age 15-40 years	CS study /logistic regression OR	No index, Agency (6 items) household decisions (4 items); divorce decision making (1 item) family planning decision (1 item).	Contraception (ever used or plan to use)	Positive relationship Couples are significantly more likely to use contraceptives if the wives have authority (Odds Ratios varied from 1.25 to 5.45).
Govindasamy and Malhotra, 1996	Egypt 1988	DHS survey Married/ cohabiting women 15-49 yrs (N=**8,911**).	CS study /logistic regression OR	Summative index Index graded 1-12 Decision-making (12 items)	Contraception (current use)	Positive relationship Household decision-making is associated with current use of contraception (wife OR=1.02, joint OR= 1.09) Mobility and current use of contraception (1.08***). REF: Husband/others

Study quality

All studies had scores ranging from 6-8 out of 9 using the NIHs heart and lung study quality tool for cross sectional studies. All studies reported research questions, objectives, sample size, study time exposure, outcomes and confounders. Not all of the studies reported information about follow-up. Additionally, none of the studies provided information about "sample size justification, power description, or variance and effect estimates" as required by the tool.

2.4. Discussion

Summary

This study investigated the relationship between women's empowerment and their SRH outcomes using a systematic review approach. Findings from this review demonstrate an overall positive relationship between women's empowerment and SRH. The degree and direction in which empowerment affects SRH was dependent upon the way empowerment was measured and the component of SRH being investigated. These findings are consistent with other reviews, which investigated the relationship between women's empowerment and the individual components of SRH. Some of these reviews include Prata et al. (2017) and Hawkins et al. (2016), both of which found positive associations between empowerment and contraception. Upadhyay et al. (2014) also found a positive relationship between empowerment and fertility while Pratley et al. (2016) found a positive relationship between empowerment and maternal/child health.

Gaps in literature

Although this study achieved its aim, some gaps in the current literature were identified. These gaps include 1) a skewed distribution of literature across the continent, 2) lack of diversity in population, especially a lack of subgroup analysis or marginalized populations, 3) absence of a rigorous study design such as an Randomized Control Trial or a longitudinal study, 4) lack of qualitative or mixed-method studies, 5) lack of primary data collection, 6) Lack of comparative studies, 7) lack of a consistent measure of empowerment and, 8) insufficient measure of SRH outcomes and a lack of biomarkers to test for HIV and other STIs .

Skewed distribution in the study location and study period

Although there are 54 countries in Africa, the twenty two studies in this review were from only sixteen African countries. 70% of the continent did not report any study on women's empowerment and reproductive health. Furthermore, the studies were limited to two regions. Ninety percent of the studies reviewed are from 10 countries, 2 West African countries (Ghana and Nigeria) and 8 east African countries. This review identified a lack of publications from countries that have the poorest Human Development Index as well as lowest Gender Equality Index (World Bank, 2019b). Countries with such poor indices include Mali, Niger Liberia Chad and Congo. Apart from the indices mentioned, Africa is a very diverse continent. Most countries have a completely different social, cultural, religious, economic and political climates. This finding is quite significant considering that women's empowerment is a multidimensional construct affected by social, economic, legal and political factors

within a community (Kabeer, 1999; Kishor & Subaiya, 2008). The skewed distribution of studies makes it difficult to generalize findings to all women in Africa. Studies from countries with better indices might blind researchers and policy makers from making appropriate interventions further worsening the inequality and inequity.

Additionally, a gap exists between the reported time of data collection and the time of publication in all the studies. The majority (80%) of the publications occurred after 2010, with peaks appearing in 2014 and 2017. The timing of these studies could be attributed to the surge of interest in the field of women empowerment following the International Conference on Population and Development (ICPD) in 1994, the Beijing women's conference in 1995 and the 3rd Millennium Development Goal of promoting gender equality and empowering women (UN, 2015). Prior to these gender equality landmarks, I found few or no studies in the field of women's empowerment. A second reason could be due to the availability of empowerment data from the DHS women's empowerment module. The women's empowerment module was added the women household questionnaire in 2009. Prior to this time it was an optional module although most countries were reporting data from the module by 2008 (Heckert & Fabic, 2013; Kishor & Subaiya, 2008). A surge of studies is seen in 2014 and 2017. The timing of these studies suggests a response towards the ending of the MDG period and the emergence post-2015 Sustainable Development Goals (SDGs). It is anticipated that more studies targeting women's empowerment and SRH will be conducted following the SDGs. Table 2.1 provides the characteristics of selected studies. It provides dates of data

collection and time of publication while figure 2.2 shows the distribution of studies by year of publication.

Lack of diversity in population

Most (19) of the studies limited their participants to women who are married or cohabiting with a partner. This leaves out a significant population of women who are unmarried or not in a cohabiting relationship. In a DHS comparative study analysis of 23 countries, Kishor & Subaiya (2008) reported that currently married women constitute only 60-78 percent of all women surveyed leaving a gap of about 23-40 % of women. The selection of married or cohabiting women has most likely led to the exclusion of women in multiple relationships and sex workers. This group of women are often at a higher risk for STIs, they also have a higher unmet need for contraception.

Absence of rigorous study design

All the studies in this review are cross-sectional studies, 75% of which are DHS surveys. Cross-sectional studies take a snapshot of the population at a particular point in time. These studies are not in a position to show causality. Therefore we cannot be 100% certain that the relationships observed occurred as a result of empowerment or due to other factors. Although it might be difficult to conduct randomized control trials in the field of women's empowerment, efforts should be made to carry out more rigorous studies. A more rigorous design that follows the women over time with multiple data collection points will provide a more accurate picture of the effects empowerment has on SRH.

Second, the studies in this review are national studies which sample and generalize to the entire population thereby missing important sub populations and vulnerable social groups. Africa has large groups of displaced persons, hard to reach populations, nomads and migrant workers. Africa has the second largest population of displaced people in the world (UNHCR, 2018). There is a need to reach out to these populations since they are usually more vulnerable.

Third, all the studies are based on individual level data, this review did not find any community-based study. The existing studies are unable to provide the unique perspectives of the communities. Results from these studies do not take into account the nuances of culture and norms within the communities where these women live. Based on published studies, we know that both women's empowerment and SRH are affected by culture, social norms and other subtle factors found within the communities (Batliwala, 1994; Biswas & Kabir, 2002; Jejeebhoy, 2000). For example, while it is generally considered that women who make decisions are more empowered, the reverses is seen in Egypt. Egyptian women who make joint decisions with their spouses are considered to be more empowered than those who make decisions alone (Kishor &Subaiya, 2008).

Fourth, there is an obvious lack of qualitative studies. Qualitative studies such as focus groups and interviews would have provided us with more clarity and an in-depth knowledge about the dynamics of the different relationships between empowering and SRH in African women (Richardson, 2017).

Lack of comparative studies

The existing studies were limited in terms of comparative analysis, only one study (Ibrahim et al., 2015) compared the effect of empowerment and SRH in two countries (Nigeria and India). Comparative studies would have helped clarify how different socio-demographic and environmental factors affect empowerment. For example, when Kishor and Subaiya (2008) compared 23 countries, they found that each country differed in the way certain socio-demographic factors interacted with empowerment. These effects still persisted despite the fact that the surveys were measuring the same items across board. Policy makers and program implementers are encouraged to take these difference into consideration and tailor interventions to meet the specific needs of each community.

Lack of primary data collection

Most of the studies in this review are from secondary data analysis, mainly the DHS. Although the data is able to answer the study's research question, there is a limit to how much information it can provide since the data was collected for purposes other than the study. Future studies need to invest in primary data collection with the intent of asking the specific questions necessary to determine how empowerment affects SRH.

Lack of a consistent measure of empowerment

This review found an inconsistency in the way women's empowerment is measured in the available literature. Measuring women's empowerment has always been a challenge because of its multidimensional nature (Prately, 2016; Richardson, 2017). Among the 22 studies reviewed, no two studies were found to use the same scale to

measure empowerment. This makes it difficult to make comparisons across studies. The problem could be attributed to the fact that women's empowerment is a latent construct which is measured by combining several variables (Kabeer, 1995). Although there are several studies which provide frameworks and guidelines for the measurement of empowerment, the field of empowerment studies is yet to agree on one specific tool to be used for comparing studies (James-Hawkins et al., 2018; Pratley & Sandberg, 2018; Richardson, 2018; Yount et al., 2016). This leaves researchers measuring the construct with the difficult task of deciding which variables to combine and what manner to combine them in. Some studies have been found to use single indicators as proxies for empowerment. For example, Asaolu et al (2017) used household decision making indicators as proxies for empowerment while Sipsma et al. (2014) used experience of IPV as a proxy for empowerment. Although some studies measured two or more indicators, these studies still had some limitations since they most often were still only measuring one component of empowerment. For example Ibrahim et al. (2015) and Samari (2018) measured empowerment using two indicators (household decision making and attitude to violence). Both indicators were only measuring the women's agency. The choice of one or two components and indicators fails to take into account the effects of other dimensions on empowerment. This will most likely mislead the researchers to finding biased outcomes, since each of these components plays a different but significant role in women's empowerment(Alkire, 2005; Kabeer, 1999b; Kishor & Subaiya, 2008; Malhotra & Schuler, 2005; Pratley & Sandberg, 2018; Richardson, 2018).

A second problem observed with measuring empowerment is seen when using summative indexes. Summative indexes assume that each component has an equal weight when exerting its effect on empowerment, thereby forgetting that each component exerts a different degree of influence on the observed outcome (Alkire, 2005; Kishor, 1995; Kishor & Subaiya, 2008; Richardson, 2017). For example, the effect of decision making about large household purchases is not the same as the effect of decision making for purchase of daily needs. Although both variables are measuring house hold decision making, daily need decision making has been found to carry more weight when measuring agency in empowerment studies (Kishor & Subaiya, 2008). These differences are further heightened by the nuances in culture and norms. Previous studies have shown that the use of summative indexes are associated with inconsistent findings (Prata, 2017; Pratley, 2016). All these factors lead to the biased findings and an incomparability of studies especially in the instances when the indexes were aggregated in different ways (Carlson et al., 2015).

Third, most of the studies did not report the theoretical basis for the choice of indicators used in generating women empowerment indexes. It can be assumed that most of these studies are based on Confirmatory Factor Analysis (CFA) since they used empowerment data from the DHS women status module. Kishor & Subaiya (2008), report that DHS used CFA to identify which factors best measure each component of women's empowerment. This missing piece of information is critical since published studies have demonstrated that although variables may appear to be very similar, in reality they might be measuring totally different concepts. For example, attitudes

towards rejecting wife beating and attitude towards a woman's right to refuse sex with her husband are both variables which measure women's attitude to negative gender roles but the two variables are measuring two totally different concepts in women's empowerment (Kishor & Subaiya, 2008). This raises the need for researchers to clearly state what they are measuring and the theoretical basis behind the measure to ensure the validity of the measures.

Finally, it was observed that all the studies focused on the social and economic dimensions of empowerment totally ignoring the political and legal dimensions of empowerment. This gives an incomplete picture of empowerment since the legal and political dimensions play critical roles in enabling the other dimensions (Kishor, 1995; kabeer 1999; Malhotra and Schuler, 2005; Alkire, 2005; Kishore & Subaiya, 2008).

Lack of biomarkers testing for HIV and other STIs

Another limitation to this study is the lack of a biomarker tests for HIV and other STIs. The available studies are limited to findings about knowledge and attitude towards these infections. For example, DHS surveys in Nigeria does not collect data on bio-marker testing for STI and HIV. Survey questions are limited to enquiring whether a woman has ever tested for HIV or not. Other questions in the survey include belief about routes of infection and attitude towards a person with HIV (Kishor & Subaiya, 2008; National Population Commission [NPC], 2014) It is difficult to ascertain the relationship between empowerment and HIV or other STIs since we do not know the actual numbers of women who are infected or not. Future studies need to invest in a bio-marker testing component.

Systematic Review Limitations

In addition to the limitations listed above, this review was subject to the all the inherent flaws (limitations and biases) associated with a systematic literature review. Some of these limitations include bias in the selection of studies and publication bias. Our search was conducted using electronic databases, we could have missed studies that are yet to be indexed. Second, our search was limited to studies in English or those with an English translation, we could have missed studies published in other languages. It is therefore necessary for readers to interpret the findings with caution since some of the studies we have might have missed could have stronger or contradictory findings.

Recommendation of future research

Based on the gaps identified from this review I make several research, policy and intervention recommendations. First, I recommend that additional research measuring other dimensions of women's empowerment be carried out. These dimensions include psychological, legal and political dimensions. The studies will provide a more accurate explanation of relationships between empowerment and SRH outcomes. I also recommend that some of these studies should be carried out in countries that have poor empowerment and gender equality indices, as this will help understand the barriers and also provide insight on strategies to improve these indices.

Second, I recommend that researchers and other experts from the various realms of empowerment form a multidisciplinary team that will harmonize the measures of women's empowerment. A harmonized measure will not only ensure comparability of

studies across time and space but will also lead to the easier implementation and evaluation of policies and interventions.

Third, I recommend qualitative studies (focus groups and interviews) to capture the in-depth perspectives of the participants. This will help policy makers and implementers understand the subtle nuances within the communities which serve as barriers to both women's empowerment and sexual reproductive health. The areas where both overlap might be the low hanging fruits which will provide the most gains in the efforts to improve the life of women.

Finally, I recommend that governments should enact laws and put in place policies or structures that will ensure women's empowerment socially, economically, legally and politically. This can be achieved through education and re-orientation of communities about the gender roles. Several countries already have these laws but lack the mechanism to enforce them.

2.5. Conclusion

This review has provided more insight to existing knowledge by presenting the current state of research on women's empowerment and Sexual/Reproductive Health in Africa. Findings from the study have demonstrated that sexual and reproductive health outcomes are improved when women are empowered. An improvement in the sexual/ reproductive health of women will eventually lead to a significant improvement of the overall health of women and the population in general (WHO, 2018a).

3. MEASUREMENT AND TRENDS OF WOMEN'S EMPOWERMENT IN NIGERIA

3.1. Background

Women's Empowerment

Empowerment is defined as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them" (Kabeer, 2001). Based on this definition, the European Institute for Gender Equality [EIGE] (2008) defined women's empowerment as "the process by which women gain power/control over their lives and acquire the ability to make strategic choices." Women's empowerment is affected by the existing norms and gender relations within society. (Swain & Wallentin, 2009)Swain & Wallentin (2009) described women's empowerment as a process in which women challenge the existing norms and culture to effectively improve their well-being''. Studies have demonstrated that it is only when harmful norms and inequitable gender roles are reversed that women can successfully be empowered (Alsop & Heinsohn, 2005; Alsop et al., 2006; Kabeer, 1999; Kabeer, 2005; Malhotra et al., 2002; WHO, 2018; World Bank, 2018).

Women's empowerment is a difficult construct to measure. It is a product of three closely interrelated domains: agency, resources, and achievements. To fully attain empowerment, all three domains have to be achieved (Kabeer, 2005). Agency is the process by which choices are made and put into effect. It is affected by both "cultural and ideological norms that determine a person's ability to implement choices and by institutional biases which reduce people's ability to make strategic life choices" (Kabeer,

2005). Achievements are the outcomes of agency, while resources "are the medium through which agency is exercised (Kabeer, 1999; 2005). Resources are obtained through relationships and institutions in a society, such as marriage, family, and religious groups (Alsop & Heinsohn, 2005; Kabeer 1999; 2005; Malhotra *et al*., 2002). In view of the complexity of the construct, EIGE (2013) expanded the scope of women's empowerment to include "women's sense of self-worth, right to choose, right to have access to opportunities and resources, right to have control of their lives both within and outside the home and the right to exercises their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally" (EIGE, 2013). Simply put, women's empowerment is the "process of women gaining power after it had been taken away from them" (Kabeer, 1991; 2005).

