2022

Type of Union and Reproductive Health Influence on Domestic Violence in Sierra Leone

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This is to certify that the doctoral study by

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Walden University
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Abstract

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by

Yvonne Rowe

MS, University of Maryland 2010

BS, University of Maryland 2006

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

November 2022

Abstract

Domestic violence (DV) is one of the most hidden but prevalent public health concerns affecting women of childbearing age in Africa despite ongoing prevention initiatives. Lack of power and control in the household is a significant precursor of DV in women, especially in sub-Saharan Africa. While poverty, gender inequality, and societal norms have been identified as directly related to DV, the factors of type of union and reproductive health choice remain unexplored. This quantitative study with a cross-sectional design assessed the relationship between the type of union, female contraceptive use, and type of DV amongst women in Sierra Leone. Anchored on the social-ecological model, a retrospective secondary dataset from the 2019 Demographic and Health Survey in Sierra Leone was used. The dataset included 3,440 women in Sierra Leone between the age of 15 to 49, of which 930 women were selected from the northern region. Using multinomial logistic regression, the analyses revealed a strong connection between age ($p < 0.001$), type of union ($p < 0.001$), and female contraceptive use ($p = 0.046$) under the physical and emotional abuse categories of DV. Findings may be applicable in developing DV interventions that target age-specific groups, type of union, and female contraceptive use that bring about positive social change within the broader community by empowering women of childbearing age to speak up and potentially fostering the development of programs to protect the reproductive health choices of women in Sierra Leone.

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Dedication

This doctoral study is dedicated to my husband Sean Rowe, my children Naydia, Sean, my mother Adita, my sister Lisa, my brother Erol, my nephews Piyush and Ethan, my nieces Emily and Elianna, brother-in-law Kirk Shorter and the entire Rowe, Stewart, Swaby, and my Kaiser family. I want to pause to recognize my late best friend Kareen Henry, who lost her life at 21 years to DV. To add, I dedicated this study to all women victims of DV who stayed in an abusive relationship to keep their families together. This degree would not be possible without God giving me the strength and my family encouraging me to stay the course. For my entire family, I am forever grateful for your kind words of encouragement and support throughout the whole process.

Acknowledgement

I would like to recognize God for His continuous blessings and the people in my life who stood by me during the process of my doctoral study. I am grateful for the support and words of encouragement that everyone has provided me throughout the past years. I owe my heartfelt gratitude to my chairperson and committee member, who stood by me while I worked through each step of my doctoral capstone. Also, I would like to thank the entire Walden professional teams, which supported me with research tips to finding relevant articles, and my family and friends. Without the support of everyone, it would have been impossible to accomplish my doctoral degree.

I recognized Dr. Jirina Foltysova, my capstone chair, for her dedication, guidance, and support throughout the process. I am forever grateful to you. You are a kind and compassionate person who desire others to achieve their goal. I could not have asked for any other chairperson than you. You provided me with the strength of an authentic coach through your actions and words of encouragement.

Thank you Dr. Namgyal Kyulo for serving as my doctoral capstone committee member. I am grateful for his knowledge and expertise and his willingness to answer questions for me whenever needed. Thanks to my URR Dr. Daniel Okenu for your exceptional knowledge, great feedback, which, in turn, allowed my paper to become a stronger capstone. For that, I am genuinely grateful.

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Section 1: Foundation of the Study and Literature Review

Domestic violence (DV) is defined in this study as any violent act that includes physical abuse, sexual abuse, or emotional abuse against women (Tekkas Kerman & Betrus, 2018). The Centers for Disease Control and Prevention (CDC; 2021) defines DV as violence against an individual. For example, physical abuse, sexual abuse, emotional abuse, or stalking are forms of violence that can threaten the health and safety of women of childbearing age 15 to 49 years. DV against women continues to be an ongoing public health issue that requires immediate multidisciplinary implementation of preventative intervention. In part, for women victims of childbearing age (15 to 49 years), according to experts from the World Health Organization (WHO; 2021), DV is a significant issue that requires more intervention to tackle influential underlying factors that place women at risk for DV, and the health and safety of women remain a top priority.

To bring awareness to the ongoing issue of DV against women of childbearing age, several public health organizations support the call to address DV such as the CDC, WHO, the United Nations (UN), and countries have developed and implemented policies and laws to protect women against violence, such as in the 1994 UN Special Rapporteur mandate to reduce violence and strengthen women's right. Despite implementation and interventions to reduce DV, globally, in 2021, 27 % of women of childbearing age 15 to 49 expressed experiencing some form of DV, including physical abuse, sexual abuse, emotional abuse from partners. Likewise, 1 out of 3 women acknowledged having experienced DV at one point in time (WHO, 2021). Similarly, DV is widespread in all nations. In many cases, the prevalence is higher in middle and low-income countries,

with approximately 37 % of women reporting experiencing DV compared to those living in high-income countries (WHO, 2021).

DV against women of childbearing age has many health and societal consequences, including homicide, suicide, unwanted pregnancy, sexually transmitted infection, HIV, low education attainment, and poverty. This is true in the region of Sierra Leone, in sub-Saharan Africa, where the prominence of polygamy is widely practiced (WHO, 2021).

Globally, the issue of DV is recognized as a human rights problem that requires immediate interventions by public health leaders; not having a multisectoral approach to prevent DV is problematic. Moreover, involving key stakeholders such as policymakers who can implement stricter laws and regulations that govern and protect women's human rights can provide a safe environment and reduce the number of DV victims, especially in countries with patriarchal laws that do not support gender equality (WHO, 2021).

Multiple research studies have shown that women of childbearing age who live in a region where polygamy widely practiced are more likely to experience DV, marital issues, poverty, and lack of educational attainment (Lasong et al., 2020; Yerges et al., 2017). For example, Nahar and Mengo (2019) revealed a strong connection between partner control and victims' dependency on the abuser as a precursor for DV. Furthermore, victims are unable to make routine decisions such as health choices access to preventative health decisions involving reproductive health choices and contraceptive usage. Also, women of childbearing age who experience DV tend to depend more on

their abuser to make routine decisions, limiting access to preventative health decisions such as reproductive health.

Researchers have thoroughly investigated potential factors that impact DV from various lenses, such as the victim's education level, income, and living in a region where male dominance and control are sometimes acceptable behaviors (Tsai et al., 2016 & Teshale, 2022). Still, little research has been conducted to show the connection between abusers' attempts to control victims' reproductive health needs, such as withholding money to get contraceptives.

Although the topic is not studied widely in Sierra Leone, other studies in both Bangladesh and India show an association between DV and women not having access to female contraceptives (Silverman et al., 2007 & Wilson-Williams et al., 2008). Both studies revealed that women exposed to intimate partner violence are less likely to accept or use contraceptive methods during postpartum. However, compliance with contraceptive methods usage might avert violent behavior, resulting in unwanted pregnancy and involuntary abortion (Silverman et al., 2007 & Wilson-Williams et al., 2008). On the other hand, little attention has been given to other influential factors, such as female contraceptive use and how an abuser can use a child to trap a victim in a relationship. Correspondingly, the victim may be less likely to leave the relationship (Wilson-Williams et al.,2008).

My study examines other underlying factors that might contribute to DV against women of childbearing age, such as type of union and reproductive health choice to better understand how different factors might influence women's rights to reproductive

health decision-making, such as the type of union. Also, it was essential to conduct this study to understand the rippling effect of DV and the factors associated with DV against women living in a region where polygamy is widely practiced. Understanding the issue can help to bring about interventions geared to empower women and support gender equality. Moreover, enacting and reinforcing laws and regulations can bring about social changes in victims' communities.

In Section 1, I present the background, problem statement, the purpose of the study, knowledge gap, positive social impact, research questions and hypotheses, theoretical and conceptual framework, the nature of the study, literature search strategy, theoretical framework, conceptual framework, literature review related to key variables and concepts, definitions, assumptions, scope and delimitations, limitations, significance, summary, and conclusions.

Background

The prevalence of DV against women of childbearing age in Sierra Leone is most likely to continue because of societal norms that condone violence and support gender inequality. The proliferation of DV has been around for years, with human rights advocates calling for action. In previous decades and in response to growing prevalence of violence against women, the UN called for an effort to prevent violence against women; in 1994, the UN called for action to avert DV by the UN representatives' member countries (UN, 2021). However, there is still a significant gap in DV laws and regulations to protect women victims despite this mandate.

For this research study, the focal area was Sierra Leone. Studies have shown that years of civil war and underlying cultural acceptance of a patriarchal society affect the structural aspect of how women are valued and respected (Beoku-Betts, 2019). Despite the previous push for implementing the Sierra Leone national action plan (SLNAP), DV continues to increase (Beoku-Betts, 2019). The country's population, post-war, showed a younger population of women with a median age of 19.7 years with 35.04 births/ 1,000 population. Furthermore, as of 2021, the median birth age in Sierra Leone was 19.6 years and the contraceptive prevalence rate of 21.2% was lower than other countries in the same region (Central Intelligence Agency [CIA], 2021).

In the 2019 Sierra Leone demographic health survey (DHS), 61% of women surveyed of childbearing age confessed to experiencing DV, including physical abuse, sexual abuse, or emotional abuse. In similar research findings, public health experts from the WHO (2021) reported that 37% of women living in developing nations experience DV, with 33 % of victims living in the sub-Saharan region of Africa. Based on a prior research study conducted outside of Sierra Leone, most DV victims of childbearing age lived in polygamy unions and had a lower level of educational attainment. Specifically, there is a significant role in the type of relationship and women's attitudes towards DV and reproductive health (Gwatimba et al., 2020; Olorunsaiye et al., 2017; Yerges et al., 2017). Research has shown DV is not centralized to one area; in Lasong and colleagues' cross-sectional study (2020) using a secondary dataset from the Zimbabwe DHS, the authors examined the association between DV amongst women of reproductive age, 15 to 49 years. The authors identified a strong relationship between DV and the education

attainment of married women living in sub-Saharan Africa. Also, the study's findings show a strong association with DV amongst women of reproductive age, between the ages of 15 to 49 years (Lasong et al., 2020). A previous retrospective study outside of Sierra Leone focused on exploring the relationship between women living in South Africa in a polygamous relationship and how the connection between reproductive health and intimate partner violence could influence women to be involved in a polygamous relationship with older men. The researchers identified a significant connection between lack of education and economic empowerment as a role in women's decision to stay involved in a polygamous relationship (Musawenkosi et al., 2018).

Another finding that connects with a comprehensive understand of DV is reproductive health management. In the 2019 Sierra Leone DHS study, reproductive health usage among women in Sierra Leone varies significantly. Based on the evidence, 46% of married women of childbearing age acknowledged the need for preventative reproductive health management. At the initial survey, despite the desire to seek reproductive health management, only 26% of currently married women actively used contraceptive management (Statistic Sierra Leone [STATS SL] & ICF, 2020). For women of childbearing age living outside of Sierra Leone, reproductive health management correlates with DV as do social determinants such as lower income, marital instability, gender inequalities, and lower education levels of abusers. Findings from Habyarimana et al. (2021) showed a connection between Rwandan women who were currently living in polygamous union and a higher risk of DV; also, there is a strong

relationship between the education level of the victim's husband and the prevalence of DV (Habyarimana et al., 2021).

In 2019, the STATS SL & ICF study focused on the prevalence of DV, contraceptive use, and polygamy from various lenses (STATS SL & ICF, 2020). Similarly, McClintock et al. (2021) and Tiwari et al. (2018) investigated polygamous relationship prevalence and the effect on a woman's reproductive health, such as the unmet reproductive health needs and emotional abuse in other regions sub-Saharan Africa.

However, there is very little or no literature on how a type of union, reproductive health (contraceptive use), and DV affects women of childbearing age living in regions of Sierra Leone where the prominence of polygamy is widely practiced. At the same time, most research studies focus on investigating polygamous relationship prevalence and effect on a woman's reproductive health from a different lens, such as women's unmet reproductive health needs and emotional abuse (McClintock et al. 2021 & Tiwari et al. 2018). My study is significant because there is limited research focusing on women's reproductive health decisions in childbearing age, DV, and the type of union. Furthermore, globally, in 2019, there were approximately 1.9 billion women of childbearing age between 15 to 49 years, with 1.1 billion women reported needing contraception. Of the number of women who reported need, only 842 million currently use contraceptive methods, and 270 million reported having unmet contraceptive needs.

This study is needed because contraceptive access can avert unwanted pregnancy and pregnancy-related health risks and promote educational opportunities and economic

opportunities (see WHO, 2020). Importantly, public health experts' roles include advocating for social changes, as in this case, addressing the global prevalence of DV. This study was needed because contraceptive access can avert unwanted pregnancy and pregnancy-related health risks and promote educational opportunities and economic opportunities (see WHO, 2020). Uniformly, lobbying key stakeholders and policymakers to develop and implement policies and regulatory laws can bring positive social change within Sierra Leone and the global community.

Furthermore, it is vital to understand and engage with health issues that might impact social determinants and influence women's empowerment, such as DV and reproductive health decision. So, policies geared toward reaching a broader community might help bring awareness to the ongoing issue. Another essential point is not having adequate resources and information on the current association between DV, reproductive health, and union type. DV could lead to health-related unmet contraceptive needs, especially among women aged 15 to 49 who live in polygynous unions. Findings from this study might contribute to the generalized public health field of study and help bring about social change and gender equality for women living in Sierra Leone, where the prominence of polygamy is widely practiced.

Problem Statement

The situation or issue that prompted a search of the literature is the widespread prevalence of DV against women of childbearing age and the impact on women's human rights and well-being. Globally, one-quarter of women of childbearing ages 15 to 49 years are at risk for DV (WHO, 2021). For example, the effect of DV of any form

negatively impacts a women's overall health. As highlighted, various factors affect the health and well-being of women victims of DV, such as physical, mental, reproductive health, and sexual health, which places women at a higher risk for acquiring HIV (WHO, 2021).

According to Semahegn and Mengistie (2015), DV against women continues to be an ongoing public health issue worldwide, despite a push by human rights advocates for interventions to safeguard gender equality for women. DV victims of childbearing age living sub-Saharan regions of Africa where the prominence of polygamy is widely practiced often face multiple social challenges. These challenges can include a lack of control over reproductive health management resulting in unwanted pregnancy, which can lead to unemployment, poverty, unmet educational needs, and an inter-reliance on the perpetrator (Gibbs et al.,2020).

As stated above, DV against women is a public health issue that impacts the broader community at multiple levels. Hence, it is critical to bring about social change within communities for the safety of DV victims, especially in sub-Saharan Africa where the prevalence of DV is 33 % compared to 25% in European Countries (Gibbs et al., 2020; WHO, 2021). Furthermore, for women living in Sierra Leone, societal norms and practices influence DV behavior against women. For instance, cultural behavior affects how community members mobilize and intervene in DV conflicts and provide support for women victims (Beoku-Betts, 2019; Gibbs et al., 2020). Besides, DV victims often suffer in isolation because of fear, financial insecurity, and inability to work and care for

themselves and their children. The consequences of DV have a rippling effect that places women at a greater risk for disenfranchising decision-making power.

Equally, allowing a woman to feel empowered can lead to lasting change that might reduce the influential factors that drive women to be involved in a polygamous relationship with older men (Musawenkosi et al., 2018; Semahegn et al., 2019). Moreover, in the sub-Saharan region of Africa, some of the growing issues are the lack of policies geared towards gender equality and protecting women's human rights, along with the lack of qualified public health experts. This ongoing problem continues to be a challenge for DV victims in regions such as Sierra Leone, where DV might not be considered an immediate public health crisis by policy makers.

To address the above problem, in 2021, public health experts from WHO called for the strengthening of guidelines and policies that support countries to identify specific underlying issues through collaborative efforts to bring about social change (WHO, 2021). The specific research problem that I addressed through this study is to an association between DV, current reproductive health choice, and observed type of union among Sierra Leonean women of childbearing age (15 to 49 years). Despite prior researchers' findings from the investigation of DV prevalence, there is very little or no literature on the influence of reproductive health choice, observed type of union, and the likelihood of having an experience of DV in Sierra Leone.

Purpose of the Study

The purpose of this quantitative study was to examine reproductive health choice (female contraceptive use) and observed type of union correlated with the type of DV

among Sierra Leonean women in childbearing age between 15 to 49 years after adjusting for women's age, wealth index, religion, and educational attainment. The study used an exploratory approach to identify the potential association between reproductive health choice, observed type of union, and how these factors might influence DV against women of childbearing age.