Women's empowerment and health

Women's empowerment has been proposed as a strategy to address the social, economic, and, health problems of the developing countries. Studies have shown that "societies where women have the same opportunities, access to resources, and life choices as men achieve higher rates of development, improved health, poverty reduction and, economic growth" (UN Women 2015). This has led to a renewed focus on gender equality and women's empowerment. The 3rd Millennium Development Goal (MDG) and the 5th Sustainable Development Goal (SDG) aim to "achieve gender equality and empower all women and girls." The positive relationship between health and women's empowerment has long been established. Women's empowerment improves sexual/reproductive health, maternal health and child health (Asaolu et al., 2017; Bloom

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et al., 2001; Conroy et al., 2016; Corroon et al., 2014; Hindin and Adair 2002; Hindin, 2000; James-Hawkins et al., 2016; Pratley, 2016; Upadhyay et al., 2014; Yount et al., 2014).

Women's empowerment in Africa

African women are among the most disempowered women in the world (Asaolu et al., 2017; UN Women, 2015). Most African countries are patriarchal societies where women are considered to be subordinate to men(Nwagbara et al., 2012; Women in law and development in Africa [WILDAF], n.d.). These societies have several norms and cultural practices that put women at a disadvantage. Additionally, African women have a low literacy level, poor economic status, poor health indices and suffer a significant amount of gender violence (Kishor & Subaiya, 2008; Nwagbara et al., 2012; Waltermaurer, 2012).

Nigeria, like other African countries, has very low levels of women empowerment (UN Women, 2015; WILDAF, n.d). Although there have been some gains in gender issues since the inception of the 3rd MDG and 5th SDG, a considerable gap remains. The Millennium Development Goals End-Point Report (2015) reported that Nigeria had attained "Strong progress in gender parity but weak progress in women empowerment." For example, Nigerian women are still not attaining secondary or tertiary education, they are mostly unemployed or employed in agriculture and other low paying jobs (Kishor & Subaiya 2008; United Nations, 2015). Furthermore, a significant number of Nigerian women lack agency to make decisions about their health, mobility, and sexual decisions (Kishor & Subaiya 2008; Nwagbara et al., 2012; WILDAF, n.d).

Rationale of the current study

Measuring empowerment has been difficult for two main reasons. First, empowerment means different things to different communities. For example, a woman that is considered empowered in Egypt might be considered disempowered in the United States (Govindasamy & Malhotra, 1996; Kishor & Subaiya, 2008). Second, empowerment is a latent construct that is made up of the combination of several observable variables. These variables are often measured or combined differently depending on the researcher or the availability of data being measured. Existing literature showed a lack of consensus on how to measure empowerment (Asaolu et al., 2018; Dworkin et al., 2017; Ewerling et al., 2017; Pratley & Sandberg, 2018; Presser & Sen, 2000; Richardson, 2018). Reviews have found that a lot of researchers used one or more observed variables as proxies to measure empowerment (Ewerling et al., 2017; Pratley, 2017; Richardson, 2016). These studies treated empowerment as a single-dimensional variable rather than the complex construct it is. For example, Sipsma et al., (2014) used intimate partner violence as a proxy for empowerment while Asaolu et al., (2017) used household decision making as a proxy for empowerment. By choosing to use a single construct, the researchers ignored the effects of other domains on empowerment.

Several studies have attempted to solve this problem by creating indexes. However, these studies were found to have some limitations. First, several of the studies created summative indexes that divided the women into binary categories of empowered and not empowered. By creating a summative index, the authors give equal weights to

all items in the scale. Such an approach ignores the complexity of empowerment and its multidimensional nature. Previous studies have demonstrated that each domain of empowerment exerts a different but important effect on the whole construct. The degree of the effect varies with each country, culture, and social norms (Kshor & Subaiya, 2008). The absences of a uniform scale make it difficult to compare levels of empowerment.

A significant number of these studies did not report the theoretical basis for the reation of categories, data appeared to be categorized arbitrarily. For example, Mutowo, Kasu & Mufunda (2014) created a summative index that awarded 35 points. Women were scored as lowly empowered (0-17points), moderately empowered (18-24 points) and, highly empowered (>25 points) while Palumeni & Adebowole, (2014) disaggregated his scores into four categories (highly empowered = ≥70%; fairly empowered = 50-59%; poorly empowered = 40-49% and not empowered < 40%. Both of these studies did not report the theoretical or methodological basis for their categories.

Second, there is a lack of studies measuring the trend of women's empowerment. Most of the available studies on women's empowerment were cross-sectional studies providing information about a particular point in time. This does not allow us to observe changes over time. Empowerment is a gradual process, and its maximum impact is felt over time. Understanding the trend of empowerment is critical in identifying the patterns of change and leverage points, which can be used for making timely interventions and responsive policies (Chao et al., 2018).

Finally, there are very few studies that measure women's empowerment in Nigeria. Nigeria is the most populous country in Africa. In 2018 the estimated population was 180 million, half of which (51%) are women (NPC, 2018). Several studies suggest that Nigerian women are disempowered (UN Women, 2017; Nwagbara et al., 2012; WILDAF, n.d). Nigeria is one of the countries that adopted the SDGs; it is also a signatory to several international agreements that aim at improving the lives of women and children (UN Women, 2017; UN, 2015). This has led to the implementation of several empowerment policies and interventions. The absence of a uniform index to measure empowerment has made it difficult to monitor and evaluate the level and effects of policies and program interventions. In 2017, a group of researchers (Ewerling et al.) developed the Survey-based Women's emPowERment index (SWPER) to provide a uniform index for use in developing countries. This index has not been validated for use in Nigeria.

Research objectives

To address the above literature gaps, this study is designed to test the performance of the Survey-based Women's emPowERment index (SWPER) and measure the trend of women's empowerment in Nigeria from 2003 to 2013. The study will answer the following research questions

1. Is the SWPER index appropriate for measuring women's empowerment in Nigeria?

Hypothesis 1: The "SWPER" index is valid & reliable for use among Nigerian women.

Hypothesis 2: Women's empowerment variables can be reduced to a few factors that appropriately measure the empowerment construct.

2. What is the current status and trend of women's empowerment among Nigerian women?

Hypothesis 3: The empowerment status of Nigerian women has been steadily increasing from 2003 to 2013**.**

3.2. Methods

Data source

The study was a secondary data analysis of the Nigerian Demographic Health Surveys (NDHS) of 2003, 2008 and, 2013. Demographic Health Surveys are nationally representative surveys conducted every four years in over 70 developing countries around the world. The surveys were conducted by the United States Agency for International Development (USAID) through Macro International or ICF International in collaboration with the relevant agencies of each country. The purpose of the surveys was "to provide up-to-date data on fertility, family planning, marriage, maternal and child mortality, child feeding practices, nutritional and health status of women and children"(National Population Commission [NPC], 2003, 2008, 2014). The more recent surveys also provided data on the awareness and attitudes regarding domestic violence, HIV/AIDS, and STIs. Demographic Health Surveys (DHS) are available on http://www.dhsprogram.com/data/available-gfdatasets.cfm.

Nigeria has had five waves of Demographic Health Surveys (1990, 1999, 2003, 2008, and 2013). The Nigerian Demographic Health Surveys (NDHS) were funded and

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technically supported by USAID through Macron international and ICF International. The surveys were implemented by the National Population Commission (NPC). Additional support was provided by the United Nations Population Fund (UNFPA) and the United Kingdom Department for International Development (DFID).

Data collection

Nigerian Demographic Health Survey's data was collected at the national, zonal, and state level. Data collection took place in all the 36 states and the Federal Capital Territory. Data collection for the NDHS 2003 took place from March to September 2003 (NPC, 2003). Data collection for the NDHS 2008 took place from June to October 2008, and data collection for NDHS 2013 survey took place from December 2012 to January 2013(NPC, 2008; 2014). DHS data is self-reported. Questionnaires were administered through face to face interviews with the women.

Study population

The study population was made up of women aged 15-49 years old who were currently residing in Nigeria. A nationally representative sample was selected using a three-stage stratified cluster design sampling. The first stage of sampling consisted of clusters selected from urban and rural areas, as recommended by the Nigeria Population Commission. The second stage of sampling was selected at the household level, while the third stage was made up of the individual samples of women aged 15-49 years. DHS 2003 sampled 365 clusters that yielded a sample size of 7,620 women. DHS 2008 sampled, 888 clusters (286 urban & 602 rural) that yielded a sample size of 33,385 women. DHS 2013 sampled 904 clusters (372 urban & 532 rural), 40,680 households

with a sample size of 38,948 women (NPC, 2003; 2005 & 2014). All three waves had

response rates of greater than 95%. The three waves of survey (2003, 2008 & 2013)

provided total data of 79,953 women.

Sample size

This study analyzed data from a sample of 53,788 women aggregated from the

three waves of surveys (DHS 2003=4,725, DHS 2008=22,563 & DHS 2013= 25,600).

The sample size was limited to the number of women who had complete data in the

women's empowerment module. Missing data across the different variables ranged from

0-31%. Data were checked and found to be missing at random. Miss table, mvpatterns

and, misschk suites from STATA were used to check the patterns of missing data. A new

variable "completeness" was generated, women with complete data were scored "0" and

those with incomplete data were scored "1". The newly generated variable was used in a

logistics regression with 10 variables (wealth index, education, religion, region,

urban/rural and the 5 outcome variables). All but 1 (urban/rural residence) of the tests

were not significant suggesting that data was missing at random (MAR) but not

completely at random (MCAR). Thereafter, complete case analysis was used to run all

the analysis. It is recommended that when conducting factor analysis, "cases with

missing values should be deleted to prevent overestimation" (Bernaards & Sijtsma,

1999; Tabachnick et al., 2007). Table 3.1 shows the percentages of missing value per

survey.

Table 3.1. Distribution of missing data

Characteristics of participants	2003 (% missing)	2008 (% missing)	2013 (% missing)
Sociodemographic variables			
Age	0	0	0
Education	0	0	0
Working	0	0	0.09
Wealth Index	0	0	0
Rural urban	0	0	0
Religion	0	0	0.43
Region	0	0	0
Empowerment variables			
Respondent's health care?	0	28.45	30
large household purchases	0	28.49	30.12
Visits to family or relatives?	0	28.47	30.14
If wife goes out without telling husband	0	0	0.11
If wife argues with husband	0	0	0.12
If wife neglects the children	0	0	0.16
If wife refuses to have sex with husband	0	0	0.13
If wife burns the food	0	0	0.13
Reading newspaper/ magazine	0	0	0.55
Employed	0	0	0.09
Years of Education	0	0	26
Education difference	0	0	30
Age at first cohabitation	0	0	25
Age at first birth	0	0	25
Partners age difference	0	0	0

Index selection

A quick review of the available indexes showed that most of them were not suitable for the level of my analysis (individual and household). These indexes were mainly created to estimate macro (national) level data for comparisons between countries. They are limited in providing within-country comparisons and subgroup analysis. Examples of these indexes include the African Gender and Development Index (UNECA, 2011); Gender Inequality Index (Social watch, 2010); African Women's Progress Scoreboard; Gender Empowerment Measure; Gender Gap Index, and Gender Development Index (UNDP, 1995). Other indexes that measured data at the individual level were focused on gender equality rather than empowerment. They often required the availability of male data for comparison. Examples of these indexes are Gender-Equality Index (Social watch, 2010); Women's Empowerment in Agriculture Index (Alkire et al., 2013).

I chose to use the SWPER index because it is the best fit for my data (DHS). SWPER has been recommended as a suitable index for the measurement of women's empowerment using DHS data collected in Sub-Saharan Africa (Ewerling et al., 2017; Raj, 2017). The index was developed with the purpose of providing a uniform index that is suitable for "within-country and between-country comparison" (Ewerling et al., 2017; Raj, 2017). SWPER was developed by reducing 15 observed variables to 3 components using Principal Component Analysis (PCA). The authors analyzed a large pool of DHS data from 34 countries. External validity for SWPER index was tested through its

correlation with the Gender Development Index (Ewerling et al., 2017). Components identified by SWPER account for all the domains of empowerment of women empowerment that were associated with reproductive health in Nigeria (Kishor & Subaiya, 2008). The index has 15 items. Each of these items is related to a subdomain of women's empowerment. The subdomains are expected to measure gender roles, agency and social independence.

Women's attitude toward intimate partner violence (gender roles)

This domain is made up items that that asses the woman's acceptance of wife beating in 5 different scenarios. The items were scored as -1 if she believes that violence is justified. It was scored as 1 if she believes IPV is not justified and 0 if she doesn't know. The Items are as follows:

1.   Beating is not justified if wife goes out without telling husband.

2.   Beating is not justified if wife neglects the children.

3.   Beating is not justified if wife argues with husband.

4.   Beating not justified if wife refuses to have sex with husband.

5.   Beating not justified if wife burns the food.

Justified= –1; don't know=0; Not justified =1

Women's decision making (Agency)

This domain is made up items that that asses the woman's decision making in 3 different scenarios. The items were scored as 1 if she makes a decision alone or with partner. It was scored 0 if she makes the decision jointly with others and scored as -1 if she makes no input in decision making. The Items are as follows:

1.   Who usually decides on the respondent's health care?

2.   Who usually decides on large household purchases?

3.   Who usually decides on visits to family or relatives?

Husband or other alone= –1; joint=0 respondent alone=1

Social independence

This domain was assessed by 7 socio-demographic characteristics of the woman.

The Items are as follows:

1.   Frequency of reading newspaper or magazine

Not at all=0; <once a week=1; ≥once a week=2

2.   Respondent worked in the past 12 months

No=0; in the past year=1; currently working=2

3.   Woman's education

Categories less the primary school=0; completed primary school =1

Completed college =2

4.   Education difference

Women minus husbands completed years of schooling (Years)

5.   Spousal age difference

Woman's age minus husbands age (Years)

6.   Age at first cohabitation (Years)

7.   Age of woman at first birth (Years)

Data analysis

Statistical analyses were performed using Stata/IC 15.0 (StataCorp). All analyses were performed using Stata's 'svy' command to adjust for the sample design (clustering) and differences in response rates. Sample weights were provided by DHS (DHS, 2019).

Descriptive data analyses

Data analysis included a descriptive analysis of study participants. I explored the socio-demographic characteristics of the respondents. The socio-demographic factors listed above were those that have been associated with women's empowerment in the literature. Table 3.2 describes the sociodemographic characteristics of the study population, while table 3.3 provides the distribution of women empowerment variables among this population.

Factor analysis

A women's empowerment index was created using factor analysis. Factor analysis was performed to identify the underlying structure of the survey responses (observed data) and how they loaded on to the relevant domains of the latent variable (Kline, 2014; Mulcahy, 2006). Additionally, factor analysis tested the validity of the SWPER using Nigerian data since the index was previously developed and validated using data from other countries (Ewerling et al., 2017). Factors with Eigen values of greater than 1.00 were selected according to the Guttman–Kaiser criterion. The presence of elbow joints on scree plots and Kaiser-Meyer-Olkin measure (KMO) of greater 0.5 were also considered. Factor loadings greater than 6 were considered to be high, while

those greater than 3 were considered to be moderately high (Kline, 2014; Yeomans & Golder, 1982).

Orthogonal rotations using Varimax/Promax and Oblique rotations using oblique oblim were used to rotate the components (Kline, 2014). An empowerment index was predicted from the three factors retained. The index measured women's decision-making scores, attitude to wife-beating scores, social independence scores. Cronbach's alpha was measured to ensure reliability or internal consistency of the index (Tavakol & Dennick, 2011). All analyses were conducted with Stata (version 14) using the factormat functions. Tables 3, 4, and 5 provide the Eigen values and variance from the factor analysis, while tables 6, 7, and 8 provide the factor loadings of the variables identified by factor analysis. Weighted factor scores were generated using the predict function.

3.3. Results

Socio-demographic characteristics of study participants

Table 3.2 displays the socio-demographic characteristics of Nigerian women from 2003 to 2013. The average ages of the women in 2003, 2008 & 2013 were 28.02 years, 28.65 years & 28.86 years, respectively. A large proportion of the women surveyed had no formal education (48.70%, 47.21% & 48.52% in 2003, 2008 & 2013, respectively). There appeared to be some increase in the trend of formal education. The proportion of women who attained higher education increased from 5.62% in 2003 to 7.24% in 2008 & 7.59% in 2013.

In all the surveys, women interviewed were divided into five wealth quintiles. Each quintile contains about 20% of the women. Most (>65%) of the women were

employed. About 40% of the women surveyed were Christians, while about 60% were Muslims. Majority of these women lived in rural areas (64.58% in 2003, 68.67% in 2008 & 63.48% in 2013). The highest proportions of women resided in the North-western region (36.48%, 30.18% & 37.34% respectively), while the South-eastern region had the least proportion of women (7.66%, 9.05% & 8.01 %). The rest of the women are uniformly spread across the other geopolitical regions.

Table 3.2. Sociodemographic characteristics of participants

Characteristics	2003 % n= 4, 725	2008 % n= 22, 563	2013 % n= 25,600
Age			
15-19	9.68	7.9	8.21
20-29	39.68	37.13	37.05
30-39	30.92	32.94	33.16
40-49	19.72	22.04	21.57
Education			
No education	48.70	47.21	48.52
Primary	22.47	21.73	18.61
Secondary	23.21	23.79	25.29
Higher	5.62	7.24	7.59
Employment			
Not working	34.71	37.17	30.79
Working	65.29	67.16	69.21
Wealth index			
Poorest	16.85	23.29	23.56
Poorer	19.55	21.07	21.27
Middle	21.22	17.74	17.25
Richer	19.96	17.83	17.85
richest	22.42	20.07	19.96
Residence			
Urban	25.42	31.33	36.52
Rural	64.58	68.67	63.48
Region			
North-central	12.23	14.10	12.86
North-east	18.79	15.21	17.09
North-west	36.48	30.18	37.34
South-east	7.66	9.05	8.01
South-south	14.07	12.73	9.67
South-west	10.77	18.73	15.02
Religion			
Christian	38.27	45.46	39.48
Islam	61.73	54.54	60.52

Weighted scores.

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Empowerment characteristics of study participants

This study found that the proportion of women who took part in any of the decision-making variables has been gradually increasing from 2003 to 2013. Women who made decisions about their health care alone or jointly with a partner increased from 25.54% in 2003 to 30.78% in 2008 & 39.04% in 2013. Women who made decisions about large household purchases increased from 21.38% in 2003 to 37.40% in 2008 & 37.88% in 2013, while those who made decisions about visits to family or relatives increased from 39.72% in 2003 to 55.01% in 2008 & 47.58% in 2013. The rest of the women did not take part in any of the decision-making.

Acceptance of negative gender roles (justification for wife-beating) was also found to be high among the women surveyed, although there appears to be a gradual reduction in acceptance rates from 2003 to 2013. This study found that acceptance of a husband's justification to beat his wife if she goes out without telling him decreased from 58.65% in 2003 to 34.95% in 2008 & 27.55% in 2013. Acceptance of wife-beating if she neglected the children also decreased from 51.29% in 2003 to 32.09% in 2008 & 25.69% in 2013 while justification of wife-beating if she argued with spouse decreased from 45.42% in 2003 to 30.04% in 2008 & 22.77% in 2013. Justification of wife-beating if she refused to have sex with her husband also decreased from 41.18% in 2003 to 29.21% in 2008 & 21.49% in 2013. Justification of wife-beating if wife burnt the food was found to have the least acceptance rates. It decreased from 17.46% in 2003 to 17.40% in 2008 & 15.78% in 2013.

In general, all the social factors surveyed are poor. The women started cohabiting at a young age. The average age of cohabitation in 2003 was 16.92 years, which increased slightly to 17.54 years in 2008 & 17.82 years in 2013. These women also had their first childbirth at a young age; the average age of first childbirth in 2003 was 18.7 years. There was a slight increase to 19.23 years in 2008 & 19.46 years in 2013. This study also found a large age and educational -differences between spouses. On the average, the male partners were 11 years older than their female partners (2003=11.27 years; 2008=10.55 years & 2013= 10.44 years), they also had an average educational difference of 1.4 years (2003=1.6; 2008=1.41 & 2013= 1.45). Despite these findings, there appeared to be some degree of economic empowerment among the surveyed women. Most (>65%) of the women surveyed were employed. The proportion of women employed increased from 65.29% in 2003 to 67.41% in 2008 & 69.21% in 2013. Table 3.3 depicts the empowerment characteristics of the participants.

Table 3.3. Distribution of women's empowerment variables

Characteristics	2003 % n= 4, 725	2008 % n= 22, 563	2015 % n=25,600
Joint decision making			
Respondent's health care?	25.54	30.78	39.04
Large household purchases	21.38	37.40	37.88
Visits to family or relatives?	39.72	55.01	47.58
Justification of wife-beating if			
Goes out without telling husband	58.65	34.95	27.55
Neglects the children	51.29	32.09	25.69
Argues with husband	45.42	30.04	22.77
Refuses to have sex with husband	41.18	29.21	21.49
Burns the food	17.46	17.40	15.78
Socio-demographic characteristics			
Reading newspaper/ magazine	19.02	17.54	15.64
Employed	65.29	67.41	69.21
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Age	28.02 (9.6)	28.65 (9.5)	28.86 (9.69)
Years of education	5.30 (5.09)	5.60 (5.32)	6.29 (5.44)
Education difference in years	-1.61 (4.39)	-1.41 (4.24)	-1.45 (4.34)
Age at first cohabitation	16.92 (4.34)	17.54 (4.58)	17.82 (4.61)
Age at first birth	18.7 (4.14)	19.23 (4.39)	19.46 (4.45)
Partners age difference	-11.27 (7.93)	-10.55 (7.66)	-10.44 (7.54)

Weighted scores.

Index creation and Factor analysis

Factor analysis from the three waves of surveys demonstrated that the data was best reduced to three factors. The choice to retain three factors was made based on the Guttman–Kaiser criterion, scree plots and, Kaiser-Meyer-Olkin measure (KMO). In this study, the three factors identified explained more than 80% of the variance in each survey. All three surveys had KMO values greater than 0.80 (2003= 0.801; 2008= 0.805

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& 2013= 0.819) and scree plots with 3 factors above the elbow. Figures 3.1, 3.2, and 3.3

are scree plots of NDHS 2003, 2008 & 2013, respectively.
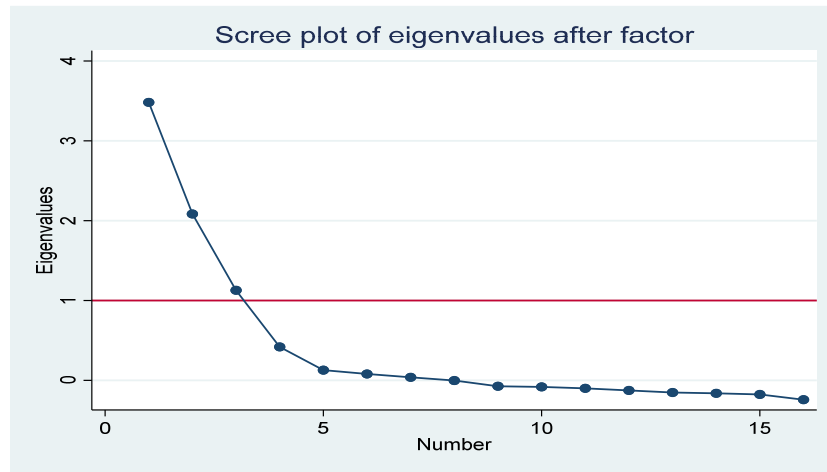
Figure 3.1. Scree plot of Eigen values 2013
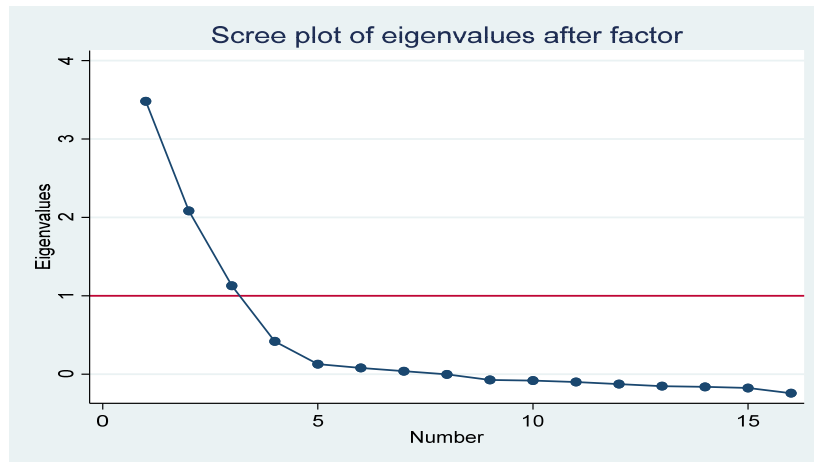
Figure 3.2. Scree plot of Eigen values 2008
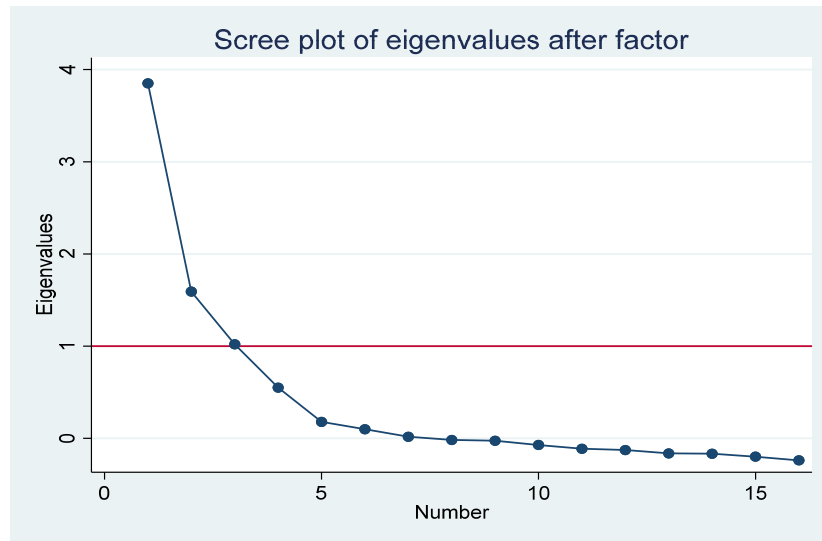
Figure 3.3. Scree plot of Eigen values 2003

The first factor identified by this study was made up of variables related to women's attitudes towards gender violence. This factor was labeled as "attitude" in the analysis. The second factor was made up of variables related to women's social independence which, was labeled as "social." While the third factor was made up of variables related to the women's decision-making status, which was labeled as "agency."

Tables 3.4 3.5 and, 3.6 provide the Eigen values and variance for each survey. In all the surveys the first factor (attitude) explained over 50% of the variance (2013=55%; 2008=55% & 2003=62%). This factor had Eigen values greater than 1 (2013=3.88; 2008=3.48 & 2003=3.85). The second factor (social) also had Eigen values greater than 1 (2013=2.37; 2008=2.08 & 2003=1.59). The factor explained 26-33% of the variance (2013=33% 2008= 33% & 2003=26). While the third factor (decision making) explained

the remaining 16-18% of the variance (2013=16%; 2008=18% & 2003=16%). Eigen values for the third factor were 1.14 in 2013; 1.13 in 2008 & 1.02 in 2003.

All the surveys had overall KMO values greater than the selected cutoff point of 0.5 (2013=0.819; 2008=0.805 & 2003=0.801). All the three factors had acceptable Cronbach's alphas. The Cronbach's alphas were as follows, attitude (2013= 0.89; 2008=0.88 & 2003=0.88); social (2013=0.89; 2008=0.69 & 2003=0.70); agency (2013=0.68; 2008=0.64 & 2003=0.69). Cronbach's alpha greater than 0.7 indicated reliability and internal consistency of a scale (Tavakol & Dennick, 2011).

Table 3.4. Factor analysis (Eigen values and Variance) 2013

Component name	Eigenvalue	Proportion Variance	Cumulative Variance	Cronbach's alpha
Attitude to violence	3.8789	0.5454	0.5454	0.89
Social factors	2.3660	0.3327	0.8782	0.89
Decision making	1.1419	0.1606	1.0388	0.68

Table 3.5. Factor analysis (Eigen values and Variance) 2008

Component name	Eigenvalue	Proportion Variance	Cumulative Variance	Cronbach's alpha
Attitude to violence	3.4813	0.5582	0.5582	0.88
Social factors	2.083	0.3341	0.8923	0.69
Decision making	1.128	0.1809	1.0732	0.64

Table 3.6. Factor analysis (Eigen values and Variance) 2003

Component name	Eigenvalue	Proportion Variance	Cumulative Variance	Cronbach's alpha
Attitude to violence	3.851	0.622	0.622	0.88
Social factors	1.592	0.257	0.879	0.70
Decision making	1.020	0.164	1.044	0.69

Factor Loadings

Five items loaded on the first factor in all three surveys. The five items were all related to women's attitudes towards gender violence. The first item was the justification of wife-beating if she goes out without telling her husband. It had factor loadings of 0.778 in 2013; 0.802 in 2008 & 0.703 in 2003. The second item was the justification of

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wife-beating if she argues with her husband, it had factor loadings of 0.807 in 2013, 0.820 in 2008 & 0.803 in 2003. The third item (justification of wife-beating if she neglects children) had factor loadings of 0.820 in 2013, 0.779 in 2008 & 0.818 in 2003. The fourth and fifth factors (justification of wife-beating if she refuses sex and if she burns food) also had high factor loadings. Item 4 had the following factor loadings (2013=0.761; 2008=0.716 & 2003= 0.734), while item 5 had the following factor loadings (2013=0.727; 2008= 0.681 & 2003=0.738). Factor loadings greater than 0.6 were considered to be high, while those greater than 0.3 were moderately high. Factor loadings less than 0.3 were considered to be non-significant (Kline, 1994).

Four variables loaded on the second factor. These factors were related to the woman's social characteristics. The first item to load on this factor was the woman's education level (factor loadings in 2013= 0.637; 2008=0.640 & 2003=0.704). The second item was the frequency of reading a newspaper or magazine (factor loadings in 2013= 0.477; 2008=0.411 & 2003=0.553). The third item was the woman's age at first birth (factor loadings in 2013=0.783; 2008=0.717 & 2003=0.697), while the fourth factor was the woman's age at first cohabitation (factor loadings in 2013=0.820; 2008= 0.778 & 2003= 0.765). All four factors had high factor loadings.