For this study, there were two predictor variables: reproductive health (female contraceptive use) and type of union (in polygynous, non-polygynous, or currently not in union). The dependent variable accounted for the type of DV experienced by women victims of childbearing age: physical abuse, sexual abuse, and emotional abuse. The confounder variables included women's age, wealth index, religion, region, education attainment.

The study focused on the northern region of Sierra Leone, which is the region with the highest prominence of polygamy practice. To determine the region within Sierra Leone where the prominence of polygamy widely practiced, I ran a descriptive statistic using the type of union and region to identify the region with the most polygynous unions in the data set.

I applied Bronfenbrenner's socioecological model (SEM) in this study. The concepts and behavioral models that ground this theory align with factors within environment that can influence behavior such as physical, social, cultural environment (Glanz et al., 2015). In my study, the five hierarchical levels of SEM were applied: individual, interpersonal, community, organizational, and public policy. These five levels

provided a framework for implications to bring about social change for women of childbearing age victims who experienced DV.

Research Questions and Hypotheses

In this study, I used secondary dataset from the 2019 Sierra Leone DHS to examine the following three research questions.

Research Question 1 (RQ1): Is there an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$1: There is no association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

H_1 1: There is an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where

the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 2 (RQ2): Is there an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV(no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$2: There is no association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$2: There is an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely

practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 3 (RQ3): Is there an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$3: There is no association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$3: There is an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the

prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

The focus of the research questions is to examine the relationship between the type of union, female contraceptive use, and type of DV among women of childbearing age 15 to 49 years, living in the selected region of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced: To determine the region within Sierra Leone where the prominence of polygamy is widely practiced, I ran descriptive statistics using the type of union and region to identify the region with the highest number of polygynous unions.

The association being tested and how the variables are measured: Intrapersonal: gender (dichotomous), Intrapersonal: age (ranked), interpersonal, community, public policy: DV (nominal), Intrapersonal: type of union (nominal), Intrapersonal, interpersonal: reproductive health (nominal), Intrapersonal: education attainment (nominal), intrapersonal; wealth index(ranked), Regional (nominal)

Theoretical Framework

I applied the SEM theory's concepts and behavioral models to ground this study. The SEM aligns with factors that influence behavior within the physical, social, and cultural environments (Glanz et al., 2015). Based on public health experts from the CDC (2021) and Glanz et al. (2015), the application of the SEM model provides a foundation and guide in developing research studies that focus on violence. Likewise, the SEM guides the researcher in identifying underlying contributory factors at multiple levels; for example, addressing and preventing violence requires understanding social and

environmental factors and how these factors might influence DV within the community (CDC, 2021).

I used Urie Bronfenbrenner (1979) model in this study, which focuses on the conceptual SEM framework. The logical connections between the framework and the nature of this study included social and environmental factors that might play a role in DV. Hence, the application of the SEM helped me consider the underlying contributory factors impacting DV at multiple levels, between individual, relationship, community, and societal factors and how addressing and preventing violence requires understanding social and environmental factors which influence DV within the community (see Glanz et al., 2015). Moreover, when applied to determine the hierarchies of behavior influence and how these impacts might affect preventative behavioral changes, the SEM model serves as an upstream guide to involve multilevel interventions.

Figure 1

The Social Ecological Model

Note. Adapted from "The Social-Ecological Model: A Framework for Prevention" by Centers for Disease Control and Prevention, 2022. (https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html)

The social-ecological model levels in figure 1 described the influences of DV at each level:

1. Individual/Intrapersonal: covers attitudes and belief about violence, history of violence or witnessing violence
2. Relationship/Interpersonal: strongly patriarch, physical, sexual violent, unsupportive family
3. Community: general tolerance of violent behavior with the community, poverty, lack of employment, lack of support from police, weak sanction against perpetrators
4. Societal: inequality, gender, cultural belief, religious, social policies, and economic

Table 1 depicts an overview of variables and research questions and the level of measurement influence under the SEM levels.

Table 1

Variables and Research Questions Identified at Each Social Ecological Model

Levels	Variables	Research question using these variables
Intrapersonal/Individual, Community	Is there an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	RQ1
Interpersonal/relationship Community	Is there an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	RQ2
Intrapersonal/individual Interpersonal/relationship Community	Is there an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	RQ 3

Furthermore, when SEM applied to determine the hierarchies of behavior influence and how these impacts might affect preventative behavioral changes, the SEM model serves as an upstream guide to involve multilevel interventions that can bring about changes at different levels (Glanz et al., 2015).

According to Tekkas Kerman and Betrus (2020), examining DV from a broader avenue to include SEM multilevel concepts: intrapersonal (personal history of the individual: age, education status, income, norms, and cultural beliefs), interpersonal (spouse, friends, family), community (workplace, community availability of resources such as safe shelter for victims, and support group) and societal(financial security, poverty, laws, and policies in place to protect victims of DV) can bring about changes at all levels.

As noted above, DV against women continue to be an ongoing challenge which requires a SEMs multidisciplinary implementation of interventions at multilevel that focuses on the broader community. To describe the impact of DV, Semahegn et al. (2017) suggested the transformation of communities as an approach to preventing DV against women. As noted earlier, globally, one in three women experienced DV, driven by poverty, polygamous relationship, access to education, income insecurity, and lack of reproductive health control management (WHO, 2021). Based on previous scholarly literature reviews, violence against women deeply rooted in societal views embedded in gender-based inequality (Behrman, 2019; Gibbs et al., 2020; Semahegn et al., 2019).

This research's underlying theoretical framework model focused on using the social-ecological model to identify environmental behavioral which influence DV against

women of childbearing age living in Northern Sierra Leone. By integrating the social-ecological model, I had more insight on how DV impacts victims and the wider community (Semahegn et al., 2017). Also, I applied finding that might bring about social changes for victims of DV. I purposed an integrated multidisciplinary interventional approach using SEM as a guide to bring about social change at all levels. As stated earlier, the ongoing issue of DV described above is a critical public health issue that requires an understanding of the multiple underlying barriers and challenges women victims of DV in the age group of 15 to 49 from seeking help, such as financial security, poverty, and lack of education (Behrman, 2019; Semahegn et al., 2019).

For my research study, the application of the SEM theories and concepts helped connecting specific context of the study, which focused on DV against women between the age 15 to 49 years living in Sierra Leone or other countries within sub-Saharan Africa where polygamous marriage widely practice. Mainly, the theory provided essential guidance to understand behavior that impacts the individual and the broader communal area. Also, considering the factors associated with DV and the application of the SEM can help guide the development of the program and map interventions to prevent DV among women of childbearing age.

The logical connections between the framework presented and the nature of this study include preventing and advocating for protection for women against gender-based inequality, likewise, implementing interventions that geared to upstream approach, also will provide an opportunity for leaders to have multiple interventional changes at all levels. Undoubtedly, building interventions on metatheories will give a broader

integration of different views; each fundamental aspect of the applied theory can influence behavioral change at all levels. As noted above, DV issues require interventions that address individual, community, and societal needs. Likewise, tackling these issues will necessitate government interventions such as policies, laws, regulations, and preventative interventional health promotion programs.

Nature of the Study

In this study, I used a quantitative cross-sectional study design along with retrospective secondary data source from DHS. The data in the study from 2016 to 2019 Sierra Leone dataset from the Demographic and Health Surveys (DHS) program, to determine whether there was an association or relationship between type of union, reproductive health (female contraceptive use) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing ages 15 to 49 years, living in the selected region (eastern, northern, north-western, southern, and western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy widely practiced, after controlling for women's age, wealth index, religion, and education attainment. The data analytical strategy included descriptive statistical analysis, inferential statistical analysis, which I used to understand association between the predictor variables type of union, female contraceptive use and outcome variable type of DV. I used a Multinominal logistic regression examine association between the predictor variables and the outcome variable.

A multinominal logistic regression test can help determine whether there was relationship or an association between the outcome and predictor variables. The

multinominal logistic regression test was appropriate to show association or relationship between reproductive health (female contraceptive use) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) females in childbearing ages 15 to 49 years, living in the selected region (eastern, northern, north-western, southern, and western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy widely practice and currently residing in type of union (in a polygynous union, in non-polygynous union and not currently in a union).

To determine the region within Sierra Leone where the prominence of polygamy widely practiced. I ran descriptive statistics using the type of union and region to identify the region with the most polygynous unions.

There were two independent variables: reproductive health (female contraceptive use) and type of union. Reproductive health was described by female contraceptive use as *yes* or *no*. Type of union observed was defined as in a polygynous union, in a nonpolygynous union, or not in an union. The dependent variable of DV was defined as the type of abuse, whether physical abuse, sexual abuse, or emotional abuse. The covariates included women's age, wealth index, religion, education attainment.

For this research study, I requested permission in writing to the primary investigator with a detailed overview of the planned research design and a full explanation of intent. I outlined the primary purpose of the dataset used for the capstone research study and handled data to secure information to avoid compromising the dataset. The approved dataset owned by the primary investigator Demographic Health and Survey (DHS funded by United States Agency for international development (USAID). The

primary investigators provide support to developing countries; the survey allows for a nationally representative household survey that includes population, health, and nutrition data. The sample size for the above study was between 5,000 to 30,000 households. The official approval for this dataset consisted of a written letter request from me explaining the intend of usage. I received a written approval letter from the primary investigator DHS, to use data resources from the Sierra Leone 2019 Demographic and health survey dataset in this research study.

Literature Search Strategy

I used a combination of Walden University library, google, and Google Scholar for my literature search strategy. In the Walden library system, I used various databases. The following databases used APA PsycINFO, CINAHL Plus, Medline with Full Text, PubMed, and ScienceDirect. I used Google search engines, Government websites, and health organization websites. The following keywords were used to search the literature*: type of marriage polygamy, non-polygamy monogamy, social-ecological model, Sierra Leone, Africa, sub-Saharan Africa, intimate partner violence, DV, violence against women, reproductive health, usage of contraceptive, polygyny, polygynous, public health, married women, income, childbearing age, quantitative, meta-analysis, and religion.* To get insight into DV's independent variable, I reviewed information from governmental sources Center for Disease Control and Prevention, World Health Organization, and United Nations. In the geographical region of Sierra Leone, I reviewed current demographic information from the United States Central Intelligence Agency (CIA) World Fact book to understand current events in Sierra Leone.

The scope of literature reviewed was within five years from 2016 to 2021. Research articles include peer-reviewed, government sites and reputable organizations such as the Centers for Disease Control and Prevention, World Health, and United Nations.

Theoretical Framework

The application of theory is vital in research and practice. In a research study, understanding the behavior requires guidelines for action. Glanz et al. (2015) explained theory as a set of concepts, constructs, variables, and models that provide a systematic approach to understanding and explaining phenomena (Glanz et al., 2015). This study's behavioral model is Urie Bronfenbrenner's social-ecological model (SEM) concepts and behavioral model. SEM model is commonly used to understand the interaction between an individual and environment and how these factors might play a role in behavior (Glanz et al., 2015).

In 1979 Urie Bronfenbrenner introduced the SEM model focusing on three underlying environmental systems: microsystem, mesosystem, exosystem, and the macrosystem. The *microsystem* level of the theory centers on factors that influence behavior, consisting of interaction within the family structure and workgroup interaction. The *mesosystem* examines a broader level of interaction, including physical family, school, and work setting. In contrast, the *exosystem* consists of a more general scale of interaction such as economics and politics. Whereas *macrosystem* is more the overarching aspect of culture, subcultural includes economics, education system, and how this system influences behavior (Bronfenbrenner, 1977).

The social-ecological model (SEM), the concepts and behavioral models ground this theory, align with factors within a physical, social, cultural environment that influence behavior (Glanz et al., 2015). Public health experts from the CDC (2022) and Glanz et al. (2015) agreed on the importance of applying the SEM as a guide in a research study focusing on violence to identify underlying contributory factors at multilevel; for example, addressing and preventing violence requires understanding social and environmental factors and how these factors might influence DV within the community (CDC, 2022). The SEM presented in this study is significant to health promotion.

For this study, I applied the CDC (2022) social-ecological model framework for DV prevention focusing on four-level SEM, including individual, relationship, community, and societal. The multilevel aspect of the model allows interventions to develop at all levels: individual, relationship community, and societal. Uthman et al. 2010, applied the SEM theory to understand the influence of intimate partner violence in sub-Saharan Africa. Based on the findings, intimate partner violence behavior is influenced by multifaceted factors best explained through the contextual evaluation of each level of SEM. Despite the positive aspect of the multilevel approach to behavioral interventional changes, the model does not provide specific influences.

As noted in previous studies, SEM is a hallmark theoretical framework to understand behavior. Semahegn et al. (2017) suggested the transformation of communities as an approach to preventing DV against women. According to Tekkas Kerman and Betrus (2020), examining DV from a broader avenue to include SEM

multilevel concepts: intrapersonal (personal history of the individual: age, education status, income, norms, and cultural beliefs), interpersonal (spouse, friends, family), community (workplace, community availability of resources such as safe shelter for victims, and support group) and societal (financial security, poverty, laws, and policies in place to protect victims of DV).

The rationale for selecting the SEM framework conceptualizes, to have the ability to value factors that influence DV from multilevel. The theory relates to the current study. As mentioned before, DV is a global public health issue that requires intervention to protect victims and bring about communal change. Particularly, DV impacts individuals, relationships, communities, and society. Also, the research questions focus on exploring how reproductive health, type of union, geographical region, prominence of polygamy might influence DV.

Table 2

Theoretical Framework of Each Variable

Social Ecological Model	Research Questions and Variables
Intrapersonal Level (Individual)	Reproductive health choice, type of union, women's age, religion, wealth index, education
Interpersonal (Relationship)	Type of union
Community	Region
Societal (public policy)	Education attainment

Intrapersonal Level (Individual)

Reproductive health choice focused on female contraceptive use. At this level, does the individual has access to birth control. The type of union observed by the individual in a polygynous union, in a non-polygynous union, or not currently in a union. Other covariates variables such women's age, wealth index, religion, region, education attainment.

Interpersonal (Relationship)

Reproductive health choice focused on how partner might influence the choice of contraceptive use. DV predictor of violence, relationship influence by prominence of polygamy.

Community (settings within the community, workplace, school, religious centers, or social clubs)

DV acceptance by community, prominence, and practice of polygamy

Societal (public policy)

The type of program in place to provide access to reproductive health and protect women from DV abuse.

Literature Review Related to Key Variables and/or Concepts

DV against women is a well-researched topic by scholars due to its impact on women's human rights and gender equality. This study investigated the connection between DV, reproductive health, and type of union. My objective was to determine if there was a link between DV reproductive health and type of union among women of childbearing age living in a selected region of Sierra Leone in sub-Saharan Africa, where polygamy is widely practiced.

A quantitative cross-sectional study design was used along with retrospective secondary dataset from DHS. In this study, DV was delineated as physical abuse, sexual abuse, or emotional abuse. The independent variables were reproductive health choice and described female contraceptive use as yes or no, and the type of union included polygynous union, in a nonpolygynous union, and not currently in a union. In preparation, I conducted a comprehensive review of prior scholars' studies on DV involving women of childbearing age or reproductive age who lived in regions where the prominence of polygamy is widely acceptable. More specifically, most studies were geared to countries in the region of sub-Saharan Africa.

In Lasong et al. (2020), the researchers examined trends and factors such as husband's abuse of alcohol, partner growing up in a family where wife-beating is acceptable, and the educational attainment of married women and their husbands to determine the possible association of DV among married women of reproductive age

living in Zimbabwe. At the same time, Owusu and Agbemafle (2016) assessed factors aligning DV with higher neonatal morbidity and mortality among married pregnant women living in Ghana. In both studies, the researchers used cross-sectional studies with a secondary dataset from a demographics survey. Although both studies undertook a similar systematic research approach, there were various vital findings. For Owusu and Agbemafle (2016), the key findings were that educational level achievement, alcohol use by husband, and prior parental history of abuse increases the risk of DV for married women living in Ghana. In Lasong et al. (2020), the main findings were that women in a polygamous marriage were more likely to experience DV than women in a nonpolygamous relationship.