Four items loaded on the third factor. These factors were related to decision making and employment. The decision-making items include decision making about the respondent's health care (factor loadings 2013= 0.785; 2008=0.770 & 2003=0.635); decision making about large household purchases (factor loadings 2013=0.753; 2008=0.711 & 2003=0.655); decision making on visitation to family or relatives (factor

loadings 2013= 0.723; 2008=0.691 & 2003=515). Employment loaded inconsistently in

the three surveys. It had a moderate factor loading in 2013 (0.317) but did not load well

in 2008 and 2003 (0.244 & 0.294 respectively). Educational difference and age

difference between cohabiting partners had insignificant factor loadings and thus left out

of the final analysis. Tables 3.7, 3.8, and 3.9 shows factor loadings of NDHS 2003,

2008 & 2013, respectively while Figure 3.4 is a graph depicting the different factor

loadings.
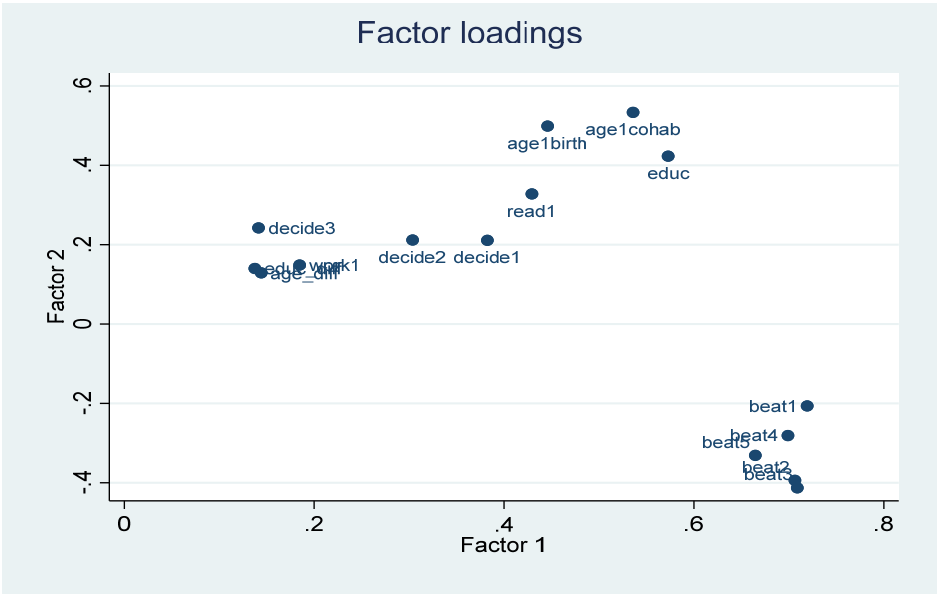
Figure 3.4. Graph of factor loadings

Table 3.7. Factor loadings in 2013

Items on scale	Factor 1 (Attitude to violence)	Factor 2 (Decision making)	Factor3 (Social factors)
Beating is justified			
If wife goes out without telling husband	0.7777	<.3	<.3
If wife argues with husband	0.8067	<3	<3
If wife neglects the children	0.8202	<.3	<.3
If wife refuses to have sex with husband	0.7614	<.3	<.3
If wife burns the food	0.7269	<.3	<.3
Who makes the final decisions			
Respondent's health care?	<.3	<.3	0.7849
large household purchases	<.3	<.3	0.7525
Visits to family or relatives?	<.3	<.3	0.7234
Social-demographic characteristics			
Education	<.3	0.6365	<.3
Employed	<.3	<.3	0.3170
Reading newspaper/ magazine	<3	0.4766	<3
Age at first birth	<.3	0.7833	<.3
Education difference	<.3	<.3	<.3
Age difference	<.3	<.3	<.3
Age at first cohabitation	<.3	0.8206	<.3

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Table 3.8. Factor loadings in 2008

Items on scale	Factor 1 (Attitude to violence)	Factor 2 (Decision making)	Factor3 (Social factors)
Beating is justified			
If wife goes out without telling husband	0.8018	<.3	<.3
If wife argues with husband	0.8201	<.3	<.3
If wife neglects the children	0.7786	<.3	<.3
If wife refuses to have sex with husband	0.7155	<.3	<.3
If wife burns the food	0.6806	<.3	<.3
Who makes the final decisions about			
Respondent's health care?	<.3	<.3	0.7704
large household purchases	<.3	<.3	0.7107
Visits to family or relatives?	<.3	<.3	0.6908
Socio-demographic characteristics			
Education	<.3	0.6397	<.3
Employed	<.3	<.3	0.2437
Reading newspaper/ magazine	<.3	0.4111	<.3
Age at first birth	<.3	0.7169	<.3
Education difference	<.3	<.3	<.3
Age difference	<.3	<.3	<.3
Age at first cohabitation	<.3	0.7774	<.3

Table 3.9. Factor loadings in 2003

Items on scale	Factor 1 (Attitude to violence)	Factor 2 (Decision making)	Factor3 (Social factors)
Beating is justified			
If wife goes out without telling husband	0.7034	<.3	<.3
If wife argues with husband	0.8034	<.3	<.3
If wife neglects the children	0.8181	<.3	<.3
If refuses to have sex with husband	0.7338	<.3	<.3
if wife burns the food	0.7379	<.3	<.3
Who makes the final decisions about			
Who makes the final decisions about			
Respondent's health care?	<.3	<.3	0.6351 |
Large household purchases?	<.3	<.3	0.6547
Visits to family or relatives?	<.3	<.3	0.5145
Socio-demographic characteristics			
Education	<.3	0.7039	<.3
Employed	<.3	<.3	0.294
Reading newspaper/ magazine	<.3	0.5526	<.3
Age at first birth	<.3	0.6970	<.3
Education difference	<.3	<.3	<.3
Age difference	<.3	<.3	<.3
Age at first cohabitation	<.3	0.7649	<.3

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3.4. Discussion

Measuring empowerment

This study is one of the first studies to use data reduction methods (factor analysis) to measure women's empowerment in Nigeria. Empowerment is a complex construct that is difficult to measure. Studies have shown that it is best measured by a scale or an index which captures its multiple domains (Asaolu,2018; Ewerling et al., 2017; Kabeer, 2005; Kishor & Subaiya, 2008; Malhotra et al., 2001; Pratley et al., 2017; Richardson, 2016). This study showed that women's empowerment in Nigeria is best explained by three factors (decision making, attitude towards gender violence, and social independence). The three factors identified closely aligned with the domains of empowerment described by Kabeer (2005) & Malhotra et al. (2001). Kabeer (2005) reported that empowerment is a product of three closely interrelated components: agency, resources, and achievements. The decision making and attitude to gender violence factors identified by this study represent women's agency as described by Kabeer while the social independence factor represents both the resources and achievement domains of empowerment (Asaolu, 2018; Ewerling et al., 2017; Kishore & Subaiya, 2008; Richardson, 2016).

This study validated Ewerling et al's claim that the SWPER index is suitable for measuring empowerment in Africa using the DHS. When applied to Nigerian data the index found similar results as other 33 African countries (Ewerling et al., 2017). The results were consistent through the 3 cycles of survey even though factor analysis was used rather than principal component analysis (PCA) as used by Ewerling et al. (2017).

Identifying a tool that adequately uses DHS data to measure empowerment is a major

step towards harmonizing the measurement of empowerment since most developing

countries rely on DHS as its primary source of health data. DHS is one of the most

widespread and comparable surveys across the world. The questionnaires are usually the

same across the board with minor modifications to suit the individual needs of different

countries (DHS, 2019). The surveys are regularly conducted every five tears and usually

have large sample sizes of between 5,000 and 30,000 households (DHS, 2019). This

makes them suitable to follow trends.

Trend of women's empowerment status

The results from this study show that the empowerment scores of Nigerian

women have been steadily increasing from 2003 to 2013**.** Despite this increase, a lot of

Nigerian women are still disempowered. Garba (1997) defined women empowerment as

"a process of enhancing women's capacity to influence and participate in making

decisions which directly or indirectly affect their lives." Going by this definition, this

study shows that over 50% of Nigerian women were disempowered. These women

appear to have been denied the freedom to make life choices; less than 50% of the

women surveyed took part in decision making about their health, visitation to friends

and families, or even about household purchases. Furthermore, a significant portion of

them (20%) believed that some form of intimate partner violence was justified. This

indicates an acceptance of the unfavorable gender roles assigned to them. This finding

can be explained by the patriarchal nature of Nigeria where culture, social norms and

institutions are interacting to deny women agency and access to available resources(Makama, 2013; Nwagbara et al., 2012).

This study also found that Nigerian women have poor levels of social independence. Social independence reflects the historical decisions that affects women's access to available resources and their achievements. A significant proportion of the women surveyed lacked education, only about 25% of the women had completed secondary school, while only 8% had some form of college education. They also marry or start cohabitating at a young age. All these factors come together and form a vicious cycle of poverty and disempowerment. Studies have shown that women who marry at an early age were more likely to 1) have low levels of education since they have been taken out of school for marriage; 2) start having children at a young age with all the associated complications of early childbirth; 3) be married to older men and have lesser agency; 4) be unemployed or employed in menial/ low paying jobs (FMOH, 2012; NPC, 2003; 2008; 2014; WHO, 2018; UNFPA, 2018). This finding brings forth the need to educate the girl child. However it must be borne in mind that education alone will not solve the problem. The only way to improve the empowerment status of these women is to establish policies and interventions that address the underlying causes of the gender inequality. Findings from this study are in agreement previous studies (Kishore & Subaiya 2008; Nwagbara & Ering, 2007). Kabeer (2005) reports that lack of agency, negative gender roles, low educational attainment, lack of access to resources, and information are the cardinal signs of disempowerment in women.

Research and policy recommendations

1. Formation of multidisciplinary teams of researchers to harmonize the existing measures of women's empowerment. A harmonized measure will provide the means of inter and intra country comparability of studies and interventions. Harmonized measures should include a representation of all the other dimensions of women's empowerment (social, legal, economic and political).

2. Qualitative studies should be conducted to get a better understanding of the meanings and nuances associated with measuring women's empowerment in different communities. Women's empowerment can only occur when there is an understanding of the culture and norms of that community. Empowerment can be attained through the combination of "education, poverty alleviation and, re-orientation of communities about the gender roles" (United Nations, 2015). Qualitative studies will help identify the barriers and enabling conditions for empowerment.

3. Locally, Nigeria should enact laws and put in place structures to ensure women's empowerment in all spheres (socially, economically, legally and, politically). Nigeria already has several policies that support women's empowerment, the gap occurs as a result of poor implementation and enforcement of these policies (United Nations, 2015; UN Women 2017; WILDAF, n.d). Advocacy and political will is required to achieve women's empowerment in Nigeria.

Limitations of the study

This study is a secondary data analysis of cross-sectional data. Although I studied the trend of data from 2003 to 2013, each of these surveys was still just a cross-sectional survey. This type of data makes it difficult to demonstrate causality since each survey only provides us with a snapshot of the situation at a point in time. Secondly, secondary data analysis limits the researcher's ability to dig in and answer the research questions since the data was collected for purposes other than this study. Study findings are limited to data that is already available.

Additionally, data collection is through self-recall, which is associated with recall bias. A significant portion of this survey focuses on personal and sensitive information. This type of information is associated with social desirability bias. The women are likely to answer sensitive questions in a manner they believe is appropriate to their society. Finally, this survey has a significant amount of missing data. Missing data is always associated with some degree of bias, which should be taken into consideration when interpreting findings from the study.

Strengths of the study

The main strength of this study lies in its large sample size, which is disaggregated by regions. This study analyzed data from over 50,000 women. Secondly, the availability of data from three waves of surveys provides us with a means of observing the trend of women's empowerment in the absence of longitudinal data. The three surveys span over ten years.

Another strength of this study is that it used a validated scale and utilized factor analysis to identify the subdomains of empowerment in Nigeria. Empowerment sub-domains were not selected arbitrarily. Furthermore, the Cronbach's alpha for each of the sub-domains was calculated, thereby establishing reliability.

3.5. Conclusions

Empowerment plays a key role in improving the general wellbeing of women and their children. It is hoped that findings from this study have provided information that may be used to advocate for the improvement of women's status. To the best of my knowledge, there are very few studies that have utilized data reduction methods to identify latent variables that appropriately capture the sub-domains of empowerment. By using factor analysis to test the SWPER index on Nigerian data, we hope that it can now be used for monitoring and evaluating several of the empowerment programs implemented across the country. Achievements and failures can be compared to other countries so that lessons learned and best practices can be shared.

4. WOMEN'S EMPOWERMENT AND SEXUAL REPRODUCTIVE HEALTH (SRH) IN NIGERIA: PREVALENCE AND TREND

4.1. Background

Sexual and Reproductive Health (SRH) is not only a fundamental human right, "it is a key determinant to the overall health of women and their children" (WHO, 2017a; Starrs et al., 2018). SRH problems account for "one-third of all the health problems experienced by women between the ages of 15 and 44 years" (WHO, 2019a). African women suffer a disproportionate burden of SRH ill health. The World Bank (2019) reported that the lifetime risk of maternal death in Sub-Saharan Africa was 1 in 38, demonstrating a large disparity when compared to women from the more developed regions. The lifetime risk of maternal death among women in the European Union was 1 in 10,700 and 1 in 3,100 in North America. WHO (2017a) estimated that more than half of the world's maternal death occurred in Sub-Saharan Africa, with 20% occurring in Nigeria(Souza, 2019).

Antenatal Care (ANC) and Skilled Birth Attendance (SBA)

The high maternal mortality rates are attributed to poor uptake of antenatal care (ANC) and supervised birth attendance (SBA) as well as a significant unmet need for contraception. The World Health Organization (2019b) reported that while ANC coverage in the developed countries is over 91%, it is only 64% in Sub-Saharan Africa. Similarly, World Bank (2019a) reported that by the end of 2017, SBA in Sub-Saharan Africa was still less than 60%, while Europe, North America, Latin America, and the

Caribbean had all achieved over 91%(United Nations Childrens Funds[UNICEF], n.d.; World Bank, 2019a). ANC and SBA decrease maternal morbidity and mortality by preventing unplanned pregnancies, identifying and treating women at risk of pregnancy and delivery complications (Bloom et al., 1999, 2001; Corroon et al., 2014; World Health Organization [WHO], 2016). UNICEF (n.d.) reported a decline in maternal mortality among countries that have attained high levels of ANC & SBA. Several barriers to the uptake of ANC and SBA in Africa have been identified. These barriers include poverty, illiteracy, lack of access to health care services, gender inequality, culture, and pregnancy related social norms (Ahmed et al., 2010).

Sexually Transmitted Infections (STI)

African women also bear a larger proportion of the global STI burden, which is worsened by the advent of HIV infection (WHO, 2017a; 2018b). WHO (2018b), reports that between 5-85% of STI cases are in developing countries, with the highest-burden occurring in Sub-Saharan Africa. Having an STI predisposes women to HIV infection. This relationship occurs both as a result of biological and behavioral factors. CDC (2019) reported that "people who have an STI are five times more likely to get infected with HIV after exposure." The presence of an STI is often associated with sores and broken skin, which weaken biological barriers that help prevent HIV transmission (CDC, 2019). Furthermore, a person infected with STI is more likely to have engaged in high-risk sexual behaviors such as engaging in sexual intercourse without a condom or having multiple sexual partners (CDC, 2019).

Human Immunodeficiency Virus (HIV)

Globally, 37.9 million adults are living with HIV/AIDS (Joint United Nations Programme on HIV/AIDS [UNAIDS]., n.d.). Seventy-five percent of these people are in Africa. African women bear a disproportionate burden of HIV. UNAIDS (2018) reported that women account for 61% of the people living with HIV in Africa. Harris (2015) also found that among persons aged 15-24 years, the ratio of HIV infection among females and males is 3:1 and that every 4 out of 5 new infections in Sub-Saharan Africa occurred in young women aged 15-24 years. Both STI and HIV transmission can be prevented by 1) counseling and behavioral approaches, 2) use of barriers (condoms) during sexual activities, 3) vaccinations, 4) prompt diagnosis, and treatment of infections (CDC, 2019). In this study, we limit our analysis to condom use and HIV testing.

HIV testing is key to the control of the HIV epidemic. The only way to know your HIV status is by taking a test. Globally only about 75% of people infected with HIV have ever been diagnosed. The rates are significantly lower in Africa (UNAIDS, 2019). Studies have shown that HIV testing is the weakest link along the HIV continuum of care (Harries et al., 2016; Hill & Pozniak, 2015; UNAIDS, 2015; Levi et al., 2016). Barriers to HIV testing include a lack of awareness, poor access to testing services, fear of results, stigma, religious and sociocultural factors (Harries et al., 2016; Levi et al., 2016; Takarinda et al., 2016).

Condom use

Correct and consistent condom use serves the dual purpose of contraception and prevention of STI/HIV (CDC, 2019). WHO (2017) reported that 50 million new HIV

infections were averted by correct and consistent condom use. CDC (2019) also reported a marked reduction in rates of infection from HIV and other STIs following the increase in availability and uptake of condoms. Condom use in Africa remains low despite all efforts; poor uptake has been attributed to social norms and poor preventive health services (Agha et al., 2002). Other barriers to condom use include poor risk perception, dislike of condom, shame/stigma when purchasing a condom, and the lack of condom negotiation power by women (Agha et al., 2002; Conroy et al., 2016).

Sexual/Reproductive Health (SRH) in Nigeria

Nigerian women have very poor SRH. Contraception, maternal health, and condom use are low while HIV and other STIs are high (World Bank, 2019; WHO, 2018). Over 20% of the world's maternal deaths occur in Nigeria (Souza, 2019). UNICEF (2019) reported that only 62% of pregnant women attained the minimum required ANC visits of which only 43% had SBA. Additionally, World Bank (2019) also reported that only 28% of Nigerian women used any form of modern contraception. Condom use is low, only 51% of men and 49% of women reported condom use with last sexual intercourse (NARHS, 2012). STIs, especially HIV, are rising. There are 1.9 million people were living with HIV in Nigeria(National Agency for the Control of AIDS [NACA], 2018). Like most developing countries, Nigerian women bear a larger proportion of HIV burden. Women have a prevalence rate of 1.9% compared to 1.1% among men (NACA, 2018). HIV testing in Nigeria is also low, only 34% of Nigerians have ever been tested (NACA, 2015). The main barriers identified are poor access to health care and stigma (NACA, 2015; NARHS, 2012).

Women's empowerment and Sexual/Reproductive Health

Women's empowerment is "the process by which women gain power/control over their lives and acquire the ability to make strategic choices." (EIGE, 2008). An empowered woman has the "right to choose, right to have access to opportunities and resources, the right to have control of her life both within and outside the home" (EIGE, 2008). Empowering women has been identified as one of the strategies to improve the health, economic, and social wellbeing of women, their children, and society as a whole" (United Nations, 2015). United Nations (2015) designated women's empowerment and gender equality as the 3rd Millennium Development Goal (MDG) and 5th Sustainable Development Goal (SDG).

The relationship between women's empowerment and several components of SRH has previously been established (Corroon et al., 2014; James-Hawkins et al., 2016; Upadhyay et al., 2014; Yount et al., 2014). Empowerment is associated with increased uptake of ANC and SBA (Beegle et al. 2001; Pratley, 2016). It is also associated with an increase in the uptake of HIV testing, Venereal Disease Research Laboratory (VDRL), and other STI screening (Harris, 2015; Singh, Luseno, & Haney, 2013). Women's empowerment leads to improved SRH when women acquire knowledge and agency to make healthy choices (Fagbamigbe & Idemudia, 2015; WHO, 2015) or when it brings about a reduction in barriers to accessing health care services. For example, empowered women are more likely to be educated, get a job, and be economically empowered (World Bank, 2019). Economic empowerment has been associated with improvement in all aspects of SRH. Education and access to media are also associated with an increased

awareness of harmful gender and social norms that put women at risk of SRH problems (Kishor & Subaiya, 2008).

Rationale of the current study

Although a large number of studies investigating women's empowerment and different components of SRH (ANC, SBA, contraception, HIV & STIS) exist, the existing literature suffers from the following limitations.

First, only a handful of studies investigate the relationship between women's empowerment and multiple SRH outcomes within one study. Most of the available studies investigated only one SRH outcome at a time. For example, Sipsma et al. (2014) investigated the relationship between empowerment and antenatal care, while Mutowo, Kasu & Mufunda (2014) examined the relationship between empowerment and condom use. Another study (Singh, Luseno & Haney, 2013) explored the relationship between empowerment and HIV. Although these studies provided useful information, they do not give the complete picture of the SRH situation since all the components are interrelated.

Secondly, none of the existing studies investigated the relationship between SRH and multiple domains of empowerment. Most of the available studies only focus on the relationship between one domain of empowerment and SRH. Previous studies have demonstrated that measuring one domain of empowerment provides a biased result because it ignores the effects of other domains of empowerment (Ewerling et al., 2017; Pratley et al., 2017; Richardson, 2016). Women's empowerment is a complex construct made up of of multiple domains such as social, economic, political and legal domains

(Asaolu, 2018, Ewerling et al., 2017; Kabeer, 2005; Kishor & Subaiya, 2008; Malhotra et al., 2001;Pratley et al. 2017; Richardson, 2016).

Third, only a few of the existing studies examine the trend of the relationship between empowerment and SRH outcomes. Most of the available studies are cross-sectional studies that provide information about a particular point in time. A systematic review of 22 studies by Richardson (2018) found that half of the studies were cross-sectional surveys, while the other half were randomized control studies with follow up periods of 3 – 9 months. This does not allow us to observe changes over time. Empowerment is a gradual process, and its maximum impact is felt over time (World Bank, 2019). Understanding the trend of the various components of SRH is critical in identifying the patterns of change and leverage points, which can be used for making timely interventions and responsive policies (Chao et al., 2018).

Finally, to the best of my knowledge, no study investigated the association between empowerment, maternal health, STI, and HIV testing in Nigeria. This study is necessary because Nigeria has a large population of women who are disempowered. These women are also at an increased risk of maternal death, HIV, and other STIs. Despite the provision of free SRH services, a large proportion of Nigerian women are still not attending ANC, nor are they getting tested for HIV and other STIs (NARHS, 2012; NACA, 2015; UNICEF, 2016). Understanding the relationship between these factors will help identify points for action in reducing both maternal mortality and STI.

Research objectives

To address the above literature gaps, this study is designed to investigate the relationship between multiple domains of women's empowerment and multiple components of SRH (ANC, SBA, HIV testing, STI, and condom use) among Nigerian women from 2003 to 2013 using the DHS national survey. The study will answer the following research questions

1. What is the prevalence of ANC, SBA, STI, HIV testing, and condom use among Nigerian women?

Hypothesis 1a: ANC among Nigerian women has been steadily increasing from 2003 to 2013.

Hypothesis 1b: SBA among Nigerian women has been steadily increasing from 2003-2013.

Hypothesis 1c: HIV testing among Nigerian women has been steadily increasing from 2003 to 2013.

Hypothesis 1d: Condom use among Nigerian women has been steadily increasing from 2003 to 2013.

Hypothesis 1e: Prevalence of STI among Nigerian women has been steadily decreasing from 2003 to 2013.

2. What is the relationship between women's empowerment and SRH (ANC, SBA, HIV testing, STI, and condom use) among Nigerian women?

Hypothesis 2a: Women's empowerment is positively associated with ANC, and the relationship is persistent over time.

Hypothesis 2b: Women's empowerment is positively associated with SBA, and the relationship is persistent over time.

Hypothesis 2c: Women's empowerment is positively associated with HIV testing, and the relationship is persistent over time.

Hypothesis 2d: Women's empowerment is positively associated with condom use, and the relationship is persistent over time.

*Hypothesis 2e***:** Women's empowerment is negatively associated with STI, and the relationship is persistent over time.

4.2. Methods

Data source

The study was a secondary data analysis of the Nigerian Demographic Health Surveys (NDHS) of 2003, 2008, and 2013. Nigerian Demographic Health Surveys are nationally representative surveys conducted every four years. Nigeria has had five waves of Demographic Health Surveys (1990, 1999, 2003, 2008, and 2013). Nigerian Demographic Health surveys were conducted by the United States Agency for International Development (USAID), ICF International, and the National Population Council (NPC). Demographic Health Surveys are carried out to provide "up-to-date data on fertility, family planning, marriage, maternal and child mortality, maternal and child nutrition, domestic violence, HIV/AIDS, and STIs" (NPC, 2008; 2014).

Data collection

Nigerian Demographic Health Survey's data was collected at the national, zonal, and state level. NDHS is a self-reported survey administered through face to face

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interviews. The three waves of data collection took place in September 2003, June to October 2008, December 2012(NPC, 2003; 2008; 2014).

Study population

The study population consists of women in the reproductive age group (15-49 years) who lived in Nigeria at the time of the study. The women were surveyed using a three-stage stratified cluster sampling design. Urban and rural clusters were first selected, followed by household-level sampling and individual level sampling. NDHS collected data on 7620 women from 365 clusters in 2003. In 2008, 33,385 women from 888 clusters were surveyed while 38,948 women from 904 clusters were surveyed in 2013 (NPC, 2003; 2008 & 2014). The total population size of the three surveys was 79,953 women.

Sample size

This study analyzed data from three waves (2003, 2008 & 2013) of NDHS. An aggregate sample of 53,788 (NDHS 2003=4,725, NDHS 2008=22,563 & NDHS 2013= 25,600) women were analyzed. The sample size was limited to the number of women who had complete data in the women's empowerment module. The sample size for ANC and SBA was limited to women who have been pregnant in the last five years. An aggregate sample of 36,332 (NDHS 2003=3,775, NDHS 2008=14,529 & NDHS 2013= 18,028) women were analyzed for ANC and SBA.

Missing Data

Table 3.1 provides the distribution of missing data across the variables. Missing data was checked using STATAs miss suite. A new binary variable "completeness" was

generated, it grouped the women into those with complete data and those with incomplete data. The new variable was regressed against 10 variables (wealth index, education, urban/rural, religion, region and the 5 outcome variables). All variables except urban /rural residence were found to be non-significant. Rural women were less likely to respond suggesting that data is Missing At Random (MAR) but not Completely at Random (MCAR). Complete case analysis was used for the study. It has been shown that "complete case analysis of large samples from epidemiological surveys using logistics regressions are unbiased as long as the missing-ness is not dependent on the outcome variables" (Little & Zhang, 2011; Schafer & Graham, 2002; Westreich, 2012; White & Carlin, 2010). It should be noted that although this method is not biased, it is still considered to be inefficient because it leads to loss of information" (Bartlett et al., 2015).

Dependent variables

The study investigated the relationship between women's empowerment and five SRH outcomes (ANC, SBA, STIs, HIV testing, and condom use). The dependent variables from the survey were: 1) "antenatal care" 2) "skilled birth attendance" 3) "had STI in last 12 months", 4) "ever been tested for HIV," and 5) "used a condom in the last sexual intercourse," All five indicators were dichotomous variables. Study participants were asked: 1) if they received ANC during their last pregnancy, 2) if their last childbirth was an SBA, 3) if they had ever been tested for HIV, 4) if they have had an STI in last 12 months, and 5) if they used a condom during their last sexual intercourse.

The answers were scored 'Yes' (=1) or 'No' (=0) (DHS, 2019). SBA was defined as births supervised by doctors, nurses, or midwives (WHO, 2015).

Independent variables

Empowerment

The independent variables are 1) attitude to intimate partner violence (IPV), 2) decision making "agency" and, 3) social independence. These variables are factors (domains of empowerment) predicted by factor analysis using the Survey-based Women's emPowERment index (SWPER) on Nigerian Demographic Health Surveys (See chapter 3 of this dissertation). SWPER has been recommended for the analysis of DHS data collected in Sub-Saharan Africa(Atake & Ali, 2019; Ewerling et al., 2017; Raj, 2017; Richardson, 2018). A group of researchers developed this index to provide a validated tool that captures the complexity of women's empowerment as well as provides a uniform tool for "within-country" and "between country" comparison among studies (Ewerling et al., 2017; Raj, 2017). The scale has 15 items. Each of these items is related to a domain of women's empowerment. For example, the domain measuring agency is made up of 3 items inquiring about the woman participation in household decision making while the domain measuring attitude to violence is made up of 5 items investigating the acceptability of wife-beating. The third domain, "social independence," is made up of items that measure the women's level of education, employment, access to media, age at first cohabitation and age at first childbirth (Ewerling et al., 2017).

Other independent variables

Other independent variables adjusted for were age, education, regions, residence, and wealth index. Age was categorized into four categories (15–19, 20–29, 30–39, and 40–49 years). Education was also categorized into four categories (no education, primary, secondary, or tertiary education). Region was divided into the six geopolitical regions in Nigeria (North-central, North-east, North-west, South-south, South-east, and South-west. Residence was categorized into; urban or rural areas, while the household wealth index was divided into quintiles; poorest, poor, middle, rich, and richest (see table 3.2).

Data analysis

Statistical analyses were performed using Stata/IC 15.0 (StataCorp). All analyses were performed using Stata's 'svy' command to adjust for the sample design (clustering) and differences in response rates. Sample weights were provided by DHS (DHS, 2019).

Descriptive data analyses

Data analysis included a descriptive analysis of study participants. I explored the socio-demographic characteristics of the respondents. The socio-demographic factors listed above were those that have been associated with the characteristics and trends of 5 SRH variables (ANC, SBA, HIV testing, STIs, and condom use). Table 1, describes the sociodemographic characteristics of the study population. Independent variables found to be associated with the dependent variables were included in the multivariate analysis. A chi-square test was used to identify the significance of the relationship. P-value was

set at the 0.05 significance level (Acock, 2008; Long & Freese, 2014; Mulcahy, 2006).

Variables were tested to rule out multicollinearity.

Multivariate regression analysis

The weighted scores of the empowerment factors (index) predicted by factor

analysis were used as independent variables to run multivariate regression analysis**.**

These regressions looked at the relationship between each of the five dependent

variables and the independent variables (domains of women empowerment). Since both

dependent and most of the independent variables were categorical variables, logistic

regression analysis was done. Coefficients, Odds ratios, p-values, and 95% confidence

intervals (CIs) of each outcome variable were measured. P-values <.05 were considered

statistically significant for all analyses (Acock, 2008). Covariates adjusted for include

wealth index, urban-rural dwelling, and geopolitical regions. Age, education, and

employment were excluded because they were already incorporated into the index.

Adjusting for them would lead to multicollinearity.

4.3. Results

Socio-demographic characteristics of study participants

Table 4.1 displays the socio-demographic characteristics of Nigerian women who took

part in the 2003, 2008 & 2013 DHS. The average ages of the women in 2003, 2008 &

2013 were 28.02 years, 28.65 years & 28.86 years, respectively. A large proportion of

the women surveyed had no formal education (48.70%, 47.21% & 48.52% in 2003, 2008

& 2013, respectively). There appeared to be some increase in the trend of formal

education. The proportion of women who attained higher education increased from 5.62% in 2003 to 7.4 % in 2008 & 7.59% in 2013.