To add, in studies conducted by both Alquaiz et al. (2021) and Lasong et al. (2020), the researchers emphasized the importance of understanding influential factors associated with DV, such as type of union and reproductive health choices, instead of focusing on DV alone. According to the authors, understanding different influential factors is another approach in addressing DV among women. Other research studies focusing on DV against women, including ones by Njie-Carr et al. (2021) and Ola (2021), identified a comparable prevalence of DV or intimate partner violence against women. Findings from these studies emphasize the dynamics of DV and the long-term impact on both victims and survivors of violence. Additionally, women who are victims or survivors of DV were more likely to experience chronic health and emotional issues (Tiwari et al., 2018). Adding to the above studies, Adefalu et al. (2019) identified a strong connection between countries with poor law and interventional infrastructure for

victims of DV as a leading driver for psychological effect on women living in sub-Saharan Africa. Some of the researchers' suggestions are that DV will not resolve without developing and investing in community-based interventional programs and focusing on laws and regulations that govern and address women's human rights. Moreover, the issue of DV is still a rising incidence that most people remain afraid to discuss openly, especially in communities where the behavior is widely accepted. Even though there were similarities between the studies noted above, there is still variation because of other multilevel factors and the geographic location of DV victims. According to Pandey (2016) and Adefalu et al. (2019), public health experts must highlight the ongoing issue of DV to address sociocultural and structural norms and lack of human rights law as the drivers, especially in most developing nations. In other words, data precisely captured by researchers are sometimes integrated, such as the type of DV. For example, the term DV and intimate partner violence are used interchangeably in different regions. Therefore, the lack of consistency of terms might impact how respondents respond to questions or share DV experiences. As noted by Øverlien and colleagues (2019), using the correct words relating to DV during interviewing sessions is critical since victims create their meaning through their experience based on what makes sense to their life experience.

In most of the studies reviewed for this study, researchers consistently underpinned their investigation of DV, focusing on using the SEM to exemplify how DV might impact victims at various levels. When applied to a study, the SEM can help to strengthen the study since it provides a broader level for an implication of intervention as the underlying contributory factors that can interplay at multilevel. For example,

intervention can be tailored to address DV at the individual, relationship community, and societal level (Glanz et al., 2015).

Irrespective of the strengths noted above, some gaps have been identified in some of the approaches used by the researchers. For example, this is a quantitative study and a secondary dataset was used; therefore, the trustworthiness of the data might be an issue since data from self-reports could vary depending on respondents' willingness to report DV or experiences might not have been captured appropriately. Despite the potential weakness, the ability to have access to a secondary dataset allows researchers to explore possible factors that might link to DV and help develop and implement a preventative intervention.

In this study, I examined multiple scholarly research studies. Based on findings, there is still a direct gap between DV, reproductive health, and the types of union among women of childbearing age living in Sierra Leone, where the prominence of polygamy widely practiced. As noted by the WHO (2021), the prevalence of DV is higher in developing countries than in other developed countries. However, the prevalence of women living in Sierra Leone exposed to DV might be more significant because of the post-war and ongoing conflict in addressing women's human rights and gender inequality (Beoku-Betts, 2019).

Independent Variable

Reproductive Health (female contraceptive use), in this study reproductive health defined as contraceptive use methods including female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms, or if no respondents do not

use any form of birth control. In findings from King et al.'s (2018) study focusing on Roma, the noted contraceptive use can significantly impact DV's prevalence. The authors contribute the finding to poverty, the law of resources, and the availability of specialized clinicians. According to the researchers' women living in countries with economic problems, lower education attainment, poor access to health care might be at a higher risk for DV since having ready access to contraceptive resources increases the likelihood of compliance with birth control (Marston et al., 2018). The study's strength contributes to the literature on women's human rights; in particular, this study highlights the need for sexual education and reproductive health education and resource women of childbearing age.

Corresponding studies conducted in sub-Saharan Africa, Wandera et al. (2018) identified a strong relationship between married women living in Uganda, contraceptive use, and intimate partner violence (physical, sexual, or emotional). The study showed a strong connection between a woman's request for a partner to use condoms as a form of contraceptive as an indicator for DV. To add, half of Uganda's married women who participated in the study experienced intimate partner violence. Likewise, only a quarter admitted to using contraceptive measures. Overall, most women in the study identify requesting a partner to use condoms to prevent pregnancy as having a higher chance for violent behaviors (Wandera et al., 2018).

In addition to the above, King et al. (2018), Olorunsaiye et al. (2017), and Wandera et al. (2018) also presented studies with a similar finding of an association between contraceptive use and DV. The authors examined women in seven West and

Central African countries, including Sierra Leone. The study aimed to examine the association between women's attitudes towards contraception usage and the risk of DV. The authors identified that norms and practices might have been a barrier in women seeking contraceptives. Likewise, some of the challenges noted were lack of access to contraceptives, health literacy (respondent inability to understand how to use contraceptives effectively), and lack of accessible family planning clinics.

Furthermore, evidence in the study correlates with prior studies noted above; the unique differences observed in the study are that women who experience DV are more likely not to use contraception. More specifically, all the studies mentioned above identify a need for countries to strengthen their policy, law, and practice. The authors recommend a qualitative study grounded in understanding a women's perspective and contraceptive use for further research studies.

Type of Union was identified in that study as polygynous union, non-polygynous union, and not currently in a union. In the purpose studied region, there were limited studies available addressing unions. Looking outside of the studied region, in Nevala's (2017) study focusing on women residing in European Union (EU), the author seeks to understand the link between a woman's living relationship and the risk of experiencing DV secondary to the role of coercive partner control as a factor. Additionally, the author noted variations of screening among EU countries. Based on findings, women with a partner who uses coercive control experienced higher psychological and physical abuse. However, the limitations identified in the study were that the specific type of relationship or union was not measured. In addition, the inquiry focuses on EU countries. The

strength of the study, it provides the scholars with additional evidence of other factors that might influence DV. One of the recommendations from the author is for additional countries to routinely screen women for coercive control.

More specific studies by Behrman, 2019; Lasong et al., 2020; and Habyarimana et al., 2021 centered their studies in the region of Sub- Saharan Africa on the connection between women living in a polygamous type of union and DV. The overall findings from each study confirmed that women were living in polygamous unions or at greater risk for DV. The authors suggest that a women's partner's age is a potential risk since most spouses are much older than their female partner. Moreover, these countries have a higher prominence of male dominance behavior.

Another study by Fagbamigbe and colleagues (2020) concentrated more broadly on investigating any marriage and the connection between DV. The researchers identified a higher risk for DV regardless of the type of marriage and the type connected to DV in three African countries: Mozambique, Nigeria, and Kenya. Significantly, findings from the study correlate with previous studies mentioned above; there was a higher chance of DV among women regardless of the type of union. In particular, for women living in countries where culturally, the behavior of DV is acceptable, the issue might go unnoticed since society accepted the behavior as social norms. Additionally, one other finding worth noting from the above studies is that younger married women were at a higher risk for DV, which correlates with women of childbearing age. The above research studies are essential to the conversation of DV amongst women in childbearing.

For unmarried women, there were limited studies available focusing on DV. Likewise, considering the amount of study conducted on DV, there were limited studies that specifically addressed women who were actively living in a household with a partner and not married. However, the results became available when intimate partner violence was included in the conversation. Naved and Khan (2021) investigated women who were never married but, in a relationship, and living in Bangladesh. The depth of study circles more on women who were never married; however, there was inadequate evidence to support if these women were actively living in a committed union or relationship with a partner; therefore, for this study, one of the limitations is not knowing the connection with the living arrangement. However, information gained from the study showed that unmarried women are also at an increased risk for DV.

Dependent Variable

DV is defined in this study as physical abuse, sexual abuse, and emotional abuse. Also, the term DV is used interchangeably as intimate partner violence, depending on the region and time of publication. In the evaluation of finding from multiple sources focusing on physical abuse, the assessment of studies conducted by Ellsberg et al. (1999); Kassa and Abajobir (2020); Pandey (2016); and Wencheko and Tadesse (2020) all suggested shown a strong relationship between higher poverty rates, lack of law and policies supporting gender equality among women victims of childbearing age and experienced physical abuse. In Wencheko and Tadesse's (2020) study, one crucial pointer worth noting was that out of 5,184 participants of women of childbearing age who were polled, 24 percent of women agreed wife beating is justifiable. Likewise, depending on a

women's religious affiliation, the acceptance of wife-beating changes. For example, in the study, Muslim women were less likely to oppose wife-beating when compared to Christian or other religious groups (Wencheko & Tadesse, 2020).

Prior studies also focused on sexual abuse against women of childbearing age living in a region of sub-Saharan Africa, showing a strong connection between male dominance, poverty, educational level, and women not working outside of the home (Kawuki et al., 2021; Okenwa et al., 2009).

Another study conducted outside of Africa in Turkey shows that sexual abuse is strongly connected to a woman's age, education level, and not being employed outside of the home. However, in the same study, result findings show a higher risk for employed women to experience sexual violence outside of the house than unemployed women. Thirdly, whereas, for emotional abuse in studies, most perpetrators and victims do not view the issue as DV. However, for women living in countries where DV norms and behavior are acceptable underlying issues might not be reported as DV (Tiruye et al., 2020). An additional study outside of Africa focuses on emotional abuse, showing a strong relationship between a women's reproductive health. The authors of this study assessed data from 60,350 women living in India; based on the result, 38 percent of women who polled in the study admitted that emotional abuse by spouses might have hurt their reproductive health because of the psychological impact of the abuse (Tiwari et al., 2018).

Supporting Covariate

The covariate in this study were women's age, wealth index, religion, education attainment. Prior research studies have shown a close relationship between women's age and their risk for DV; according to prior findings from other studies, women between the age of 15 to 49 years are at a higher risk for DV (Alkan and Tekmanlı, 2021; Alquaiz et al. 2021; Yuksel-Kaptanoglu et al. 2012). Likewise, multiple scholarly studies have shown that type of union, wealth, religion, and education might play a significant role in DV. According to findings from Habyarimana et al. (2021), there is a higher trend of DV depending on household wealth and education level. At the same time, both Alkan and Tekmanlı (2021) and Kawuki et al. 2121emphasized the importance of including marital, age, education in studies since these factors might also influence victims of DV. Therefore, controlling for these factors that influence DV is crucial to reduce limitations and increase the generalizability of the study.

As noted earlier above, DV is an extensive research topic by scholars. I conducted numerous literature review for this paper focusing on different type of DV findings by expert scholars. Given the vast depth of this topic, numerous issues remain to explore, such as DV amongst same-sex couples, DV against male partners by the female partner amongst partners in developing countries such as Africa, and the implication of laws in developing countries to prevent DV. To the best of my knowledge, there were inadequate evidence on this research topic that analyzing the link between reproductive health (female contractive use) type of union (polygamous, non-polygamous, not in an union), and DV amongst women of childbearing age living in Sierra Leone sub-Saharan Africa.

Definitions

The operational definition for variables in the study includes DV, gender, reproductive health, type of union, age, wealth index, prominence of polygamy, region of Sierra Leone, and education attainment.

Gender: In the use of the term female, it is imperative to explain the term in the content of the study. According to Paçarizi (2021), the term sex denotes the biological difference between males and females, whereas gender refers to socially constructed categories based on sex. For this study, the term gender refers to females born with physical organs at birth.

Childbearing Age: The mean age at which a woman's first birth occurred. The term refers to childbearing age interchangeably with women of reproductive age 15 to 49 years (WHO, 2021).

Reproductive Health (female contraceptive use): defines a woman's reproductive health needs, including contraceptive use, access to contraception, having the ability to make contraceptive health decisions for a healthier sexual and reproductive future (Ahinkorah et al., 2020).

Type of Union: for this study focusing on the prominence of polygamy, type of union defines as the type of coupling relationship or intimate family structure (Goldfarb, 2021) included in a polygynous union, in a non-polygynous or not currently in a union.

Prominence of Polygamy: geographical region where multiple partners relationship is highly practice. Typically, the practice is common in community with strong cultural and norms of multiple cohabitation practice (McDermott, 2018).

DV: this term is used interchangeably with intimate partner violence depending on the region. Kramer and Finley (2021) defined DV as a type of behavior used by one partner in a relationship to control the other. In this study, the term type of DV used to describe violence against women by a male partner includes physical abuse, sexual abuse, and emotional abuse. Physical abuse against women consists of physical contacts such as slapping, hitting, or punching. Sexual abuse is a partner committing nonconsensual sexual acts without permission or forcing sexual acts without victims' consent. Emotional abuse includes verbal communication that humiliates another person's self-worth, such as shouting at, scolding, or mocking (WHO, 2021).

Assumptions

The study focused on four assumptions. These assumptions were necessary for the background of the study.

- It is assumed participates in the survey gave verbal or written consent to participate.
- The assumption is that all field editors and surveyors received the same training and used the same collection and data evaluation mode during collection. Likewise, data was handled ethically, and participates were not coercion to participate in the survey.
- Respondents respond honestly to the questionnaire.
- Following assumption, examined participants' health perspective to avoid gender bias.

These assumptions were necessary to ensure data was collected according to institutional review board guidelines, and participants' autonomy to participate was respect and data check for accuracy and consistencies and error.

Scope and Delimitations

The study's scope focused on women of childbearing age 15 to 49 living in regions of Sierra Leone where the prominence of polygamy is widely practiced. The information was helpful to understand the factors that might influence DV or reproductive health and the type of union. Equally, not addressing DV could be result in human rights violation against women's right to a safe, socially, and economically stable environment. Besides, DV has a lasting impact on women's health; if we do not address the DV, this issue will transfer over to future generations (Ahinkorah et al., 2018).

The boundaries of the study focused on DV against women in childbearing age 15 to 49. The population excluded from this study includes women over 45 years. Carthy and Taylor (2018) described DV abuse in women over 45 years as fear of the unknown or the inability to navigate the system after being in the same relationship for some time. Another concern cited by researchers is that majority of older women over sixty felt they were at the end of their life to leave a comfortable environment and rebuild, for them, reporting and seeking help for DV might be a challenge to navigate necessary available resources (Carthy & Taylor, 2018).

The study has potential for generalizability. The method of recruitment and the inclusion criteria, detailed information on data collection could be generalized to similar

studies focusing on DV in women. However, the study cannot be generalized to male victims of DV.

Limitations

There were several limitations I would like to note from this study. First, the dataset is a secondary dataset from DHS. Another possible limitation was the participants' selection process, and the primary investigator used the 2015 Sierra Leone census survey that divided each region of the country into a cluster. While there was no specific limitation identity for internal or external validity or the confounder variables, the possibility of limitation might increase since the data is a secondary source. Likewise, the selection process might increase a risk for selection bias since participants were not randomized into a specific group. The potential external validity limitations were the adequacy of the sampling design and the willingness of participants to provide meaningful information on questions specific to address DV issues and reproductive health decisions.

The biases that could influence the study outcome were interviewing participants not part of the original preselected household. Another potential bias would be handling sensitive DV information to protect the DV victim's identity. The DHS applied multiple techniques to address limitations to reduce the limitation risk, such as interviewing preselected households in the implementation phase. Likewise, the application of appropriate data management through sample weights and calculated and added to the file to ensure representation from all districts.

Significance

The study of DV against women of childbearing age living in Sierra is significant because there are limited research studies focusing on women's reproductive health decisions in childbearing age, DV, and the type of union, to the best of my knowledge. My study is essential to the overall health and safety of women. My study aimed to understand factors that influence reproductive health choice and DV against women of childbearing age 15 to 49 years living in Sierra Leone Sub–Saharan Africa.

Further, as a public health leader, one of my roles is to advocate for social changes that will bring awareness to women's human rights and gender equality. Furthermore, as leaders, we can influence for change by advocating, lobbying key stakeholders and policymakers in the development, and implementing of policies and regulatory laws that can bring positive social change within Sierra Leone and the global community.

My research as the potential to contribute to the public health field of study since DV continues to be a public health crisis which impacts people and the community. The variables in the study, reproductive health (female contraceptive use), type of union, and DV, are critical to address, understand and engage with victims. Moreover, addressing other social determinants of health issues that align with health and well-being is more likely to influence how women feel empowered to report DV issues and advocate for reproductive health decisions. Therefore, to connect the gaps noted in my study, there will be a need for policies and interventions that can reach a broader community when developed.

An additional pointer was the lack of adequate resources and information on the current association between DV, reproductive health, and union type. Also, this could lead to health-related unmet contraceptive needs, especially among women aged 15 to 49 who live in polygynous unions. Also, not addressing women's reproductive health needs could result in unplanned pregnancies and lack of spacing between children, leading to a higher risk of maternal and infant mortality. According to Aleni et al. (2020), inappropriate spacing of children could lead to inadequate recovery from previous pregnancy secondary to macro and micronutrient depletion. Also, women are at a higher risk for pregnancy-related complications that might result in maternal mortality.