In all the surveys, women interviewed were divided into five wealth quintiles. Each quintile contained about 20% of the women. Most (>65%) of the women were employed. About 40% of the women surveyed were Christians, while about 60% were Muslims. Majority of these women lived in rural areas (64.58% in 2003, 68.67% in 2008 & 63.49% in 2013). The highest proportions of women resided in the North-western region (36.48%, 30.18% & 37.34% in 2003, 2008 and 2013 respectively), while the South-eastern region had the least proportion of women (7.66%, 9.05% & 8.01 %). The rest of the women are uniformly spread across the other geopolitical regions.

Table 4.1. Socio-demographic characteristics of Nigerian women

Characteristics	2003 n= 4, 725	2008 n= 22, 563	2013 n= 25,600
	%	%	%
Age			
15-19	9.68	7.9	8.21
20-29	39.68	37.13	37.05
30-39	30.92	32.94	33.16
40-49	19.72	22.04	21.57
Education			
No education	48.70	47.21	48.52
Primary	22.47	21.73	18.61
Secondary	23.21	23.79	25.29
Higher	5.62	7.24	7.59
Employment			
Not working	34.71	37.17	30.79
Working	65.29	67.16	69.21
Wealth index			
Poorest	16.85	23.29	23.56
Poorer	19.55	21.07	21.27
Middle	21.22	17.74	17.25
Richer	19.96	17.83	17.85
richest	22.42	20.07	19.96
Residence			
Urban	25.42	31.33	36.52
Rural	64.58	68.67	63.48
Region			
North-central	12.23	14.10	12.86
North-east	18.79	15.21	17.09
North-west	36.48	30.18	37.34
South-east	7.66	9.05	8.01
South-south	14.07	12.73	9.67
South-west	10.77	18.73	15.02
Religion			
Christian	38.27	45.46	39.48
Islam	61.73	54.54	60.52

Trends of SRH components (ANC, SBA, HIV testing, condom use, and STI)

        Table 4.2 depicts the trend of ANC, SBA, HIV testing, condom use, and STI among Nigerian women from 2003 -2013. The rates of ANC and SBA both showed a very slow increase over ten years. There was no increase in ANC between 2003 and 2008; it only increased slightly from 58% in 2008 to 61% in 2013. SBA also increased from 35% in 2003 to 39% in 2008 but started to show a decline to 38% in 2013. HIV testing had been steadily increasing across the three waves of Nigerian Demographic Health Surveys. In 2003, only 8.3% of women reported that they had ever been tested for HIV; it increased to 18.4 % in 2008 & 33.3% in 2013. Unlike HIV testing, the increase in condom use with the last partner had been very slow. Condom use increased from 2.31% in 2003 to 2.94% in 2008 & 3.61 % in 2013. History of having an STI in the last 12 months also increased from 0.86% in 2003 to 1.91% in 2008 & 3.61% in 2013. Figure 4.1 shows the trend of SRH outcomes from 2003-2013.

Table 4.2. Trend of SRH outcomes among Nigerian women in 2003-2013

SRH outcomes	2003		2008		2013	
	n	%	n	%	n	%
	n= 4,725		n= 22, 563		n= 25,600	
HIV Testing	368	8.3	3,312	18.4	8,711	33.3
STI	37	0.86	406	1.91	802	3.61
Condom use	118	2.31	543	2.94	889	3.5
	n= 3,775		n= 14,529		n= 18,028	
ANC	2,189	58	7,554	58	10,997	61
SBA	1,321	35	5,666	39	6,850	38
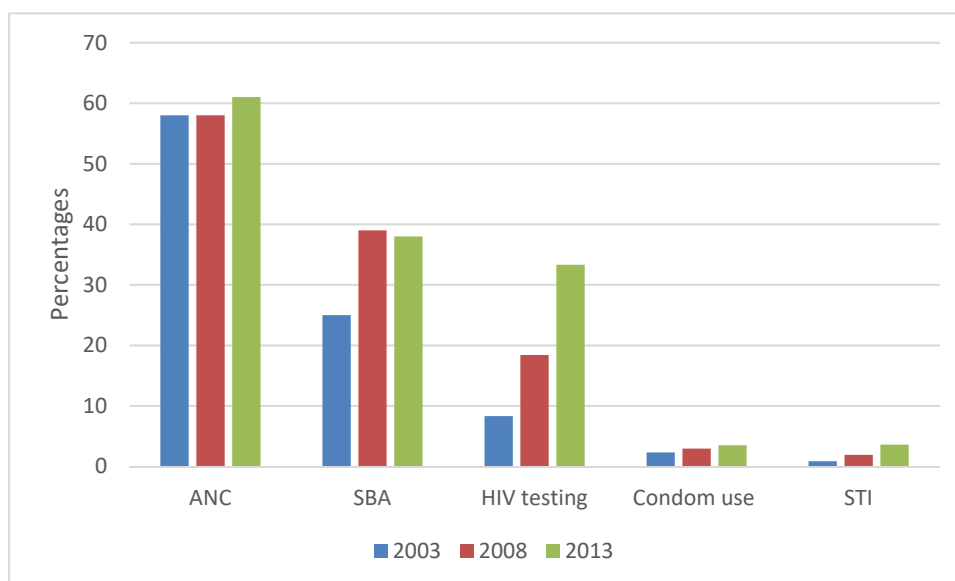
Figure 4.1. Trends of SRH outcomes 2003-2013

Summary of findings

Overall the logistic analysis demonstrated a positive relationship between women's empowerment factors and SRH outcomes (ANC, SBA, HIV testing, condom use, and STI). Women with higher scores of social characteristics were more likely to attend ANC, have a SBA, ever been tested for HIV, use a condom with the last sexual partner, and report a history of STI in the last 12 months. Social independence was significantly related to all five outcomes across the three waves of surveys.

Decision making "agency" was positively related to ANC, HIV testing, and STI but not significantly associated with SBA or condom use. Attitude to IPV was only significantly related to HIV testing. Women who did not justify wife-beating were more likely to have ever been tested for HIV. There was no association between justifications of wife-beating with ANC, SBA, STI, or condom use.

Wealth index and place of residence were positively related to all five outcomes. Living in the North-western and North-eastern regions of the country was negatively associated with ANC, SBA, HIV testing, and condom use. Living in the urban areas was associated with the increased uptake of ANC, SBA, HIV testing, and history of STIs but not with condom use.

Relationship between women's empowerment and antenatal care (ANC)

Table 4.3 depicts the relationship between women's empowerment and ANC. This study found a positive relationship between women's empowerment and ANC. Social independence was the strongest predictor for ANC. In all three waves of NDHS, women with high social independence were more likely to have received ANC

(2013=AOR 1.50; P<.001; CI 1.42-1.67; 2008=AOR 1.80; P<.001 CI 1.66-1.96; 2003=AOR 1.85; P<.001; CI 1.53-2.24). Decision making was also a strong predictor of ANC in 2013 and 2008. This relationship became insignificant in 2003 after adjusting for other variables. Attitude to IPV was not significantly related to ANC.

Wealth index and place of residence were also positively related to ANC in all three surveys. Compared to the poorest quintile, the odds of receiving ANC among women from the richest quintile increased more than 14-fold in all waves of the survey (2013= AOR 15.14; P<.001; CI 10.77-18.81; 2008= AOR 13.32; P<.001; CI 9.43-18.81; 2003= AOR 14.94; P< .001; CI 8.12-27.49). Compared to urban areas, women who lived in rural areas were less likely to have received ANC (2013=AOR 0.70; p<.001; CI 0.55-0.89; 2008= AOR 0.77; P<.001; CI 0.45- 0.76; 2003=AOR 0.70; p<.05; CI 0.48-0.91). Women from the northern regions were less likely to have received antenatal care. Compared to the North-central region, the odds of receiving ANC by women from the North-east decreased by about 40 % (2008=AOR 0.72; p<.001; CI 0.53- 0.97; 2003=AOR 0.72 p<.05; CI 0.53-0.97). Women from North-west were also less likely to have received ANC (AOR 2013=0.58; 2008 =0.34 & 2003=0.25) while the odds of receiving ANC by women from the South-east increased (AOR 2013=2.18; 2008 =1.48 & 2003=4.0).

Table 4.3. Logistics regression of women's empowerment and ANC in 2003-2013

Characteristics	2003		2008		2013	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Empowerment factors						
Attitude to IPV	1.10	0.978- 1.25	1.0	0.94-1.06	0.94	0.90-1.01
Decision making	1.14	0.993-1.31	1.19**	1.18-1.29	1.13**	1.04-1.23
Social factors	1.85**	1.53-2.24	1.80**	1.66 -1.96	1.54**	1.42- 1.67
Residence						
Urban-rural	0.66*	0.48 -0.91	0.59**	0.45-0.76	0.70**	0.55-0.89
Regions						
North-central	REF	REF	REF	REF	REF	REF
North-east	0.62*	0.43-0.90	0.72**	0.53-0.97	O.48	0.79 -1.43
North-west	0.25**	0.18-0.34	0.34*	0.25-0.46	0.58**	0.45- 0.75
South-east	4.0**	2.42-6.54	1.48**	1.01-2.18	2.18**	1.51- 3.15
South-south	0.70	0.40-1.21	0.53*	0.38-0.73	0.456	0.35 -0.60
South-west	1.41	0.73-2.75	1.22	0.84-1.78	1.39	0.88-2.18
Wealth index						
Poorest	REF	REF	REF	REF	REF	REF
2nd poorest	1.19	0.93-1.51	1.94**	1.66-2.28	2.17*	1.80-2.61
Middle	2.65**	1.99-3.52	3.93**	3.15-4.92	4.27**	3.40-5.37
2nd richest	4.67**	3.33-6.56	6.90**	5.40-8.82	8.93**	6.76- 11.78
Richest	14.94**	8.12-27.49	13.32**	9.43-18.81	15.14**	10.77-21.27

*p< 0.05 ** p<0.005

Relationship between women's empowerment and skilled birth attendance (SBA).

Table 4.4 shows the relationship between women's empowerment and SBA. This study found that women with high social independence were more likely to have an SBA (2013=AOR 1.34; P<.001; CI 1.27-1.42; 2008=AOR 1.40; P<.001; CI 1.33-1.47; 2003=AOR 1.56; P<.001; CI 1.43-1.72). Both decision making and justification of wife-

beating were not significantly related to SBA, although they were both significant before

adjusting for other variables.

The odds of SBA increased significantly with an increase in wealth index and place of

residence. Compared to the poorest quintile, women in the richest wealth quintile were

over 300% more likely to have an SBA in their last delivery (2013=AOR 7.30 P<.001 CI

5.54-9.64; 2008=AOR 5.03 P<.001 CI 3.84-6.57; 2003 = AOR 4.42 P<.001 CI 2.83-

8.85). In comparison to the North-central region, women who resided in the North-west

and North-east region were less likely to have an SBA at their deliveries. The odds of

having an SBA by women in the North-east was at least 40% less likely compared to

women in the North-central region (2013=AOR 0.53 P<.001 CI 0.43-0.66; 2008=AOR

0.53 P<.001 CI 0.41-0.67; 2003 = 0.57 P<.001 CI 0.41-0.80). The relationship with

urban/rural residence was also significant. Women who lived in the rural areas were less

likely to have an SBA (2013=AOR 0.8 P<.001 CI 0.70-0.91; 2008=AOR 0.68 P<.001 CI

0.60-0.78). This relationship was not significant in 2003.

Table 4.4. Logistic regression women's empowerment and skilled birth attendance in (SBA) 2003-2013

Characteristics	2003		2008		2013	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Empowerment factors						
Attitude to IPV	1.1*	1.00-1.21	1.00	0.98-1.05	0.99	0.94-1.04
Decision making	0.9	0.80-1.02	0.95	0.90 -1.01	1.01	0.95-1.08
Social factors	1.56**	1.43-1.72	1.40 **	1.33-1.47	1.34**	1.27-1.42
Residence						
Urban-rural	0.90	0.72-1.13	0.80**	0.70-0.91	0.68**	0.60-0.78
Regions						
North-central	REF	REF	REF	REF	REF	REF
North- east	0.57**	0.41-0.80	0.53**	0.41-0.67	0.53**	0.43-0.66
North -west	0.25**	0.18-0.34	0.30**	0.24-0.37	0.36**	0.30-0.46
South-east	0.85	0.61-1.20	1.21	1.00-1.46	1.13	0.92-1.38
South-south	0.77	0.54-1.11	0.95**	0.78-1.17	0.63**	0.53-0.74
South-west	0.82	0.58-1.16	1.35	1.11-1.63	1.07	0.89-1.29
Wealth index						
Poorest	REF	REF	REF	REF	REF	REF
2nd poorest	1.68**	1.24 2.30	1.89**	1.55-2.32	2.64**	2.13-3.29
Middle	2.33**	1.66-3.28	3.15**	2.52-3.95	4.80**	3.74-6.18
2nd richest	3.96**	2.80-5.61	5.00**	3.93-6.36	6.57**	5.07-8.51
Richest	4.42**	2.83-8.85	5.03**	3.84-6.57	7.30**	5.54-9.64

*p< 0.05 ** p<0.005

Relationship between women's empowerment and HIV testing

Table 4.5 depicts the relationship between women's empowerment and HIV

testing. This study found positive relationships between all three factors (social

independence, attitude to IPV, and decision making) of women's empowerment and HIV

testing. In all three surveys, women with high social independence were more likely to

have ever been tested for HIV (2013=AOR 1.84; P<.001; CI 1.73-1.95; 2008=AOR 1.84; P<.001 CI 1.73-1.98; 2003=AOR 1.91; P<.001; CI 1.66-2.20). Women who took part in decision making were 16% more likely to have ever been tested for HIV in 2013 (P<.001; CI 1.08-1.24), but this relationship was not significant in 2008 and 2003. Women who justified wife-beating were less likely to be tested for HIV in 2013(AOR 0.93; P<.05; CI 0.88- 0.98). This relationship was also not significant in 2008 and 2003. Before adjusting for socio-demographic factors, both decision making and justification of wife-beating were significantly related to HIV testing in the three surveys.

Wealth index was positively related to HIV testing. In 2013, the odds of being tested for HIV among women from the richest quintile were 16.94 times that of women from the poorest quintile (P<.001; CI 12.84-22.36). The same pattern was seen in 2008 and 2003. Compared to the poorest quintile, the odds of HIV testing among women from the richest quintile increased 12-fold in 2008(AOR 12.78; P<.001; CI 8.75-18.67) and four-fold in 2003 (AOR 4.29; P< .05; CI 1.82-10.02).

Place of residence was also found to be associated with HIV testing. Compared to the North-central region, women from the North-west were 32% less likely to have ever been tested for HIV (AOR 0.68; p<.001; CI 0.51- 0.99), while women from the South-east were more likely to have been tested for HIV (AOR 2013=1.36; 2008 =2.9 & 2003=2.38). In 2013 and 2008, women who reside in rural areas were less likely to have been tested for HIV (2013=AOR 0.71; p<.001; CI 0.60- 0.83; 2008= AOR 0.77; P<.001; CI 0.64- 0.91). The relationship was not significant in 2003.

Table 4.5. Logistics regression of women's empowerment and of HIV testing in 2003-2013

Characteristics	2003		2008		2013	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Empowerment factors						
Attitude to IPV	1.04	0.84 - 1.31	1.08	1.02 - 1.14	0.93*	0.88 -0.98
Decision making	0.89	0.77 - 1.05	1.06	0.99 -1.14	1.16*	1.08 - 1.24
Social factors	1.91**	1.66 - 2.20	1.84**	1.73 - 1.98	1.84**	1.73 - 1.95
Residence						
Urban-rural	0.60	0.345 -1.10	0.77*	0.64 - 0.92	0.71*	0.60 - 0.83
Regions						
North-central	REF	REF	REF	REF	REF	REF
North-east	0.34**	0.18 - 0.65	0.89	0.60 – 1.33	1.13	0.85 -1.48
North-west	0.21**	0.10 - 0.42	0.53**	0.37 – 0.78	0.68**	0.51-0.89
South-east	2.38*	1.02 - 5.54	2.9**	2.28 – 3.70	1.36**	1.05-1.76
South-south	1.23	0.65 - 2.34	1.36*	1.03 – 1.79	0.83	0.66-1.04
South-west	0.80	0.48 - 1.34	0.99	0.78 – 1.20	0.61**	0.49-0.77
Wealth index						
Poorest	REF	REF	REF	REF	REF	REF
2nd poorest	1.41	0.72 - 2.77	2.5	1.83 - 3.45	2.93**	2.36-3.62
Middle	2.09*	1.02 - 4.28	4.2	3.06 - 5.93	5.95**	4.22-7.03
2nd richest	2.73*	1.40 - 5.39	6.5	4.58 - 9.34	9.34**	7.18-12.16
Richest	4.29*	1.83 -10.02	12.78**	8.75 -18.67	16.94**	12.83-22.36

*p< 0.05 ** p<0.005

Relationship between women empowerment and condom use

Table 4.6 displays the relationship between women's empowerment and condom use. This study found a trend that women with high social independence were more likely to have used a condom during last sexual intercourse (2013=AOR 1.13; P<.001; CI 1.03-1.24; 2008=AOR 1.18; P<.05; CI 1.07-1.33; 2003=AOR 1.72; P<.05; CI 1.35-2.19). Both decision making and justification of wife-beating were not significantly

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related to condom use at last intercourse, although decision making was significant in 2003 (AOR 1.3; p<.05; CI 1.02-1.83).

The odds of using a condom in the last sexual intercourse increased significantly with an increase in wealth index. Compared to the poorest quintile, women in the richest wealth quintile were 115% more likely to have used a condom in their last sexual intercourse in 2013 (AOR 2.15 P<.001 CI 1.39-3.33) and 102% more likely in 2008(AOR 2.02 P<.001 CI 1.17-3.48). Wealth index was not significantly related to condom use in 2003.

In comparison to the North-central region, women who resided in the North-west and North-east region were less likely to have used a condom at last sexual intercourse in 2013. (AOR 0.42 & 0.63 respectively). The finding was the same in 2008 (AOR 0.26 & 0.5, respectively). In 2003 the relationship was only significant for North-west (AOR 0.17). Surprisingly, the relationship between urban/rural residence and condom use was not significant.

Table 4.6. Logistics regression of women's empowerment and condom use in 2003-2013

Characteristics	2003		2008		2013	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Empowerment factors						
Attitude to IPV	1.06	0.79 - 1.43	0.94	0.83 - 1.06	1.05	0.95-1.18
Decision making	1.36*	1.02 -1.83	1.02	0.91 - 1.16	1.02	0.92- 1.14
Social factors	1.72**	1.35-2.19	1.18**	1.07 - 1.33	1.13**	1.03 - 1.24
Residence						
Urban-rural	1.20	0.72 - 2.01	0.84	0.17 0.66	0.81	0.64- 1.03
Regions						
North-central	REF	REF	REF	REF	REF	REF
North-east	0.36	0.15 - 0.90	0.50*	0.31 - 0.82	0.63*	0.42-0.93
North -west	0.17**	0.08 - 0.38	0.26**	0.13 - 0.39	0.42**	0.29-0.62
South-east	0.73	0.34- 1.58	1.7**	1.22 - 2.52	0.93	0.66-1.31
South-south	0.83	0.38 -1.85	1.4*	1.01 - 1.96	0.76	0.54-1.08
South-west	1.60	0.88 -2.95	1.91*	1.38 - 2.63	1.74	1.31-2.30
Wealth index						
Poorest	REF	REF	REF	REF	REF	REF
2nd poorest	0.39	0.11- 1.39	0.84	0.49 - 1.42	1.16	0.78-1.72
Middle	1.21	0.43 -3.39	1.07	0.64 - 1.80	1.21	0.81-1.82
2nd richest	1.78	0.72- 4.43	1.62	0.97 - 2.71	1.46	0.97-2.21
Richest	1.79	0.72 - 4.47	2.02**	1.17 - 3.48	2.15**	1.39-3.33

*p< 0.05 ** p<0.005

Relationship between women's empowerment and STI.

Table 4.7 shows the relationship between women's empowerment and STI. The study found that none of the three empowerment factors were significantly related to STI in 2003 and 2008. However, this pattern changed in 2013 when women with high social independence were found to be more likely to report a history of STI in the past 12

months (AOR 1.24; P<.001; CI 1.11- 1.38). Wealth index was also significantly related to having an STI in all the surveys. Compared to the poorest quintile, women from the richest wealth quintile had higher odds of reporting a history of STI (2013=AOR 2.20; P<.05; CI 1.36-3.63; 2008=AOR 2.12; P<.05; CI 1.33-3.40; 2003=AOR 6.42; P<.05; CI 1.93-21.36).

Place of residence is associated with a history of STI. This study found that women who lived in the rural area were less likely to report a history STI in 2013 and 2008 (2013=AOR 0.63; P<.05; CI 0.50-0.80; 2008=AOR 0.81 P<.05; CI 0.61 - 1.06). The relationship was not significant in 2003. Compared to women in the North-central region, women in the North-west region were more likely to report a history STI (2013=AOR 2.42; p<.001; CI 1.5-3.9), while women who lived in the South-south region (2013=AOR 0.30; p<.001; CI 0.20-0.45 & 2008= AOR 0.4; p<.05;CI 0.25-0.70) and South-west region (2013=AOR 0.28;p<.001;CI0.02-0.07 & 2008=AOR 0.37; P<.001; CI 0.23-0.61) were less likely to report an STI in the last 12 months.

Table 4.7. Logistics regression of STI on women's empowerment in 2003-2013

Characteristics	2003		2008		2013	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Women's empowerment factors						
Attitude to IPV	0.77	0.34 -1.75	0.99	0.87 -1.12	0.95	0.87-1.03
Decision making	0.83	0.52 -1.34	0.86	0.74 -1.00	1.69**	1.41- 2.02
Social factors	1.35	0.74 -2.46	1.16**	0.99 -1.34	1.24**	1.11 -1.39
Residence						
Urban-rural	3.69	1.58- 8.65	0.81**	0.61 -1.06	0.63**	0.50-0.80
Regions						
North-central	REF	REF	REF	REF	REF	REF
North-east	0.20**	0.04 -0.93	0.67	0.44 -1.04	1.03	0.68-1.52
North -west	0.25	0.06-1.14	1.11	0.75 -1.63	2.42**	1.50-3.90
South-east	1.24	0.38- 4.03	1.27	0.84 -1.94	1.20	0.83-1.73
South-south	1.10	0.41- 2.96	0.41*	0.25 -0.70	0.30**	0.20-0.45
South-west	0.19	0.04 -1.05	0.37**	0.23 -0.61	0.28**	0.02-0.07
Wealth index						
Poorest	REF	REF	REF	REF	REF	REF
2nd *poorest*	1.76	0.45 -6.91	1.57*	1.09 -2.27	1.96**	1.32-2.90
Middle	2.60	0.85 -8.01	1.52*	1.03 -2.25	1.96*	130.-2.95
2nd *richest*	2.13	0.51-8.97	1.55*	1.03 -2.34	2.3**	1.48-3.66
Richest	6.42**	1.9321.36	2.12**	1.33 -3.40	2.2**	1.36-3.63

*p< 0.05 ** p<0.05

4.4. Discussion

Summary of findings

This study is one of the first studies on women's empowerment and SRH (HIV testing, condom use, and STI) in Nigeria. Although this study found a rising trend in SRH, the rise was only minimal, with obvious disparities among subpopulations. None of the 5 SRH outcomes achieved the national target for universal coverage (80%) or MDG/SDG targets of elimination. Wealth index and place of residence were strongly associated with all the SRH outcomes. Women with higher wealth index and those from the urban areas had better SRH. Compared to the North-central region, women from the North-west and North-east consistently reported worse SRH outcomes. Overall, there appeared to be a positive relationship between women's empowerment and SRH.

Prevalence and trend of Antenatal Care (ANC) and Skilled Birth Attendance (SBA)

In 2014 Nigeria adopted the universal coverage of ANC and SBA as its main strategy for the prevention of maternal deaths (UNDP, 2018; WHO, 2015). Despite these efforts, this study only found a minimal increase (3% point) in the trend of ANC and SBA from 2003 to 2013. The slow increase in uptake could be attributed to the inequity and shortage of maternal health facilities, as well as the lack of trained staff and equipment. The majority of maternal health care services are located in urban areas (WHO, 2018c; World Bank, 2019).

Another reason for the poor uptake of ANC and SBA is the widespread prevalence of harmful social norms associated with pregnancy and childbirth

(Fagbamigbe & Idemudia, 2015; Iliyasu et al., 2010). In most parts of Nigeria, pregnancy is considered a routine process that does not warrant additional care. Women are considered weak if they seek ANC or SBA (Iliyasu et al., 2010). Furthermore, the patriarchal nature of the country further inhibits women from accessing health care (Makama, 2013; Nwagbara et al., 2012). For example, women need to get permission from their husbands to access ANC or SBA (Fagbamigbe & Idemudia, 2015; NARHS, 2012). This leads to delays in accessing emergency obstetric care. It is recommended that Nigeria should establish additional maternal health centers that are distributed equitably. Nigeria should also implement programs that will encourage community re-orientation and gender empowerment to overcome the barriers identified.

Prevalence and trend of Condom use

Condom use has been the backbone of Nigeria's STI and HIV prevention strategy (NARHS, 2012; NACA, 2015). This study found that the rates of condom use in Nigeria only increased marginally (2.31% to 3.61%) from 2003 to 2013. The rates from this study are significantly less than the levels reported by other studies. For example NARHS (2012) reported that condom use rose from 23% to 51% among men and 8% to 49% among women from 2003 to 2012. These findings may be explained by the fact that data analysis for this study was limited to women in a marital or cohabiting relationship. Women in a marriage or committed cohabiting relationship have lower levels of risk perception associated with sexual intercourse. They are also less likely to request for condom use for fear of being accused of infidelity (Aggha et al., 2002). The findings could also have been as a result of the type of question asked. This study is a secondary

data analysis of DHS data, which asked the women if they used a condom during the last sexual intercourse with the cohabiting or married partner. The question did not take into consideration the history of previous condom use or condom use with other partners apart from the spouse or cohabiting partner (NPC, 2014).

Secondly, this study did not find a significant association between condom use and urban/rural dwelling, even though previous studies have reported that urban dwellers have higher odds of condom use compared to rural dwellers (Kabagenyi & Okibgo, 2015). This finding can also be explained by the reasons mentioned above.

Prevalence and trend of HIV testing

This study found a significant increase in the number of women tested for HIV. This increase can be attributed to the massive HIV/AIDS and STI prevention campaigns that have been going on across the country since 2004. These campaigns, especially the prevention of mother to child transmission program (PMTCT) have led to an increase in awareness and demand creation for HIV testing (NARHS, 2012; NACA, 2015). Despite the increase in uptake, Nigeria is yet to achieve its target of testing, 90% of pregnant women (NACA, 2018). Women are scared to take HIV tests and other STI screenings for fear of the stigma associated with both infections. Aggha et al. (2002) reported that women were scared that they would be cast as promiscuous if they are diagnosed with HIV or other STIs. De-stigmatization and community education is recommended to normalize the process of HIV testing to increase uptake.

Prevalence and trend of Sexually Transmitted Infections (STIs)

This study showed that despite the increase in condom use and HIV testing, rates of STI among Nigerian women were increasing. It found that the proportion of women who reported a history of STI in the last 12 months increased from 0.89% in 2003 to 3.34% in 2013. This finding was in line with WHO's (2019a) report of a global increase in rates of STIs. The study also found that women living in urban areas and those that have a higher wealth index were more likely to report a history of STI in the past 12 months. The paradoxical finding can be explained by the increase in awareness and the demand created from STI/HIV campaigns. Women living in urban areas and those with those with higher socioeconomic status tend to be more informed about signs and symptoms of STIs, they are also more likely to have access to better health care. These two factors make it easier for them to properly identify STI and recall history of infections. The availability of newer diagnostic tests has also led to an increase in STI diagnosis, reporting, and surveillance (NARHS, 2012).

Furthermore, there has been a push for STI screening among pregnant women. Nigeria's STI screening policy recommends the screening of all pregnant women at their first ANC (NARHS, 2012). Despite the increased testing, a subpopulation (poor, rural, and northern) are not accessing the services. A more focused implementation of STI prevention services targeting rural women, hard to reach women, and women from marginalized regions is recommended.

Relationship between empowerment and SRH outcomes

Overall, there appeared to be a positive relationship between women's empowerment and all 5 SRH outcomes. This study found that the social independence

had the strongest and most consistent effect on all the SRH outcomes. Women with high

social independence scores were more likely to attend ANC, have an SBA, use condoms,

and be tested for HIV. They were also more likely to report a history of STI. The socio-

demographic factors related to the social independence domain in Nigeria are the

woman's age at marriage, age at first childbirth, education, and access to information,

media. All these factors are dependent on the values and norms of the community,

institutions, policies, and legal frameworks that determine women's access to available

resources (Ewerling et al., 2017). For example communities that value women's

education are more likely to have better SRH since educated women have better access

to health education, economic power, and agency over their health (Fagbamigbe &

Idemudia, 2015; Singh, Luseno, & Haney, 2013;). They are also more likely to have the

ability to overcome the barriers to accessing health care. Kabeer (2001; 2005) reported

that the level of women's empowerment is dependent upon the interplay between their

socio-demographic characteristics and their "cultural/ideological norms."

This study also found that the relationship between other domains of

empowerment (agency & attitude to violence) and SRH is inconsistent. For example,

decision making was significantly related to condom use in 2003 but not in 2008 or 2013

while it was related to STI in 2013 but not in 2008 and 2003. Both of these findings

suggest that the societal and institutional determinants of health play a stronger role in

the relationship between empowerment and SRH than the individual-level determinants.

This finding was consistent with the literature.

Another reason for the inconsistent finding with other domains ("agency" and "attitude to violence") might be because both domains represent just one component of empowerment, while health behaviors that improve SRH occur as a result of the interaction between several components. For example, the inconsistent relationship between "agency" and condom use could be attributed to the complexity of the process of condom use which requires overcoming several barriers like shame/stigma, poor risk perception, and the fear of being accused of unfaithfulness (Aggha et al., 2002). Furthermore, this study measured "agency" in terms of household and health care decision-making questions, thus neglecting other forms of decision making such as sexual decision-making or economic decision making. The choice of questions might have led to some bias in the findings. Kishore & Subaiya (2008), found that agency in one decision-making domain did not necessarily translate into agency in another domain. They also reported a variation in the effect of decision making in different cultures; for example, being able to make household decisions by Egyptian women does not necessarily translate to empowerment since it is the norm for women to make all the household decisions (Kishor, 2000; Yount et al., 2016). It is therefore recommended that caution should be used when planning and implementing interventions that are based on a single component of empowerment. Ideally, interventions should be designed to target several components of empowerment at different leverage points to maximize the effects of empowerment on SRH and other health outcomes.