There is a favorable possible implication for positive social change in addressing gender equality. Also, identifying the region where polygamy widely practiced could be another approach in connecting key stakeholders and engaging with community leaders to get involved in preventive interventions that gear to bring about social change and stop the occurrence of future generations of DV victims.

Summary and Conclusion

Previous research has shown that DV a global public health issue that does not have any boundaries. As noted above, 1 in 3 women experiences DV worldwide, including physical abuse, sexual abuse, and emotional abuse. Also, the experience of DV places women at risk for years of physical and psychological health issues. At the same time, women who experience DV are also robbed of their autonomy to make reproductive health and childbearing decisions. In like manner, for women who are living in areas where the prominence of polygamy is widely practiced and DV behaviors are acceptable,

not addressing the issue will carry over to future generations, and the cycle of DV will continue. The influence of reproductive health choice (female contraceptive use) and type of union influence DV in women of childbearing age living in Sierra Leone is unknown. An additional gap identified that will be vital to public health practice is developing and implementing interventions that focus on the partner of victims. Not involving the perpetrator in the intervention process can delay interventions that bring about behavioral change. By involving perpetrators, they can change their behavior; likewise, getting everyone involved in preventing DV could result in an accomplishment for the entire community.

Besides, addressing these issues can alleviate future economic instability, bridging and inequality gaps. To conclude, social change in Sierra Leone and other sub-Saharan African countries will require policy changes, laws, and regulations that specifically support women's human rights and empowerment to leave relationships. Stopping DV will require everyone's involvement at all social and ecological levels to bring about social change from an upstream approach.

Section 2: Research Design and Data Collection

Worldwide, the prevalence of violence against women, including DV, is a significant concern for public health experts and policymakers (WHO, 2021). DV does not have any boundary, and 1 out of 3 women have admitted to experiencing DV; the issue is more pronounced for women of childbearing age and who live in sub-Saharan Africa (WHO, 2021). Besides, the effect DV impacts women's human rights and robs women of the right to make health decisions such as reproductive health choices (Ahinkorah et al., 2020; Nahar & Mengo, 2019). DV continues to be an issue, despite the mandate and request by public health experts for more enforcement of laws to protect women against perpetrators, especially in areas where the DV behavior is viewed as normal and acceptable by the community. Also, women living in regions with DV behaviors may view it as normal. They, at times, suffer in silence (Cools & Kotsadam, 2017). Furthermore, for women victims of childbearing age, the challenge is more profound than getting out of a relationship, surviving after leaving an abusive situation continues to be an issue for victims. According to Reese et al. (2021) and McClintock et al. (2021), most women who stay in DV relationships in the region of sub-Saharan Africa do so because of the intergenerational transfer and acceptance of DV behavior. Another issue for women victims is the inability to provide for their own basic needs.

This study aimed to examine the connection between a women's reproductive health choice (female contraceptive use), type of union, and DV, and how this might influence women of childbearing age living in a region of Sierra Leone where polygamy is widely practiced. In this study, I analyzed the connection between reproductive health

(female contraceptive use), type of union, and DV to provide more insight into the implication of the prominence and practice of polygamy and how this issue might impact the region in study. Furthermore, there are research findings from Sierra Leone that align with prior researchers' findings, such as how women view and place emphasis on a stable living environment rather than leaving a relationship for uncertainty (Thobejane, 2016; Tiwari et al., 2018). Additionally, it is essential to note that regions with higher patriarchal norms support spousal abuse and control over women's reproductive health choices. Similarly, these behaviors are socialized and reinforced as a part of premarital teaching (Chisale, 2016).

Section 2 will cover research design and rationale, the methodology including an overview of the population, sampling procedures I used, instrumentation and operationalization of constructs, operationalization of each variable used in the study, and the data analysis plan. The section also includes threats to validity, ethical procedures, and a summary.

Research Design and Rationale

A quantitative study was designed to examine the association between type of union, reproductive health (female contraceptive use), and type of DV. The following variables were applied to examine for association and differences among DV victims living in the region of Sierra Leone, where the prominence of polygamy is widely practiced. The dependent variable, DV, was measured as the different forms of DV abuse, including physical, sexual, and emotional. The independent variables in the study concentrated on factors that impact the uptake of DV amongst women of childbearing

ages, such as reproductive health (female contraceptive use) and type of union. The independent variable, reproductive health, measured contraceptive use by women of childbearing age.

The independent variable reproductive health addresses how reproductive health might impact DV from the SEM perspective. The intrapersonal factors include women understanding reproductive health and how this might influence decision-making in power in reproductive health management. The interpersonal factors include partner, family, and friends, and how they might influence a woman's decision in reproductive health management. At the community level, resources available to women include education on reproductive health management, DV prevention programs, education empowerment, lack of access to health services, low health literacy, and health decision-making autonomy on when to start a family.

The second independent variable, type of union, focused on the current living arrangement of women of childbearing age; these include polygynous union, nonpolygynous union, and not currently in a union. According to the SEM, the intrapersonal factors include marriage arrangement, teen marriage, lack of education, poverty, religion, culture, and norms. The interpersonal factors are partner, family, and friends and how they might influence the type of union. These factors impact the type of union at the community level, such as the region in Sierra Leone where polygamy is predominantly practiced, religion might be a factor, as well as arranged marriage, women marrying older men, poverty, and lack of education and financial security. At the community level, SEM factors include lack of women's rights laws to protect against

force or arranged marriage, a lack of jobs, infrastructures that foster education for young women, and a lack of resources. The covariates of women's age, the wealth index, religion, and education attainment may also impact type of union.

This quantitative research study used a cross-sectional design using retrospective secondary data sources from DHS studies from 2016 to 2019 Sierra Leone dataset from the Demographic and Health Surveys (DHS) program. The purpose design used to determine whether there was an association between reproductive health (contraceptive use) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among females of childbearing ages 15 to 49 years, living in the selected region (eastern, northern, north-western, southern, and western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy widely practiced, after controlling for women's age, wealth index, religion, and education attainment.

Next, whether there was a difference in the interaction between reproductive health choice (female contraceptive use), type of union female currently residing in union (in polygynous union, in non-polygynous union and not currently in a union), and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among females in childbearing ages 15 to 49 years, living in the selected region (eastern, northern, north-western, southern, and western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy widely practice. To determine the region within Sierra Leone where the prominence of polygamy widely practiced. I ran a descriptive statistic to identify the region with the most polygynous unions.

Cross-Sectional Design

Using a cross-sectional design with a retrospective dataset reduces the number of collection times. Typically, a cross-sectional design helps the researcher to examine and compare the desired population at one point in time to describe the characteristic of the population in the study (Allen, 2017). Furthermore, it was cost-effective since the primary investigator already does most of the groundwork. Also, the secondary dataset from DHS has a large sample size between 5,000 to 30,000 participating households. In addition, expert researchers frequently apply cross-sectional design to describe a population without manipulating variables. Furthermore, this design used mainly for census studies, focusing on understanding the overall population (Allen, 2017). Another advantage of using the above design was that it enables the researcher to assess the association among multiple outcomes of interest (Bangdiwala, 2019). Also, for both experts and scholars, the cross-sectional design provides an insight that helps advance knowledge in the public health discipline space, as we focus on the global population health.

Methodology

In this study, the focus was on DV which continued to be an ongoing public health issue that has a lasting impact on women's human rights and gender equality (WHO, 2021). The targeted population in this study are women in childbearing age 15 to 49, living in region of Sierra Leone where prominence of polygamy widely practiced. This quantitative study uses a retrospective cross-sectional design with a secondary dataset from DHS, 2019 Sierra Leone Demographic and Health Survey. The initial data

collection took place between May 15 to August 31, 2019. The population in the study includes 15,574 women in the age group of 15 to 49 living in the different geographical regions of Sierra Leone. The primary investigator DHS uses the Women's Questionnaire survey to collect information on fertility, awareness, and use of family planning methods, DV, breastfeeding practices, nutritional status of women and children, mortality for both women and child, and other health-related issues (Statistics Sierra Leone [STATS SL] & ICF, 2020).

Sampling Procedures Used by Original Creators of the Data set

The primary investigators, the DHS, used a national sample survey that provides updated information on Sierra Leone's demographic and health indicators (STATS SL & ICF., 2020). According to Creswell and Creswell (2018), having a plan prior to conducting research is critical to the study's success. Based on STATS SL & ICF (2020) publication on Sierra Leone 2019 demographic survey, the authors described the comprehensive study as follows, a stratified sample with two stages of cluster design. According to the primary investigators, regions were stratified to include two districts into the urban and rural areas. The first stage includes an enumeration area (EA) of equally divided into subsections of sample units. These EA units were originally defined in the 2015 population and housing census survey that includes different Sierra Leone provinces that were divided into districts, which were further divided into chiefdoms census. According to the public health research team from STATS SL & ICF (2020), all households listed in the 578 selected enumeration during the second stage. The authors

explained how the targeted group were selected, including women aged 15 to 49 and males between 15 to 59.

According to public health experts from STATS SL & ICF (2020), the total study representative sample size, including both women and men, was approximately 13,872 households, with half of the household (6,936) selected for biomarker and men's survey. Household participants were from different provinces of Sierra Leone. The subsample household includes women from Eastern, Northern, Northwest, Southern, and Western Areas.

In the study, public health experts from STATS SL & ICF (2020) describe participants' distribution as 19.7 % Eastern, 21.3 % Northern, 16.1 % North West, 18.6 % Southern, and 24.3 % in the Western Areas, which is one of the largest provinces. As such, the DHS statistician used calculation mathematically to weight and adjust the number of women from each province, so the contribution from each woman was proportional representation in the study. In addition, the researchers randomly selected one eligible woman from each household sample to survey for additional questions concerning DV. Also, the researchers ensured that the sample size was appropriate to maintain generalizability which is essential to representing the broader Sierra Leone population.

To gain access to the dataset, I requested permission in writing with a planned overview of the research design and a full explanation of intent and reasoning. I delineated the primary purpose of the dataset, which was for doctoral capstone research study. Also, I assured the primary investigator of my intention to ensure information

security and avoid any compromise of the dataset. The Sierra Leone 2019 Demographic and health survey request from the DHS program source based on request approval for this study. The Demographic Health and Survey (DHS funded by United States Agency for international development (USAID) owned the approved secondary dataset. The primary investigators provide support to developing countries; the survey allows for a nationally representative household survey that includes population, health, and nutrition data. The researchers in the study clearly defined the inclusion and exclusion criteria. The researchers described the eligibility criteria for participants. Participants in the sample meet the criteria for gender female and age 15 to 49. The specific inclusion criteria are age, gender, and biomarker to include the height and weight of women participants; the study's exclusion criterion was women over 49 years and male. Identifying the inclusion and exclusion criteria helps avert any risk for the study's internal and external validity violation.

For this study, the G *Power software analysis used to determine the sample size's effectiveness. The G *Power was suitable since it provides two types of procedural variation to estimate power, enumeration, and large sample approximations (Faul et al., 2009). Mainly, the enumeration procedure used by the DHS provides practical information and the sample size of the population in the study. For this study, an effect size of 0.3 used to calculate the strength of association or differences between variables. In addition, an alpha level of 0.05 used as a threshold to determine if the null hypothesis ought to be rejected. Also, the chance of a false-positive result might result in a type 1 error. So having a significance alpha level of 0.05 or 5 %, it is more unlikely that the null

hypothesis would be rejected (Bruce et al. 2018). The minimal sample size required for this study was 150 based on a calculation using G* Power 3.1.9.6 X (Heinrich-Heine-Universität Düsseldorf, 2022).

Instrumentation and Operationalization of Constructs

The 2019 Sierra Leone Demographic Health Assessment develops under the DHSs programmers' guidance funded by the United States government and collaborative efforts from key stakeholders. The structural foundation of the questionnaires was used in prior population-based studies in Sierra Leone from 2008, 2013, and 2019. The primary objective of the survey questionnaire was to gather information on fundamental demographic and health indicators. This information provides up-to-date information on the population. Likewise, results from the questionnaire are intended to use policymakers and programmers to develop programs that will address the overall health care need of the country. The questionnaire was appropriate for the current study because it provides information on women's overall health, including reproductive health, DV, nutritional status, access to health, and maternal and child health. Reliability defines as the consistency of results from multiple measurements or observations by the researcher (Bruce et al., 20218).

The United States Agency funds the DHS organization for International Development (USAID), the organization is well known globally for demographic surveys that focus on population health. With the consistency and repeatability of these surveys, findings are relevant to this current study. Alike, the study's validity aligns with the actual

situation because of the consistency of the measurement of the instrument used by the researchers (Allen et al., 2020).

The DHS questionnaire instrument was used in multiple countries nationally. A similar instrument was used in other countries such as Kenya with 123 publications, Tanzania with roughly 107 publications, and nine in the country of study Sierra Leone. The validity and reliability were established based on the proportion of the population that responded yes to the same question when used globally in multiple repeatable survey questionnaires.

Operationalization of Research Variables

The variables reviewed for this study included key indicators of DV (physical, sexual, emotional abuse), demographic and social-ecological characteristics of female childbearing age victims living in Sierra Leone's region obtained from the DHS 2019 survey. Other key indicators are reproductive health, women's age, wealth index, religion, education attainment, and union type. In this research study, the primary investigator STATS SL & ICF (2020) measured each variable operationalized by using a survey questionnaire tool to collect data and capture respondents' responses using a nominal measuring scale. Tables 3 and 4 provide an overview of the research questions, the type of variables used to investigate each research question, and the type of data and measurement scale. Table 4 shows how the measurement of the variables.

Table 3

Names of Variables Included in the Sierra Leone 2019 Demographic Survey Data Set

Research Questions	Variables	Data Code
RQ 1: Is there an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	Female Contraceptive use (represented by current contraceptive method – Yes/No) Type of domestic (physical abuse, sexual, or emotional abuse) Wealth index (combined wealth index) Education Attainment	V312 D104 D108 D106 D107 V502* V505* V190 V149
RQ2: Is there an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	Type of Union (polygynous, non-polygynous, not currently in union) Type of domestic (physical abuse, sexual, or emotional abuse) Wealth index Education Attainment	V502* V505* D104 D108 D106 D107 V190 V149
RQ 3: Is there an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (Eastern, Northern, North-Western, Southern, or Western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?	Type of Union (polygynous, non-polygynous, not currently in union) Female Contraceptive use (represented by current contraceptive method – Yes/No) Type of domestic (physical abuse, sexual, or emotional abuse) Wealth index (combined wealth index) Education Attainment	V312 V505* V502* D104 D108 D106 D107 V190 V149

Note. Type 3 different variables and data codes.

* Polygynous (V502 = 1 and V505 >0).

* * Nonpolygynous (V502=1 and V505=0).

***Not currently in union (V502=0).

Table 4

Measurement of Independent, Dependent, Covariates Variable From the 2019 Sierra Leone Women's Data Set

Variable Name	Type of Variable	Category	Values and Measurement
Type of DV	Dependent	Categorical Nominal	Physical Violence abuse (Y/N) experience any less or more severe violence by husband/partner Emotional violence abuse (Y/N) experience any emotional violence by husband/partner Sexual violence abuse(Y/N) experienced any sexual violence by husband /partner
Female Contraceptive use (y/n)	Independent	Categorical Nominal	If any Yes (pills, IUD, injection, diaphragm, female condom, male condom, vaginal foams, or jelly, use of implant, female, or male sterilization), then Yes (using contraceptive) If all NO (pills, IUD, injection, diaphragm, female condom, male condom, vaginal foams, or jelly, use of implant, female, or male sterilization), then NO (Not using contraceptive)
Type of Union	Independent	Categorical Nominal	Not currently in union (V502=0). Polygynous (V502 = 1 and V505 >0). Non-polygynous (V502=1 and V505=0).
Wealth Index	Covariates	Categorical Nominal	Poorest, poorer, middle, richer, richest
Religion	Covariates	Categorical Nominal	Islam, Christian, Bahai, Traditional, None, other
Education Attainment	Covariates	Categorical Nominal	No education, Incomplete primary, Complete primary, Incomplete secondary, Complete Secondary, Higher
Women's Age	Covariates	Categorical Ordinal	Age in 5 years group (1) 15-19 (2)20-24 (3)25-29 (4) 30-34 (5) 35-39 (6) 40-44 (7) 45-49

Dependent Variable

The dependent variable measurement of DV focus on specific questions on physical abuse, sexual abuse, and emotional abuse. The instrument used by the primary investigator was a questionnaire with fixed response items to capture respondents' experiences.

- *DV: Physical abuse:* push you, shake you throw, hit, slap, twist your arm, pull your hair, beat, drag push, choke you, threaten or attack with knife, gun, or any other form of weapon?
- *DV: Sexual abuse:* physically force to have sexual intercourse with him without consent, force, or threat to perform sexually acts you did not want to do?
- *DV: Emotional abuse:* say or do something to humiliate you in front of others, threaten to harm you or someone close to you, or insult you or make you feel bad about yourself?

Independent Variables

Reproductive Health (Female Contraceptive Use)

The independent variable reproductive health measure contraceptive use including the method of contraceptive use includes modern methods: injections, pills, implants, condoms, IUD, female, and male sterilization traditional method: lactation amenorrhea, standard days rhythm, and withdrawal?

Type of Union

Type of union measured the current type of union women of childbearing age living in Sierra Leone report polygamy, non-polygamy or not currently in a union. Polygamy includes women who report husband having multiple wives. Non-polygamy union includes women who report husband only have one wife respondent. Not currently in a union includes women who report not having a husband.

Covariate Variables

The covariates variables examined were women's age, wealth index, religion, region, education attainment, type of union.

- *Age*: measured women respondent between age of 15 to 49 years. The age group 15-49 breakdown into seven subgroups 15- 19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45- 49.
- *Gender:* measured respondent assigned sex at birth male or female
- *Wealth index:* measured poorest, poorer, middle, richer, and richest; questions to respondent includes the number of personal household goods ownership includes land, animals, car, television, having source of drinking water, toilet facilities, flooring materials, and mobile phone. Based on respondent respond DHS calculated the wealth index of the overall assess and standard of living as a value of poorest, poorer, middle, richer, and richest.
- *Religion:* measured background characteristic of respondent religious affiliation includes Christian, Muslim, or other.
- *Education Attainment:* the measurement of education attainment was critical to understand the social and economic development of the country. Education attainment measured the highest level of education of respondent (no education, some primary, completed primary, some secondary, completed secondary, and more than secondary education; questions to respondents includes the number of years schooling respondent complete.

Data Analysis Plan

SPSS version 28 software used to perform statistical analysis of the DHS dataset. All necessary cleaning and screening procedure completed after downloading the secondary dataset. Initial data were reviewed during the initial collection phase by fieldworkers and data were stored and submitted via internet file streaming system to the Statistic Sierra Leone. Next, the Data was checked for accuracy and inconsistency. The primary investigator used census and survey processing software (CSPro) for data entry and editing (STATS SL & ICF., 2020).

Regarding missing data, in this research study, I addressed potential missing data by having an adequate sampling size and a well-designed research study; likewise, a weighted mathematically adjusted applied to capture a nationally representative Sierra Leone population estimate. The plan to address missing data for this research analyzes the dataset for missing data. First, I ran a missing value analysis using a little missing analyzing at random test in SPSS; this provided information on the number of missing data. There was minimal dispersion of the missing data finding, I selected the appropriate imputation technique to address the 788 missing values.

Research Questions and Hypotheses

Research Question 1 (RQ1): Is there an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where

the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$1: There is no association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

H_1 1: There is an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 2 (RQ2): Is there an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV(no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$2: There is no association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$2: There is an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 3 (RQ3): Is there an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$3: There is no association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$3: There is an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Variable Scale and Score

The independent variable, reproductive health (female contraceptive use), was measured using a nominal scale/ type of variable and was dichotomous. It measured whether a women used contraceptives with *yes* or *no.* The independent variable, type of union, was measured using a nominal scale based on the attributes describing the type of union (polygynous, nonpolygynous, not currently in union). The dependent variable, type of DV, was a categorical variable and measured attributes of DV abuse: physical, sexual,

and emotional. The covariates were measured using nominal scales regarding each attribute of the variables described in each covariate.

Analysis Plan

I ran a descriptive statistic test to analyze the frequencies and distributions of each variable. I used the predictor variables, reproductive health (female contraceptive use), type of union (in polygynous union, in non-polygynous union and not currently in union) and outcome variable type of DV (no abuse, physical, sexual, and emotional abuse), and covariates women's age, wealth index, religion, and education attainment. Next, to identify the region in Sierra Leone where polygamy prominence widely practiced, I performed a descriptive statistic using the type of union and region to identify the region with the highest number of polygynous unions. Also, I compared the dominant religion Muslim against other religions for the covariate's religion.

Since, I had dichotomous predictor variable and a categorical dependent variable for this study, and both were nominal scale measurement. I used Multinominal logistic regression test to examined for relationship between predictor variable reproductive health (female contraceptive use) and outcome variables type of DV. Likewise, I examined each covariates variables to identify the variable that had the most significant influence on the outcome variable.

I ensured all assumption pertaining to multinominal logistic regress were met including not assume normality, linearity, or homoscedasticity. However, there were some assumptions that needed to be met, such as the assumption of independence amongst dependent variable choices, the dependent variable should be nominal (type of

DV), the independent variable should be dichotomous or nominal (contraceptive use). The following assumption no multicollinearity was met; because there was only one independent variable (Ledolter, 2013). The evaluation criteria used to identify the goodness of fit test of model and testing of individual variables. I used SPSS software to analyze for goodness of fit test of the model and selection of Pseudo *R squares*. Likewise, SPSS software used to test each individual variable. Under parameters select *likelihood ratio tests* to add or omit any predictor variables (Ledolter, 2013). If there was a violation of any of the above assumptions, performing a data transformation approach by modifying or adjusting the variable that violates the assumption might cause skewness or distribution issues (Ledolter, 2013). I analyzed the variables in the dataset for any missing data prior to starting a statistical analysis. The alpha level for this test was set at 0.5 to reduce the risk for type 1 error.

All covariates were essential to understand the association between the predictor and outcome variables in this study. For instance, each of the covariate's variables influenced the overall social-ecological aspect of the population in the study. Therefore, understanding which variable influenced the predictor and outcome variables more can help bring about social change by recommending program and policy changes. After reviewing all the result tables, I reported all results, including key parameter estimates, and reviewed the *P-value* for each variable.

Threats to Validity

There is a likelihood of threat to validity with any research study, which can occur either external or internal. *Threats to External Validity* are essential to ensure that

findings can be generalized to other settings and populations (Urban and van Eeden-Moorefield, 2018). For this study, the applying secondary dataset could be a possible threat to validity. However, primary investigator of this resource is the DHS, a reputable organization that collects information on population health. So far, the organization has collected over 400 demographic health surveys in more than 90 countries worldwide. Some of the approaches that the DHS uses to prevent a threat to external validity are sample allocation representing the population and setting; also, DHS calculates sample errors on all primary variables.

Threats to Internal Validity: since the dataset was from a secondary source, one of the concerns would be the accuracy of the data, testing instrument, and statistical testing of the data. The primary investigator was DHS, which well known as a reputable organization. DHS collected information in collaboration with other local stakeholders in Sierra Leone. During the collection phase, some potential concerns would be if the instrument used could capture and measure different perspectives from the population and the type of selection process. DHS minimized internal validity threats by hiring and training staff on the vital components of the survey, interviewing techniques, and data collection techniques.

For this study, the dataset used was secondary. Likewise, the primary survey tool used was questionnaire instrument. According to Creswell and Creswell (2018), the validity of scores using an instrument is vital to draw valuable and meaningful interpretations. The author suggested three types of validity to monitor content, concurrent and construct. The content validity was relevant to how representative

questions on the test measured the actual issue. Next, concurrent validity was how flexible the instrument was to captured other perspectives on the issue. Third, construct validity aligned with whether the results from the instrument represented the concerns. For instance, we are measuring the relationship between reproductive health and the type of DV abuse in this study. For the result from this study to be practical, results findings should be able to translate into practice or develop policy and programs.

Ethical Procedures

The primary investigator DHS and the government of Sierra Leone ensured the privacy and security of the dataset. Also, the survey protocols were reviewed and approved by various stakeholders, including Sierra Leone Ethics and Scientific board Scientific Review Committee and the ICF the Institutional Review Board (STATS SL & ICF, 2020). Prior to participating, DHS researchers provide disclosure regarding privacy, and participants have the option not to participate since this was voluntary. Also, prior to participating respondent provided DHS with both written and verbal consent.

The researchers used a case identifier to reduce the risk of compromising the respondent's identity. The protect and safeguard privacy and confidential data, investigators used a tablet to collect data. Besides, interviewers were trained to transfer interview data to the central office using a secured internet file streaming system (STATS SL & ICF, 2020). As noted, this study used a secondary dataset. Therefore, the risk for potential ethical issues might arise, especially with collecting and analyzing the data. For this study, I received approval from DHS after applying in writing with full explanation

and disclosure of usage for research capstone purpose. I received Walden IRB approval number 05-25-22-0080057 prior to analyzing the dataset.

Summary

Section 2 provided an overview of this study; a cross-sectional quantitative study design utilizing retrospective secondary dataset from DHS 2019 Sierra Leone. The study aimed to identify an association or relationship between DV and reproductive health (female contraceptive use) and type of union (polygamy, non-polygamy, not in a union) amongst females of childbearing age 15 to 49 years living in Sierra Leone, sub-Saharan Africa. I introduced three research questions that were used in examining the relationship between type of union (polygamy, non-polygamy, not in a union), reproductive health (female contraceptive use) and DV. In addition, this section provided a synopsis of publication from the primary investigator on the procedure and sampling strategy used by the primary investigator STATS SL & ICF (2020). I explained in detail the structure of each variable's operationalization and the type of measurement used in the survey questionnaire to capture responses from participants. Similarly, a comprehensive overview of the data analysis plan included a statistical analysis test to test the hypothesis. Equally, I addressed potential internal and external validity risk, along with any possible ethical issues that should arise with utilizing a secondary dataset. In Section 3, I assess the secondary dataset and present the result findings.

Section 3: Presentation of the Results and Findings Section

This cross-section quantitative study aimed to examine the relationship between DV and the type of union and reproductive health choice of women. More specifically, I looked at women of childbearing age, between the age of 15 to 49 years, living in a region where polygamy is widely practiced while controlling for women's age, wealth index, religion, and education attainment. In this study, I used inferential statistic multinomial regression to examine if there was a relationship between predictor variables and the outcome variable. I used a secondary dataset from the Sierra Leone Demographic and Health Survey for this research. An evaluation of the primary dataset confirmed there were no extreme missing values amongst the 3444 respondents. I used the following three research questions:

Research Question 1 (RQ1): Is there an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

> $H_0$1: There is no association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where

the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

H_1 1: There is an association between female contraceptive use (yes/no) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 2 (RQ2): Is there an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV(no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$2: There is no association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$2: There is an association between type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

Research Question 3 (RQ3): Is there an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_0$3: There is no association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

$H_1$3: There is an association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in union) and type of DV (no abuse, physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in selected region (eastern, northern, north-western, southern, or western) of Sierra Leone sub-Saharan Africa where the prominence of polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment?

The hypotheses were used to test the relationship between the type of union, reproductive health choice (female contraceptive use), and type of DV (no abuse, physical abuse, sexual abuse, and emotional abuse) amongst women of childbearing age, between 15 to 49 years.

Section 3 outlines how I accessed the data set for secondary analysis, including the data collection process, response rate, and any discrepancies from the previous plan noted in Section 2. I provide information on baseline descriptions of demographic characteristics in the sample and any potential external validity issues secondary to the population sample size of interest and not representative of the larger population. This section concludes with findings, from descriptive statistics and multinominal logistic regression tests, which were performed to test the relationship between the predictor variables of type of union and reproductive health choice, and the outcome variable type of DV. Also, this section closes with a discussion of the findings of the quantitative statistical analyses used to test the three research questions.

Accessing the Data Set for Secondary Analysis

For this study, I utilized the most recent 2019 Sierra Leone DHS data focusing on monitoring the population and health. These data were initially collected from May 15, 2019, to August 31, 2019, and published in 2020 for use by the DHS. Over 3,440 women respondents between the age of 15 to 49 years living in different regions (eastern, northern, north-western, southern, and western) of Sierra Leone participated using the woman's questionnaire survey instrument. The dataset included results focusing on demographic and health information, including age, education attainment, wealth index, region, religion, current marital status, contraceptive use, and DV. There were 3,440 respondents; no missing values were noted except for emotional abuse, with 788 missing values.

Discrepancies

There was no significant discrepancy noted from the proposed plan. All required variables for this study were available in the survey dataset. Of note, there were 788 missing values in the emotional abuse variable. These missing values could be due to the subject's sensitivity for a woman to discuss openly or they may not have felt comfortable discussing due to fear, stigma, and cultural norms. The missing values for emotional abuse were left intact for descriptive analysis.

Descriptive and Demographic Characteristic of Sample

The 2019 Sierra Leone survey intended to provide updated estimated information on the population and health indicators in Sierra Leone. The women questionnaire was used to collect information on all eligible women between the age of 15 to 49 years. The

survey was divided into several sections with questions on respondent background characteristics. Specifically, the survey focused on regions, religion, age, marital status, the household characteristic, including (living arrange, access to running water, electricity, and access to healthcare…), reproduction, sexual health, education attainment, contraceptive use, pregnancy, and postnatal care, childhood immunization (last birth), child health and nutrition, fertility preferences, and HIV/AIDS. Only the variables included in the research questions will be analyzed for this study. The above variables provided a synopsis of the overall women's population and health investigation study questionnaire. The baseline sample demographic characteristic of respondents for this study included 3,440 women of childbearing age between the ages of 15 to 49 years living in different regions of Sierra Leone sub-Saharan Africa.

Sample Representativeness

The sample was an estimated representative of the general Sierra Leone population (STATS SL & ICF, 2020). The 2015 Population Housing Census result was used to estimate the number of households and the survey sample frame (STATS SL & ICF, 2020). Respondents included women between the age of 15 to 49 years from the five different regions of Sierra Leone, including both urban and rural areas of the eastern, northern, north-western, southern, and western. Also, to allocate for a non-proportional sampling of districts and differences in responses rate. The primary investigators used sampling weighs so the sample would be representative of the general Sierra Leone population. The primary investigator DHS used data representative of the general

population of Sierra Leone. So, to prevent bias and limit any possible external validity issues.

I used 10 variables within the dataset for this study. The variables comprised of Age, Region, Religion, Wealth Index Combined, Education Attainment, Currently/Formerly/Never in Union, Number of Other Wives, Female Contraceptive Use, and Type of DV, please see Table 5 which reflect additional descriptive details on each variable.

Table 5

Demographic Characteristics of Cohort Sample Size

Variables		Frequency	Percentage
Age in 5-years groups	15-19	168	4.90%
	20-24	526	15.30%
	25-29	750	21.80%
	30-34	610	17.70%
	35-39	703	20.40%
	40-44	391	11.40%
	45-49	292	8.50%
	Total	3,440	100
Region	Northern	930	27.00%
	Southern	834	24.20%
	Eastern	703	20.40%
	Northwestern	563	16.40%
	Western	410	11.90%
	Total	3,440	100
Religion	Islam	2749	79.90%
	Christian	689	20.00%
	None	2	1.00%
	Total	3,440	100
Type of DV	No abuse	1351	39.30%
	Physical abuse	1166	33.90%
	Emotional abuse	786	22.80%
	Sexual abuse	137	4.00%
	Total	3,440	100
Female contraceptive use	No	2759	80.20%
	Yes	681	19.80%
	Total	3,440	100
Number of Other Wives	No other wives	2437	70.80%
	1 additional wife	842	24.50%
	2 additional wives	117	3.40%
	3 additional wives	40	1.20%
	4 additional wives	2	1.00%
	no wife	2	1.00%
	Total	3,440	100
Currently/formerly/never in union		3,440	100.00%
	Total	3,440	100
Education attainment	No education	2211	64.30%
	Incomplete Primary	312	9.10%
	Complete Primary	121	3.50%
	Incomplete Secondary	597	17.40%
	Complete Secondary	109	3.20%
	College	90	2.60%
	Total	3,440	100
Wealth index	Poorest	893	26.00%
	Poorer	796	2.31%
	Middle	752	21.90%
	Richer	536	15.60%
	Richest	463	13.50%
	Total	3,440	100

Selection of Region

To identify the region with the highest prevalence of polygamy in Sierra Leone. Descriptive statistic used to explore the connection between the number of other wives and the different regions, I selected the region with the highest number of other wives. The sample region with the highest number of multiple wives will be used as this study's new sample reference size.

Figure 2 and Table 6 reflect crosstabulation between region and number of wives/partners per respondents.