This study found that place of residence had a significant association with ANC, SBA, and HIV testing. Women from the North-eastern and North-western regions had

poorer SRH. This finding can still be explained by the shortage of health care services, worsened by poverty and low literacy levels observed among the women from the North-west and North-east (World Bank, 2019). Culture and gender norms also play a significant role in the SRH of women from the North-east and North-west regions. For example, women in northern Nigeria require permission and escorts from their spouse to go out of the house, most of them are only permitted to go out in the night (Fapohunda & Orobaton, 2013; Iliyasu et al., 2010; Omoyibo et al., 2010). This limits their ability to access health care. To reduce regional disparities and increase access, SRH programs in Nigeria should focus on targeting women from the North-east and North-west regions. Additional research to identify barriers to SRH in these regions is also recommended.

Taking a holistic look at all the findings from this study, it becomes evident that poverty, low education level of women and low age of marriage/cohabitation consistently explain the relationship between all the factors and poor SRH. The first evidence that supports this claim is the fact that the social independence domain consistently exerted a significant effect on all SRH outcomes across all waves of the survey. This domain is a factor of education and age of marriage /cohabitation. Secondly, the Northwest and Northeast regions consistently reported poorer outcomes of SRH. These regions have the lowest rates of education as well as the highest rates of girl child marriage. UNICEF (2020) reports that 68% of women in the North-west and North-east regions were married before the age of eighteen. These women also began childbirth at younger ages. The North-west and North-east region also have the highest rates of poverty in Nigeria (World Bank, 2019). The relationship between education,

girl-child marriage, and poverty is a vicious circle. Girl-child marriage cuts short a girl's education and stagnates her economic participation (Girls not Brides, 2019; UNICEF, 2020; Vogelstein, 2013; World Bank, 2019). At the same time, poverty acts as a driving factor for child marriage since young girls are married off to acquire dowry, pay debts, or to reduce the burden of their responsibility on their families(UNICEF, 2020; Vogelstein, 2013; World Bank, 2019b). The lack of education further denies her access to gainful employment, further pushing her into poverty.

Policy recommendations

Ending child marriage

The main policy recommendation from this study is for Nigeria to accelerate the implementation of its plans to eliminate girl child marriage. Studies have shown that increasing the age of first marriage is associated with an increase in levels of women's education, increase female economic participation, and improvement in the health of women and their children (Girls not Brides, 2019; Vogelstein, 2013). Nigeria has been attempting to reduce rates of child marriage with limited success. Nigeria has only recorded a 9% decrease in child marriage over the past decade, making it the country with the highest number of child brides in Africa (23 million girls) and 11th globally (UNICEF, 2020).

Nigeria has several policies, laws, and interventions that support the eradication of child marriage, such as the Convention on the Rights of the Child which sets the legal age of marriage to 18 years and the Convention on the Elimination of All Forms of Discrimination against Women which requires consent for marriage. In 2016, Nigeria

developed a national strategy to end child marriage. The strategy aimed to "reduce girl child marriage by 40% by 2020 and end the practice entirely by 2030" (Federal Ministry of Women Affairs, 2016; Girls not Brides, 2019). The impact of this strategy is yet to be evaluated. However, several of the existing programs that attempt to curb child marriage and or empower women in Nigeria have not achieved the degree of success initially anticipated. Reasons for the lack of effectiveness are:

a) *Poor enforcement:* Poor enforcement is the main reason for the failure of policies in Nigeria. The country signs and ratifies several agreements, conventions and policies with intentions of implementing them, but it lacks the political will and ability to enforce and follow through. Each government has a different focus for development programs, and interventions are stopped once the government changes**.** I recommend advocacy and awareness creation campaigns to lawmakers, community gatekeepers, and civil society organizations. Advocacy will help increase political commitment and local ownership of programs to ensure the implementation of policies, laws, and interventions.

b) *Lack of sustainability*: Most often, there is no sustainability for the programs. A large number of the programs are pilot programs that are implemented with some form of grants or aid. These programs end once the funding runs out. Most often, the grants are donor-driven and end once the funder has left.

c) *Social instability:* Nigeria has been experiencing some social instability in recent years. This has eroded some of the success achieved in the affected areas. The Boko haram conflict has deeply eroded the gains in eradicating child marriage

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and other women empowerment programs in the North-eastern region. The kidnapping of girls and marrying them to members of the sect has become an incentive for recruitment and a means of terrorizing the women(UNICEF, 2020; Walker, 2019).

d) *Religious and cultural barriers.* Some of the child marriage programs across the country were doomed before they began because the practice of child marriage is deeply related to religious beliefs and the culture of the people. The narrative of child marriage should be reframed from being portrayed negatively to being about the benefits of delaying marriage and educating the girl child. I also recommend the inclusion of religious leaders and community gatekeepers right from the inception stage whenever we try to address cultural and religious sensitive issues. The 2016-2021 national child marriage prevention strategy identified religious leaders as important factors but failed to provide strategies to include them along during the planning and implementation.

Other recommendations for women's empowerment and SRH include:

Provision of targeted services to women

Although this study found a rise in the trend of ANC, SBA, and HIV testing and condom use in the past decade, the rates have not met national targets (United Nations, 2015a; 2015b; NACA, 2015). Uptake of all five services has so far remained very low. Since this study found a positive relationship between women's empowerment and SRH, it is recommended that interventions targeting the underlying factors of disempowerment should be implemented alongside SRH services. This can be achieved through:

a) Programs that combine education, economic empowerment, and health promotion. Combining these components have produced synergistic results in other Sub-Saharan African countries (World Bank, 2019).

b) Provision of female-targeted STI/HIV prevention services. Intervention programs should be implemented in settings that are culturally acceptable to women, such as antenatal clinics, child and nutrition clinics, women meetings, and religious organizations. These settings will help normalize the activities and reduce the stigma associated with HIV/STI prevention.

c) Special programs targeting women from rural areas and the regions (North-west and North-east) with the least uptake of services should be implemented. These programs should be designed, taking into consideration the peculiar barriers of these regions. For example, women in northern Nigeria have mobility restrictions that limit access. It is recommended that home-based services through community health workers, peer educators, and trained traditional birth attendants should be offered to them.

d) Implementing women empowerment programs in a culturally and religiously acceptable manner. Previous programs failed because they were not adapted in a culturally sensitive manner. For example, there was an antenatal program that encouraged male involvement across the country. It worked in the southern part of the country but failed in the north because the men stopped their wives from attending ANC since other men were there. This further brings up the issue of the need for qualitative studies to give a better understanding of the culture.

Increasing accessibility to condoms, ANC, SBA, HIV, and other STI prevention services to other at-risk populations.

Interventions should target not only females but other at risks populations such as adolescents and internally displaced people. Examples of these interventions include:

a) Awareness creation campaigns and the provision of contraception, condoms, and HIV testing services in schools of higher learning and vocational training centers to target adolescent girls. Adolescent girls have higher rates of maternal mortality and a higher risk of contracting HIV/STIs (Chandra-Mouli et al., 2015).

b) ANC and HIV/STI prevention centers should be established at Internally Displaced Persons (IDP) camps. The presence of the services within easy reach of the people will most likely increase access and uptake.

Research recommendation

I also recommend that studies investigating policy implementation, monitoring, and evaluation related to both women's empowerment and SRH should be carried out. These studies will identify gaps and best practices to achieve better impact as well as to aid future policies. I strongly recommend evaluating of the national child marriage prevention strategy.

Limitations of the study

The study has the following limitations. First, although this study explored the trend of data from 2003 to 2013. Each wave of the survey is still a cross-sectional study; thus, we are not able to infer causality for the association between empowerment and

SRH outcomes. Second, this study is a secondary data analysis that is liable to all the limitations of secondary data. Study findings are limited to the available data. Additionally, data collection was through interviews, which might have induced social desirability or recall biases.

Fourth, this survey has some missing data and was analyzed using complete case analysis. Complete case analysis is not the most efficient use of data and might be associated with some biases. Finally, this study is limited by the lack of biological tests to confirm some of the SRH outcomes clinically. The study would be stronger if the actual results of STI and HIV testing were available.

Strengths of the study

Despite these limitations, the current study has some strengths. A major strength lies in its large sample size. The study includes over 50,000 women from a nationally representative sample. Additionally, the data is from three waves of surveys, spanning over ten years. This enables us to observe the trend of SRH outcomes and women empowerment in the absence of longitudinal data. Another strength of this study is the use of factors identified through a data reduction method (factor analysis). This method ensures that factors are appropriately weighted to better reflect the magnitude of their effect on the whole construct.

4.5. Conclusions

Findings from this study show that women's empowerment is significantly associated with SRH in Nigerian. This study is one of the first studies to use three waves of national data to explore the trend. The observed trends show positive but very slow

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progress in both women's empowerment and SRH. The findings underscore an urgent

need for more intensive interventions that tackle both women's empowerment and SRH

outcomes. This study identified the empowerment factors that consistently affect SRH.

These factors may serve as leverage points for interventions as they are more likely to

produce synergistic effects. It is expected that the findings from this study will inform

evidence-based policies and interventions that will empower women and promote their

SRH. It has been recommended that maternal health, contraception, STIs, and HIV

should be integrated for synergistic effects (UNFPA, 2018; WHO, 2019c).

5. CONCLUSIONS

5.1. Introduction

Women's empowerment is the "process where women gain the ability to make strategic life choices after it has previously been taken away from them" (Kabeer, 2001). Poverty, illiteracy, gender inequality, and disempowerment of women have been consistently appearing as the major drivers for poor SRH outcomes among women in sub-Saharan Africa (Ahmed, Creanga, Gillespie & Tsui, 2010; Gita and Piroska, 2010; WHO 2018). Although several studies have suggested that there is a positive relationship between women's empowerment and SRH, this relationship is nuanced and affected by the existing culture and social norms. Unfortunately, it is these subtle differences that make it difficult to successfully implement and evaluate empowerment programs.

The goal of this dissertation was to examine the relationship between women's empowerment and SRH among women in sub-Saharan Africa, using Nigeria as a case study. The three studies presented in this dissertation highlight the importance of understanding the determinants and the relationship between women's empowerment and SRH, which can then be utilized to tackle the problems of poor SRH among African women. It is expected that findings from this study will provide data-driven recommendations that will be used when adapting, implementing, and measuring women empowerment programs within the context of SRH.

5.2. Summary of chapter II

The first study in this dissertation is a systematic review that examined the relationship between women's empowerment and SRH among women in Sub-Saharan Africa. The review found that women's empowerment is associated with improved SRH. However, it also found some limitations associated with the way empowerment was measured across the studies. The most important being, the lack of consistency in the scales/indexes used to measure the construct. This review found that despite the majority (77%) of the studies being secondary data analysis of DHS, all the studies used different types of scales and indexes to measure empowerment. The commonest method being the use of a summative index, which assumes that all domains of empowerment carry equal weight in determining empowerment. Findings from this study highlight the need for the development of a uniform scale that suitably measures empowerment in a manner that can be used for comparisons between and within countries.

This study also found that most of the existing empowerment and SRH literature from Sub-Saharan Africa are focused on the social and economic dimensions of empowerment, to the extent that it appears to ignore the political and legal dimensions. This gap paints an incomplete picture of empowerment and SRH since both legal and political components are required to provide an enabling environment for women to achieve a meaningful degree of empowerment (Alkire, 2005; Kishor, 1995; Kabeer 1999; Malhotra and Schuler, 2005). Additionally, this study found that the majority (68%) of the studies reviewed were focused on the relationship between empowerment and contraceptive use, while other components of SRH, especially STIs, are left behind.

Although a lot of studies exist on the role of economic empowerment of sex workers and HIV prevention, this population is not representative of the general population. Most of these women go into the sex trade as a result of poverty.

5.3. Summary of chapter III

The goal of the second study was to identify and measure the factors which best describe the empowerment status of Nigerian women using the Survey-based Women's emPowERment index (SWPER). Findings from this study show that women's empowerment in Nigeria is best measured by three factors (decision making "agency", attitude to intimate partner violence and social independence). The study found that "agency" is best measured by indicators demonstrating ability to make day to day decisions, while acceptance of gender roles is best measured by indicators assessing the women's attitudes towards IPV. Social independence among Nigerian women is best measured by their level of education, access to media, the age when they went into marriage/cohabitation, and the age of first childbirth. These factors adequately represent the three domains of empowerment (agency, resources, and achievements) posited by Kabeer (2005) and Malhotra et al. (2002). The study also found that a significant (>50%) of Nigerian women had low levels of empowerment. Most of the women lack agency to make decisions or agree that wife-beating is justified in one or more circumstances indicating the internalization of women's subordinate role in their communities. The culture and gender role is such that it reinforces the patriarchal power hierarchy (van Eerdewijk et al., 2017).

5.4. Summary of chapter IV

The third study utilized the empowerment factors identified from chapter III to examine the relationship between each of these factors and five components of SRH (antenatal care, supervised birth attendance, sexually transmitted infections, condom use, and HIV testing) among Nigerian women. In agreement with the systematic review in chapter II, this study found that women's empowerment is positively associated with SRH. However, the strength of effects varies with each empowerment domain measured further supporting the belief that each domain of empowerment exerts its effect through a different mechanism, with some domains having greater effects than others. This study found that social independence is the strongest predictor of SRH in Nigeria. Women with high social independence are most likely to be more educated, economically empowered, and have more agency to make strategic life choices that might impact their health.

5.5. Limitations

This dissertation has several limitations. First of all, the systematic literature review was based on only 22 articles; the review might have inadvertently missed some studies during selection, especially those not indexed in the electronic databases searched. It might also be affected by publication bias. Secondly, the other studies (chapters III & IV) utilized secondary data analysis to answer the research questions. Some of the items in the survey might not adequately provide the information required. Some of the indicators (e.g. STIs) measured might have provided more accurate information if biological tests had been conducted rather interviews. Additionally,

interviews are often associated with recall bias. In this instance, there might also be some social desirability bias since STI is a sensitive issue. Third this study is a cross-sectional analysis which does not prove causality, although the use of pooled cross-sectional data helped in following the trend. Fourth this survey collected data from women who were married or in a cohabiting relationship, thus excluding a large amount of women who are also at risk of SRH problems. Finally, these studies have some missing data, which might have biased some of the findings.

5.6. Implications for public health

Each study in this dissertation highlights the fact that women's empowerment is a product of the various relationships between the women and their environment (interpersonal community, institutions, and policy). Some of these relationships enforce harmful gender roles, which in turn lead to choices that directly or indirectly affect the SRH of women. Interventions targeting these points are expected to produce effects that will not only improve women's SRH but trickle down to other aspects of health. This study found that the social independence domain of empowerment (education, access to information, and age of first cohabitation and childbirth) has the strongest effect on SRH. It is therefore expected that intervening at this level will provide a significant improvement. For example, improvement in SRH could be achieved by interventions that enable girl child education. Ensuring that more girls are in school for longer durations will reduce the rates of early marriages and early childbirth. These girls are also more likely to acquire information about SRH. Public health practitioners can also intervene by providing SRH services for these women.

5.7. Opportunities for future research

Findings from the systematic review have demonstrated the need for a uniform tool that can appropriately measure empowerment within and between-country comparisons. Another glaring gap was the lack of qualitative studies measuring women's empowerment, which calls for additional studies to examine the context and nuances associated with women's empowerment in Africa. These findings open up a whole new playground for research that will explore the relationship between SRH, such as and these neglected components (psychological, legal, and political).

Finally this study has demonstrated a need to conduct studies that will monitor and evaluate existing policies and interventions which target women's empowerment and SRH. These studies will identify challenges and best practices that will help achieve better SRH for Nigerian women and African women in general.

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