Figure 2

Crosstabulation: Number of Wives/Partners and Respondents Region

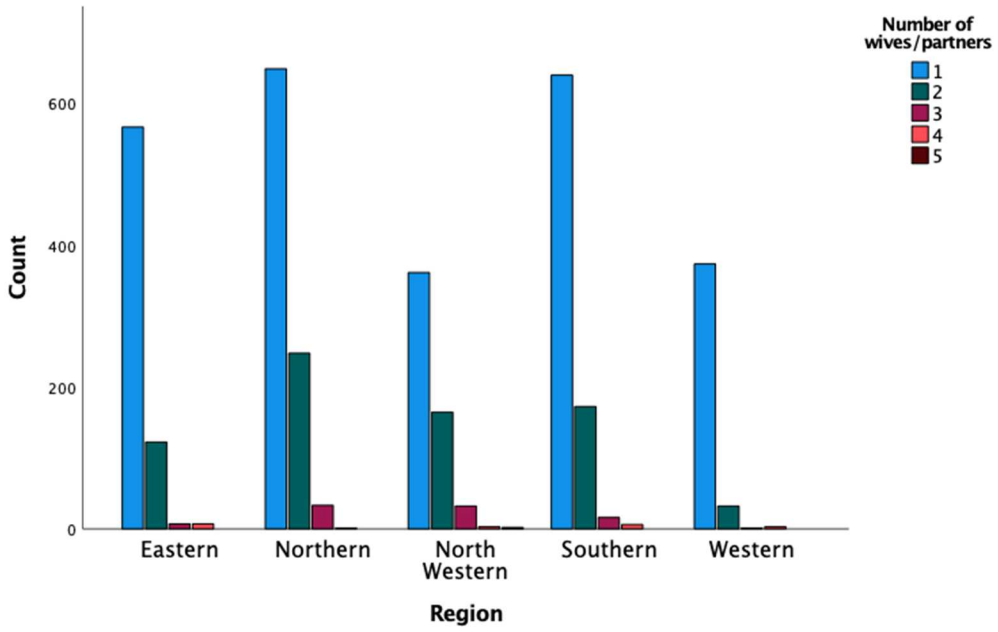


Table 6

Crosstabulation Table: Number of Wives/Partners and Respondents Region

		Number of Wives/Partner					
		1	2	3	4	5	Total
Region	Eastern	567	122	7	7	0	703
	Northern	649	247	33	1	0	930
	North-Western	362	164	32	3	2	563
	Southern	640	172	16	6	0	834
	Western	374	32	1	3	0	410
Total		2592	737	89	20	2	3,440

Based on the total sampling of 3,440 women between the age of 15 to 49 years, there were 930 respondents from the northern region, with 281 respondents living with partners with more than two wives. Compared with the overall Sierra Leone DHS result finding from a sampling of 9715 respondent women between the ages of 15 to 49, the northern region identified as the area with more prominence of polygamy practiced by respondents (STATS SL & ICF, 2020). For this study, the northern region of Sierra Leone identified as the region with the highest prominence of polygamy amongst women of childbearing age between 15 to 49 years.

The northern region was selected as the new sample size out of 3,440 respondents: 930 live in the northern region. For the other variables, I merged two variables to form physical abuse from variables experience less physical abuse and severe physical abuse. These variables were recoded to form physical abuse and then combined with two other variables, emotional abuse, and sexual abuse, to form type of DV. In addition, I merged two variables currently/formerly/never in union and the number of other wives to recode into a new variable type of union. Now, I will describe the demographic of the statistical analysis using sample size characteristics from the northern

region. Please see Table 7 for an overview of the demographic characteristics of the Northern Region.

Table 7

Demographic Characteristics of Northern Region Sample used for this Study

Variables	Frequency	Percent
North	930	100
Total	930	100
Religion		
Christian	159	17.1
Islam	771	82.9
Total	930	100
Wealth index combined		
Poorest	272	29.2
Poorer	233	25.1
Middle	227	24.4
Richer	132	14.2
Richest	66	7.1
Total	930	100
Educational attainment		
No education	692	74.4
Incomplete primary	46	4.9
Complete primary	22	2.4
Incomplete secondary	126	13.5
Complete secondary	26	2.8
Higher	18	1.9
Total	930	100
Female contraceptive use		
No	796	85.6
Yes	134	14.4
Total	930	100
Type of union		
Not in union	1	0.1
Polygynous	571	61.4
Non-Polygynous	358	38.5
Total	930	100
Age in 5-year groups		
15-19	33	3.5
20-24	133	14.3
25-29	202	21.7
30-34	147	15.8
35-39	204	21.9
40-44	113	12.2
45-49	98	10.5
Total	930	100

Results

Statistical Assumptions

For this study, a multinominal Logistic Regression is appropriate to determine if there is a relationship between predictor variables Type of Union and Female Contraceptive and the outcome variable Type of DV (no abuse, physical abuse, sexual abuse, and emotional abuse) since the outcome variable is nominal. Multinominal logistic regression test requires several assumptions that need to be met, which are exclusive of normality, linearity, homoscedasticity, and the absence of multicollinearity.

The first requirement is the outcome variable should be measured using a nominal scale: *Dependent Variable*: Type of DV (No abuse, physical abuse, sexual abuse, and emotional abuse). Second requirement is one predictor variable should be measured using either nominal, dichotomous ordinal, or continuous.

Predictor Variables: type of union (not in union, polygynous, and polygynous) and Female Contraceptive Use (No, Yes) both predictor variables use nominal measurement. Additionally, the assumption for no multicollinearity was met since there were no continuous variables used in this study (Liang et al., 2020 & Laerd Statistics, 2018).

Statistical analyses of Research Questions using Multinominal Logistic Regression

Research Question 1

I used a multinominal logistic regression shown in Table 8 in the Model Fitting Information table. The model fitting criteria and the Likelihood Ratio tests evaluated and compared the overall predictor of female contraceptive use against the null intercept only model using alpha significant threshold of 0.05. The model was a significant fit over the

null model with *x2* (15) = 47.376, $p < 0.05$. This result indicating the entire model predicts the dependent variable (type of DV) better than the null intercept-only model (Liang, J., Bi, G., & Zhan, C., 2020).

Table 8

Model Fitting Information Research Question1

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	*df*	Sig.
Intercept Only	1003.233	1017.739	997.233			
Final	985.857	1072.89	949.857	47.376	15	<.001

Note. x^2 (15) = 47.376, $p < 0.05$.

The Goodness of Fit as shown Table 9, which measures how well the data fits the model. (Laerd Statistic, 2018). Using a $p < 0.05$; the result of the model used the Pearson Chi-Square test indicated the model was not a good fit for the data [*x*2 (648) = 725.086, $p = .019$], while if Deviance Chi-Square is significant if $p > 0.05$; which indicated a good fit for the data [*x*2 (648) =629.111, $p = .695$].

Table 9

Goodness-of-Fit for Research Question 1

	Chi-Square	*df*	Sig.
Pearson	725.086	648	0.019
Deviance	629.111	648	0.695

Next, I reviewed the Pseudo *R* Square indices in Table 10, which measure Cox and Snell, Nagelkerke, and McFadden. Pseudo R Squared in the multinominal logistic regression represents R-Squared which represents the variation of the dependent variable

explained by the independent variables in the regression model (Laerd Statistic, 2018). The indices Cox and Snell (0.50), Nagelkerke (.055), and McFadden (.022) referenced to the model accounts for 2.2% to 5.5% of the variance, which is appropriate.

Table 10

Pseudo R-Square for Research Question 1

Index	Coefficient
Cox and Snell	0.05
Nagelkerke	0.055
McFadden	0.022

Next, the likelihood ratio tests Table 11 provides an overview of how well the independent and covariates contributes to the model using an alpha = 0.05 (Laerd Statistic, 2018). Age in 5 years group was statistically significant at p = .001. Whereas Female Contraceptive Use (p = .190), education attainment (p = .189), wealth index (p = .085), and religion (p = .363) were not statistically significant. In Research Question 1, the likelihood ratio test confirmed that the covariate age in 5 years group contributes significantly to the final model.

Table 11

Likelihood Ratio Tests for Research Question 1

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	*df*	Sig.
Intercept	985.857	1072.89	949.857[a]	0	0	.
Wealth index combined	986.51	1059.038	956.51	6.653	3	0.084
Educational attainment	984.637	1057.164	954.637	4.78	3	0.189
Age in 5-year groups	1001.218	1073.745	971.218	21.361	3	<.001
Female Contraceptive Use	984.614	1057.142	954.614	4.757	3	0.19
Religion	983.049	1055.577	953.049	3.192	3	0.363
North Region	985.857	1072.89	949.857[a]	0	0	.

In Table 12, parameter estimates provide information on whether female contraceptive use as an association. Using a reference category of no abuse against those who reported physical abuse, emotional abuse, and sexual abuse. When comparing physical abuse against the reference category of no abuse, predictor Age in 5-year groups was statistically significant (b = .195, *SE* = .051, $p < .001$). Therefore, if a woman is experiencing abuse, there are more likely to report physical abuse using a 95% Confidence Interval and both (Lower Bound 1.100 and Upper Bound 1.344) which is greater than 1; with an odds ratio of 1.216, the risk of physical abuse increases by 22 %. Therefore, for every 1 unit increase in Age in 5-year groups, the odds of a woman reporting physical abuse increased by 22 %. For the other categories in the type of DV:

emotional and sexual abuse, there were no significant predictors with ($p < 0.05$) when compared to the reference category of no abuse.

Table 12

Parameter Estimates for Research Question 1

Type of DV		B	Std. Error	Wald	*df*	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Physical Abuse	Intercept	-0.736	0.361	4.144	1	0.042			
	Wealth index combined	-0.049	0.068	0.527	1	0.468	0.952	0.833	1.087
	Educational attainment	-0.02	0.071	0.078	1	0.779	0.98	0.853	1.126
	Age in 5-year groups	0.195	0.051	14.58	1	<.001	1.216	1.1	1.344
	Female Contraceptive Use=0 No	-0.015	0.228	0.004	1	0.948	0.985	0.63	1.541
	Female Contraceptive Use=1Yes	0[b]	.	.	0	.	.	.	.
	Religion=1 Islam	-0.225	0.207	1.188	1	0.276	0.798	0.532	1.197
	Religion=2 Christian	0[b]	.	.	0	.	.	.	.
	North Region	0[b]	.	.	0	.	.	.	.
Emotional Abuse	Intercept	0.182	0.392	0.216	1	0.642			
	Wealth index combined	-0.153	0.079	3.796	1	0.051	0.858	0.735	1.001
	Educational attainment	0.101	0.075	1.796	1	0.18	1.106	0.954	1.282
	Age in 5-year groups	-0.029	0.06	0.233	1	0.629	0.971	0.864	1.093
	Female Contraceptive Use=0 No	-0.472	0.239	3.881	1	0.049	0.624	0.39	0.998
	Female Contraceptive Use=1 Yes	0[b]	.	.	0	.	.	.	.
	Religion=1 Islam	0.003	0.229	0	1	0.991	1.003	0.64	1.57
	Religion=2 Christian	0[b]	.	.	0	.	.	.	.
	North Region	0[b]	.	.	0	.	.	.	.

Sexual Abuse	Intercept	-2.723	0.951	8.202	1	0.004			
	Wealth index combined	0.227	0.168	1.819	1	0.177	1.254	0.902	1.743
	Educational attainment	-0.245	0.187	1.709	1	0.191	0.783	0.542	1.13
	Age in 5-year groups	-0.088	0.131	0.454	1	0.501	0.916	0.709	1.183
	Female Contraceptive Use=No	0.197	0.637	0.096	1	0.757	1.218	0.35	4.246
	Female Contraceptive Use=1Yes	0[b]	.	.	0	.	.	.	.
	Religion=1 Islam	-0.953	0.75	1.613	1	0.204	0.386	0.089	1.678
	Religion=2 Christian	0[b]	.	.	0	.	.	.	.
	North Region	0[b]	.	.	0	.	.	.	.

Note: a. The reference category is: No Abuse.

b. This parameter is set to zero because it is redundant.

For research question1, I partially rejected the null hypothesis because female contraceptive use association with type of DV were statistically significant with age in 5-year groups ($p < 0.001$) with a 95 % CI in the physical abuse category The logistic regression model was statistically significant $x2$ (18) = 67.579, $p < .001$. The other predictors' wealth index, education attainment, or religion were not significant amongst women living in the Northern region where the prominence of polygyny is widely practiced, therefore, I partially rejected the null hypothesis because these other variables would reduce the 95% Confident Interval.

Research Question 2

In research question 2 multinominal logistic regression used to determine whether there is an association between type of union (polygynous, non-polygynous, not currently in a union) and type of DV (no abuse, physical abuse, sexual abuse, emotional abuse) among females of childbearing age 15 to 49 years, living in the selected region northern Sierra Leone, which identified as the region where polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment? All necessary assumptions were met for this multinominal logistic regression.

Research Question 2: the Model Fitting Information (Table13) compared the overall model predictors against the null intercept only model using an alpha less than .05. In research question 2 the model was a significant fit over the null model with $x2$ (39) = 108.248, $p < 0.05$. The results mean that the entire model predicts the dependent variable (type of DV) better than the null intercept-only model (Liang, J., Bi, G., & Zhan, C., 2020).

Table 13

Model Fitting Information for Research Question 2

	Model Fitting Criteria			Likelihood Ratio Tests		
Model	AIC	BIC	-2 Log Likelihood	Chi-Square	*df*	Sig.
Intercept Only	1011.076	1025.582	1005.076			
Final	980.828	1183.906	896.828	108.248	39	<.001

Note: $x^2 (39) = 108.248, p < 0.05$.

Table 14 shows Goodness of Fit, which uses Pearson (chi-squared) and Deviance to assess whether the model used was a good fit for the data (Laerd Statistic, 2018). Pearson Chi-Square test indicated the model was a not a good fit for the data [$x2$ (660) = 620.315, p = .864] while Deviance Chi-Square indicated a good fit for the data [$x2$ (660) = 578.143, p = .990].

Table 14

Goodness of Fit for Research Question 2

	Chi-Square	*df*	Sig.
Pearson	620.315	660	.864
Deviance	578.143	660	.990

The Pseudo *R* Square indices in (Table 15) are Cox and Snell, Nagelkerke, and McFadden. The indices Cox and Snell (0.110) Nagelkerke (.122), and McFadden (.050) confirmed that the model accounts for 5.0 % to 12.2% of the variance, which is an appropriate fit for the model.

Table 15

Pseudo R-Square for Research Question 2

Index	Coefficient
Cox and Snell	.110
Nagelkerke	.122
McFadden	.050

The likelihood ratio tests table provides an overview of how well the independent and covariates contributes to the model using an alpha = 0.05 (Laerd Statistic, 2018). In Table 16, age in 5 years group (p = .002) and Type of Union (p = .001) were statistically significant. In comparison to education attainment (p = .167), wealth index (p = .111), and religion (p = .462) were not statistically significant. The result shows that predictors of age in the 5-year group and Type of union contribute significantly to the final model.

Table 16

Likelihood Ratio Tests for Research Question 2

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	*df*	Sig.
Intercept	1046.746	1148.285	1004.746[a]	0	0	.
Educational attainment	1045.814	1132.848	1009.814	5.068	3	0.167
Age in 5-year groups	1055.233	1142.266	1019.233	14.487	3	0.002
Wealth index combined	1046.755	1133.788	1010.755	6.009	3	0.111
Type of Union	1056.235	1128.762	1026.235	21.488	6	0.001
North Region	1046.746	1148.285	1004.746[a]	0	0	.
Religion	1043.318	1130.351	1007.318	2.572	3	0.462

Note. The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

As shown in Parameter Estimates (Table 17), which represent the Coefficients category of Type of Union, includes not in union (0), polygynous union (1), and non-polygynous union (2), the result in the parameter estimates shown below, using the reference category of no abuse against those who report physical abuse, emotional abuse, and sexual abuse. Compared to the reference category of no abuse, there was a significant predictor amongst Age in 5-year groups (b = .158, *SE* = .052, $p < .002$) under the physical abuse category. With an odds ratio with an 95% Confidence Interval and both

(Lower Bound 1.057 and Upper Bound 1.298), which is greater than 1, then the risk of physical abuse increases more times than no abuse in the model if a person experiencing abuse there are more likely to report physical abuse. The odd ratio of 1.172 shows that for every 1 unit increase in Age in a 5-year group, the odds of a person reporting physical abuse changed by 17.2%.

For the predictor variables, type of union under the physical abuse category when compared against no abuse was statistically significant ($p < 0.001$) amongst respondents who acknowledged to be in a polygynous union (b = -.680, SE = .162, $p < 0.001$) in comparison to those not in a union ($p < 0.997$) or non-polygynous union. The 95 % confidence interval with an odds ratio (Lower Bound .368 and Upper Bound 1.298) is less than one. Hence, the model has less risk of physical abuse than no abuse. Therefore, women who experience abuse are less likely to report physical abuse. The odd ratio of .506 shows that for every unit of reduction in a type of union (polygynous), the odds of reporting physical abuse changed by 49.4%, for the other categories, emotional and sexual abuse, no significant predictors against the reference category of no abuse.

I rejected the null hypothesis in research question two because there were statistically significant associations between Age in 5 groups ($p < 0.002$) and type of union (polygynous $p < 0.001$) experiencing DV amongst women of childbearing Age living in the Northern Region.

Table 17

Parameter Estimates for Research Question 2

Type of Union		B	Std. Error	Wald	*df*	Sig.	Exp(B)	95% CI for Exp(B) Lower	Upper
Physical Abuse	Intercept	-0.227	0.318	0.512	1	0.474			
	Educational attainment	0.001	0.072	0	1	0.992	1.001	0.87	1.151
	Age in 5-year groups	0.158	0.052	9.161	1	0.002	1.172	1.057	1.298
	Wealth index combined	-0.042	0.069	0.373	1	0.541	0.959	0.838	1.097
	Type of Union= 0 (not in union)	-16.925	4453.145	0	1	0.997	4.46E-08	0	.[b]
	Type of Union=1 (polygynous)	-0.68	0.162	17.58	1	<.001	0.506	0.368	0.696
	Type of Union=2(Nonpolygynous)	0[c]	.	.	0	.	.	.	.
	North Region	0[c]	.	.	0	.	.	.	.
	Religion=1 Islam	-0.159	0.209	0.577	1	0.447	0.853	0.566	1.285
	Religion=2 Christian	0[c]	.	.	0	.	.	.	.
Emotional Abuse	Intercept	-0.189	0.356	0.281	1	0.596			
	Educational attainment	0.114	0.075	2.309	1	0.129	1.121	0.968	1.298
	Age in 5-year groups	-0.031	0.06	0.27	1	0.604	0.969	0.861	1.091
	Wealth index combined	-0.14	0.078	3.208	1	0.073	0.869	0.746	1.013
	Type of Union= 0 (not in union)	-16.631	5809.639	0	1	0.998	5.99E-08	0	.[b]
	Type of Union=1 (polygynous)	-0.088	0.197	0.198	1	0.656	0.916	0.623	1.347
	Type of Union=1 (polygynous)	0[c]	.	.	0	.	.	.	.
	North Region	0[c]	.	.	0	.	.	.	.
	Religion=1 Islam	0.027	0.229	0.014	1	0.907	1.027	0.656	1.608
	Religion=2 Christian	0[c]	.	.	0	.	.	.	.

Type of Union		B	Std. Error	Wald	*df*	Sig.	Exp(B)	95% CI for Exp(B) Lower	Upper
Sexual Abuse	Intercept	-2.243	0.783	8.2	1	0.004			
	Educational attainment	-0.243	0.188	1.675	1	0.196	0.785	0.543	1.133
	Age in 5-year groups	-0.11	0.133	0.682	1	0.409	0.896	0.69	1.163
	Wealth index combined	0.228	0.167	1.862	1	0.172	1.256	0.905	1.744
	Type of Union=0 (not in union)	-17.402	0	.	1	.	2.77E-08	2.77E-08	2.77E-08
	Type of Union=1 (polygynous)	-0.346	0.417	0.688	1	0.407	0.708	0.313	1.601
	Type of Union=1 (polygynous)	0[c]	.	.	0	.	.	.	.
	North Region	0[c]	.	.	0	.	.	.	.
	Religion=1 Islam	-0.931	0.751	1.536	1	0.215	0.394	0.09	1.718
	Religion=2 Christian	0[c]	.	.	0	.	.	.	.

Note. a. The reference Category: No abuse

b: Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

C. This parameter is set to zero because it is redundant

Research Question 3

Research question 3: multinominal regression use to determine association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in a union), and type of DV (physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years living in Northern Sierra Leone which identified as the region where polygamy is widely practiced, after controlling for women's age, wealth index, religion, and education attainment.

The Model Fitting Information Table 18, Model Fitting Criteria, and the Likelihood Rates tests, evaluated, and compared the overall model predictors against the null intercept only model using an alpha less than .05. In research question one, the model was a significant fit over the null model with *x2* (18) = 67.579, $p < 0.001$. The results mean that the entire model predicts the dependent variable (type of DV) better than the null intercept-only model (Liang, J., Bi, G., & Zhan, C., 2020).

Table 18

Model Fitting Information for Research Question 3

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	*df*	Sig.
Intercept Only	1216.585			
Final	1149.007	67.579	18	<.001

In Table 19 shows the Goodness of Fit includes Pearson Chi-Square test which indicated the model was not a good fit for the data [*x*2 (873) = 925.778, $p = .105$], while Deviance Chi-Square indicated a good fit for the data [*x*2 (873) = 788.556, $p = .981$].

Table 19

Goodness of Fit for Research Question 3

	Chi-Square	*df*	Sig.
Pearson	925.778	873	.105
Deviance	788.556	873	.981

The Pseudo *R* Square indices measure Cox and Snell, Nagelkerke, and McFadden. Pseudo *R* Squared represents *R*-Squared which describes the variation of the dependent variable explained by the independent variables in the regression model (Laerd Statistic,

2018). The result from indices Cox and Snell (0.070), Nagelkerke (.078), and McFadden (.031), indicate that the model accounts for 3.1 % to 7.0 % of the variance, which is an appropriate fit for the model (Table 20).

Table 20

Pseudo R-Square for Research Question 3

Index	Coefficient
Cox and Snell	.070
Nagelkerke	.078
McFadden	.031

The likelihood ratio tests (Table 21) provides information on how well the independent variables (Type of union and female contraceptive use) and the covariates contribute to the model using an alpha = 0.05 (Laerd Statistic, 2018). Both Age in the 5-year group (p = .002) and Type of Union (p = < 0.001) were statistically significant. In comparison to ($p < 0.05$) with a 95 % Confidence Interval, the following predictors female contraceptive use (p = .202), education attainment (p = .223), wealth index (p = .084), and religion (p = .487) were not statistically significant. The likelihood ratio test showed predictor variable Age in 5 years group, and the Type of union contributed significantly to the final model

Table 21

Likelihood Ratio Tests for Research Question 3

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	*df*	Sig.
Intercept	1149.007[a]	.000	0	.
Female Contraceptive Use	1153.622	4.615	3	.202
Type of Union	1169.209	20.202	3	<.001
Age in 5-year groups	1163.640	14.633	3	.002
Religion	1151.441	2.434	3	.487
Wealth index combined	1155.652	6.645	3	.084
Educational attainment	1153.390	4.383	3	.223
North Region	1149.007[a]	.000	0	.

Note. The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

In Parameter Estimates as shown in Table 22 represents the Coefficients category of Type of Union, includes not in union (0), polygynous union (1) and non-polygynous union (2), and female contraceptive use (yes/no); the result in the parameter estimates utilizing the reference category of no abuse against physical abuse, emotional abuse, and sexual abuse. Physical abuse, when compared against the reference category of no abuse, there were significant predictors amongst Age in 5-year groups (b = .158, *SE* =.052, $p <$ .002). The Odds Ratio with a 95% Confidence Interval and both (Lower Bound 1.057 and Upper Bound 1.298), which is greater than 1, determines the risk of physical abuse increases more times than no abuse in the model if a person experiencing abuse there are

likely to report physical abuse. An Odds Ratio of 1.172 showed that for every unit increase in Age in the 5-year groups, the odds of a person reporting physical abuse changed by a factor of 17.2%

Type of union (b = .692, *SE* = .162, $p < .001$) was a significant predictor variable under physical abuse. Using an $p < 0.05$ and 95 % confidence interval with an odds ratio (Lower Bound 1.455 and Upper Bound 2.745) is greater than 1; therefore, as physical abuse increased compared to no abuse in the model depending on the union type. With an odds ratio of 1.998, a woman report experiencing abuse is 99.8% likely to report physical abuse.

Under the category of emotional abuse, female contraceptive use (b = .478, *SE* = .240, $p = .046$) was statistically significant. The 95 % confidence interval with an odds ratio (Lower Bound 1.009 and Upper Bound 2.581) is greater than 1; hence, emotional abuse will increase by 1 unit alongside model reference category no abuse. So, a woman experiencing emotional abuse while using female contraceptive is significant ($P<0.046$). Therefore, it is likely 61.3 % of the time if emotional abuse report while using female contraceptive using an odds ratio of 1.613. The following predictors under Type of DV category physical abuse Female Contraceptive use ($P = 0.831$), Religion ($P < 0.453$), Wealth index combined ($P < 0.52$), and Education attainment ($P = 0.986$) were not statistically significant when compared against the reference category no abuse.

The next category under the type of DV, emotional abuse, the following predictors Type of Union ($p < 0.557$), Age in 5 years group ($p < 0.563$), Religion ($p < 0.947$), Wealth Index combined ($p = 0.053$), and Education attainment ($p = 0.171$) were not statistically

significant at (p = 0.05) using a 95 % confidence Interval. In the sexual abuse category type of DV, the following predictors Female contraceptive use (p = 0.782), type of union (p = 0.396), Age in 5 -year groups (p = 0.42), Religion (p = 0.222) Wealth index combined (p = 0.171), and Education attainment (p = 0.208) when compared to the reference category no abuse amongst women living in North Sierra Leone.

Based on the findings, I rejected the null hypothesis in research question 3. There was a statistically significant association between Age in 5 groups (p = .002), Type of union (polygynous p < .001), and Female contraceptive use (p = .046) experiencing Type of DV amongst women of childbearing age living in the Northern Region of Sierra Leone.

Table 22

Parameter Estimates for Research Question 3

Type of DV		B	Std. Error	Wald	*df*	Sig.	Exp(B)	95% CI for Exp(B) Lower Bound	95% CI for Exp(B) Upper Bound
Physical Abuse	Intercept	-1.921	0.519	13.716	1	<.001			
	Female Contraceptive Use	0.049	0.231	0.045	1	0.831	1.05	0.668	1.651
	Type of Union	0.692	0.162	18.295	1	<.001	1.998	1.455	2.745
	Age in 5-year groups	0.158	0.052	9.17	1	0.002	1.171	1.057	1.298
	Religion	0.157	0.209	0.562	1	0.453	1.17	0.776	1.764
	Wealth index combined	-0.044	0.069	0.415	1	0.52	0.957	0.836	1.095
	Educational attainment	0.001	0.072	0	1	0.986	1.001	0.87	1.152
	North Region	0[b]	.	.	0	.	.	.	.
Emotional Abuse	Intercept	-0.395	0.568	0.484	1	0.486			
	Female Contraceptive Use	0.478	0.24	3.985	1	0.046	1.613	1.009	2.581
	Type of Union	0.115	0.196	0.346	1	0.557	1.122	0.764	1.648
	Age in 5-year groups	-0.035	0.061	0.335	1	0.563	0.965	0.857	1.087
	Religion	-0.015	0.229	0.004	1	0.947	0.985	0.628	1.544
	Wealth index combined	-0.152	0.078	3.749	1	0.053	0.859	0.737	1.002
	Educational attainment	0.103	0.075	1.876	1	0.171	1.109	0.956	1.285
	North Region	0[b]	.	.	0	.	.	.	.

Type of DV		B	Std. Error	Wald	*df*	Sig.	Exp(B)	95% CI for Exp(B) Lower Bound	Upper Bound
Sexual Abuse	Intercept	-4.784	1.67	8.206	1	0.004			
	Female Contraceptive Use	-0.177	0.638	0.077	1	0.782	0.838	0.24	2.927
	Type of Union	0.352	0.414	0.722	1	0.396	1.422	0.631	3.204
	Age in 5-year groups	-0.107	0.133	0.649	1	0.42	0.898	0.692	1.166
	Religion	0.918	0.752	1.49	1	0.222	2.503	0.574	10.925
	Wealth index combined	0.231	0.168	1.877	1	0.171	1.259	0.905	1.751
	Educational attainment	-0.236	0.188	1.585	1	0.208	0.789	0.546	1.141
	North Region	0[b]	.	.	0	.	.	.	.

Note. a. The reference category is: No Abuse.

b. This parameter is set to zero because it is redundant.

I conducted a crosstabulation of all predictors and outcome variables from the multinominal logistic regression test that were statistically significant in all three research questions. Please see Figure 3 through 8.

Figure 3

Crosstabulation of Predictor and Outcome Variables

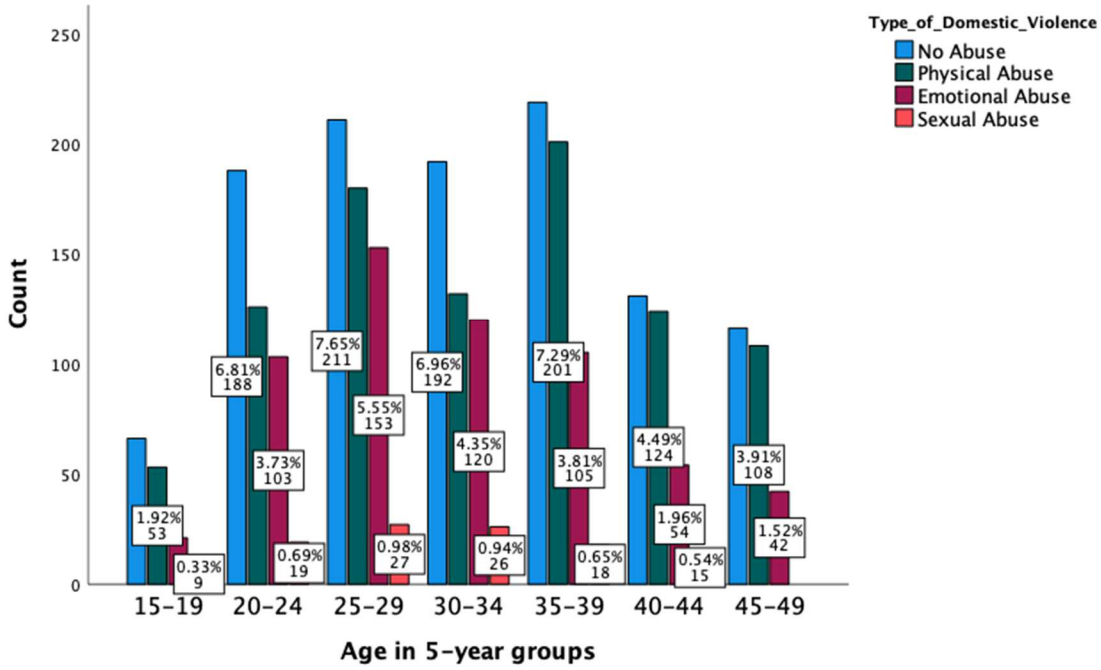


Figure 4

Crosstabulation of Predictor Variable Female Contraceptive (Yes)

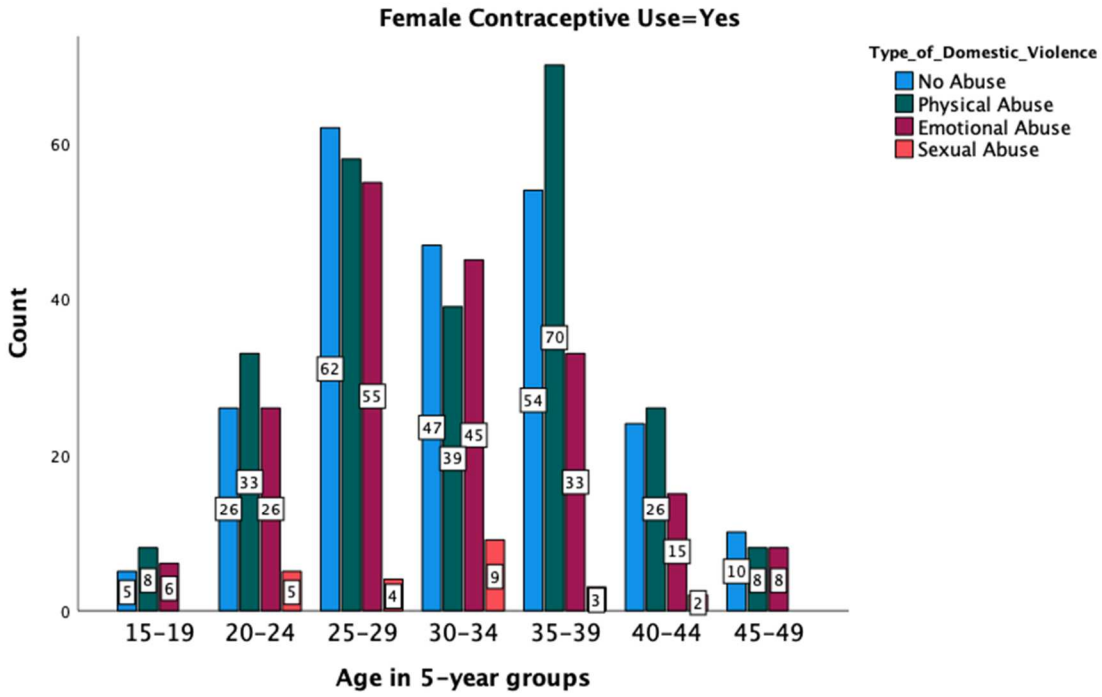


Figure 5

Type of Union (Not in Union)

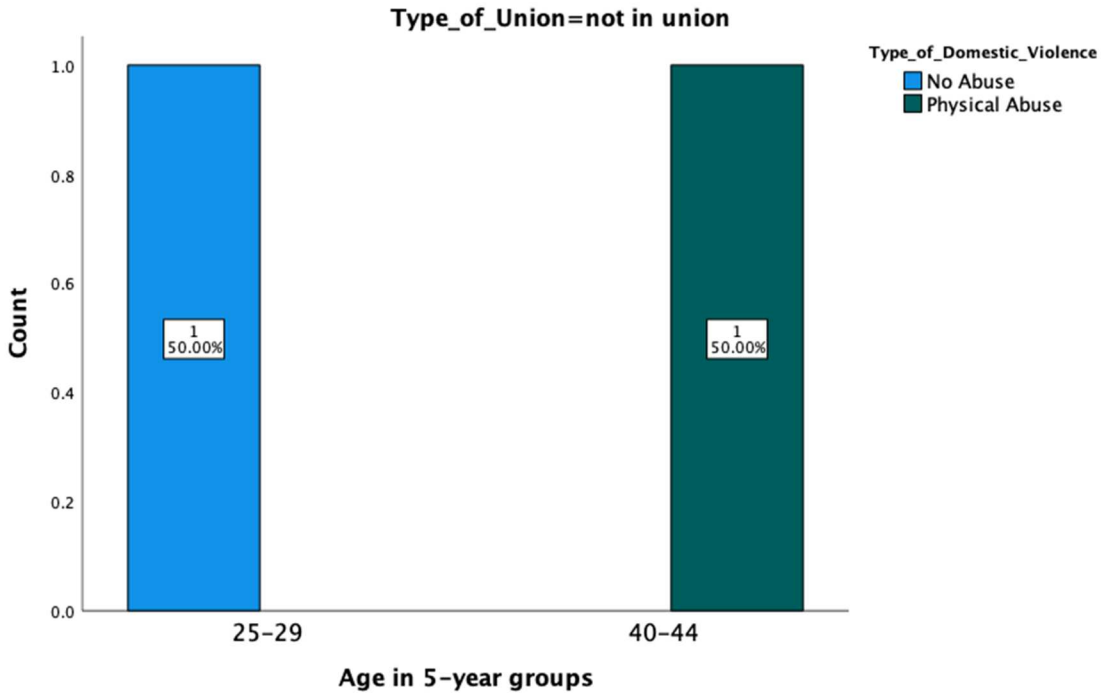


Figure 6

Type of Union and Female Contraceptive Use (No)

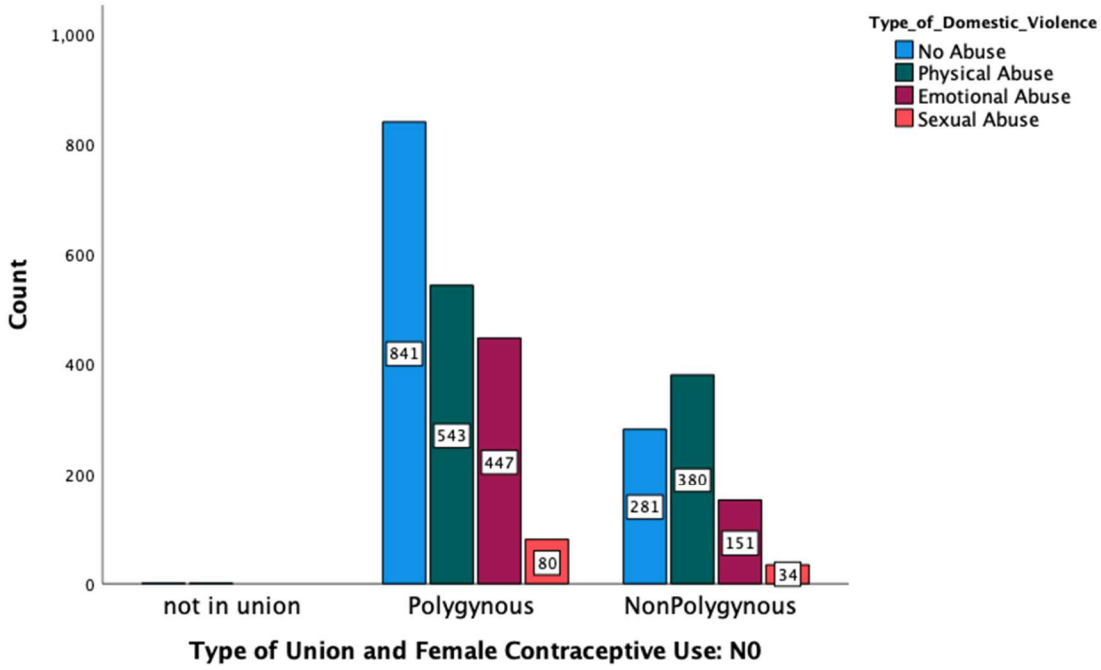


Figure 7

Type of Union (Polygynous)

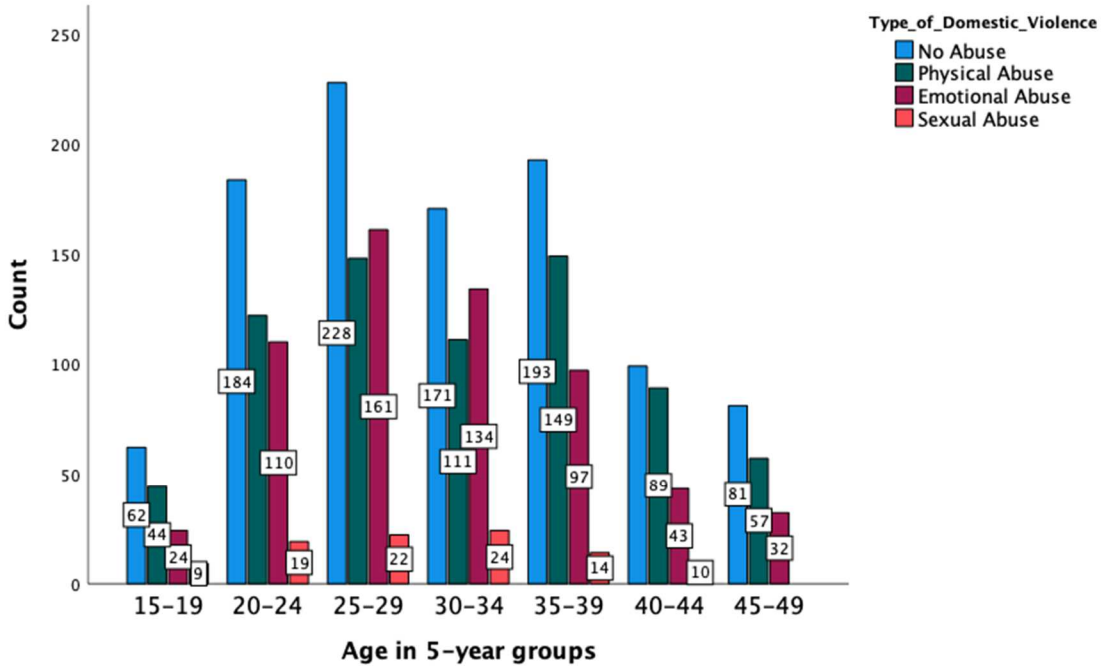
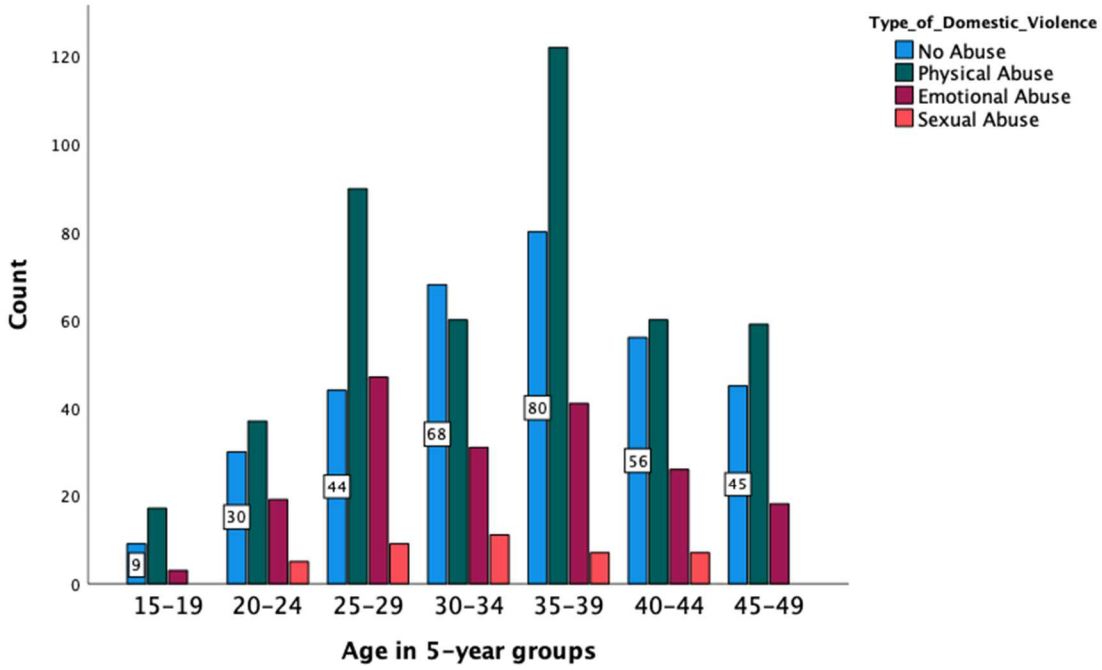


Figure 8

Type of Union (Nonpolygynous)



Summary

Multinominal logistic regression was used to evaluate the association in the research questions in section 3. The statistical analysis includes two predictor variables Type of Union (not in a union, polygynous, and non-polygynous) and Female contraceptive use (yes/no), and outcome variable type of domestic (physical abuse, emotional abuse, and sexual abuse); confounding variables age, education attainment, wealth index, and religion.

In Research Question 1, age was statistically significant at ($p < .001$) amongst respondents who reported experiencing a type of DV (physical abuse) and using female

birth control. The variables that were not significant in research question 1 was education attainment, wealth index, and religion. In Research Question 1, I partially rejected the null hypothesis since there is no association between female contraceptive use (yes/no) and type of DV among females of childbearing age 15 to 49 years living in Northern Sierra Leone.

In Research Question 2, the type of union (polygynous, $p < 0.001$; 95% CI [0.368,0.696]) and age in 5 groups *(*$p = 0.002$; 95% CI [1.057,1.298]) were statistically significant, with a type of DV under the physical abuse category: education attainment, wealth index, and religion were not statistically significant. I rejected the null hypothesis in Research Question 2 because there was a statistically significant association between age in 5 groups and predictor variable type of union.

For Research Question 3, both predictor variables type of union and female contraceptive use are statistically significant. Type of union ($p < 0.001$;95% CI [1.455, 2.745) was significant under the physical abuse category in type of DV. Though female contraceptive use ($p = 0.046$; 95% CI [1.009, 2.58]) was statistically significant under the emotional abuse category in type of DV. For covariates, age in 5 -year groups ($p = 0.002$; 95% CI [1.057,1.298]) were the only statistically significant under the physical abuse category in type of DV. I rejected the null hypothesis: there is no association between female contraceptive use (yes/no), type of union (polygynous, non-polygynous, not currently in a union), and type of DV (physical abuse, sexual abuse, or emotional abuse) among female of childbearing age 15 to 49 years, living in northern region of Sierra Leone.

In Section 4, the last chapter, I discuss research findings and the potential impact for positive social change at different social-ecological levels. Also, in this section, I introduce recommendations from other literature reviews that might be tailored to implement changes that can bring about social change within the community and the broader public health profession. Also, I introduce future research studies within the limitations of this study.

Section 4: Application to Professional Practice and Implications for Social Change

In this study, I conducted a quantitative study with a cross-sectional design along with retrospective secondary data from the DHS 2019 Sierra Leone survey. I explored the connection between the type of union, female contraceptive use, and how these factors might influence DV. The study included 3,440 women in Sierra Leone between the age of 15 to 49, of which I selected 930 women from the northern region, which I identified as the region where polygamy is widely practiced. Additionally, age, wealth index, education attainment, and religion were included as covariates to determine the relationship using multinomial logistic regression among females in childbearing between the age 15 to 49 years.

Globally, DV remains a major public health crisis for many women. DV can leave a ripple effect on victims and the general population. Additionally, 27% of victims are women of childbearing age: 15 to 49 years. The purpose of the study was to explore if there was an association between the type of union and female contraceptive use and how these factors might be associated with a type of DV (physical abuse, emotional abuse, or sexual abuse) experienced by a woman of childbearing age and living in Sierra Leone. I analyzed the relationship between the type of union, female contraceptive use, and DV among women of childbearing age living in the northern region using multinomial logistic regression. I used three research questions to guide my study.

My findings revealed an association between covariate age in all three research questions under the physical abuse category of DV. Associations were identified for both type of union and female contraceptive use under the DV categories of physical and emotional

abuse. My intention is to use the study's findings to bring awareness and social change to an ongoing public health crisis. In this section, I interpret the findings, discuss limitations, and present recommendations including implications for professional practice and social change. I end with a conclusion.

Interpretation of the Findings

The objective of my study was to examine for an association between type of union, female contraceptive use, and DV. I introduced three research questions to explore an association between predictor and outcome variables. To determine the association, I used a multinomial logistic regression with no abuse as the reference category.

Research Question 1

Prior to my study, research showed that females who requested a partner to use a condom for birth control in Uganda were more likely to experience DV (Wandera et al., 2018). However, my analysis revealed no association between female contraceptive (p = .190) used and a woman experiencing DV during childbearing age in northern Sierra Leone. This difference between findings may be because of the different methodology applied to the study. Wandera et al. (2018) used a targeted population of married women living in Uganda. Whereas my study focused and childbearing age woman 15 to 49 years in polygamous relationship.

Unlike Wandera et al. (2018), to my knowledge, there has not been previous research on the relationship between female contraceptive use and DV among women of childbearing age in the northern region of Sierra Leone, which has the highest prominence of polygamy. Importantly, the Wandera et al. (2018) study provided vital

information on condom use and DV. My finding was different. It did not reveal any link between female contraceptive use and DV. This finding was inconsistent with the previous finding because the focus was on female contraceptive use among females during childbearing age in the northern region of Sierra Leone, where polygamy is mostly practiced.

However, the covariate of age ($p < 0.001$) with a 95 % CI under the DV physical abuse category showed an association. This finding confirmed previous studies by Lasong et al. (2020), Chikhungu et al. (2021), and Peterman et al. (2015) in Malawi, Zimbabwe, and 30 other developing nations, which proved a connection between the younger a woman is, the more likely to experience DV, especially, among married women under the age 40.

In contrast, to age which indicated strong connection between DV in RQ1, female contraceptive use ($p = .190$), education attainment ($p = .189$), wealth index ($p = .085$), and religion ($p = .363$) were not comparable with previous research by Yerges et al. (2017) and Sanni et al. (2020) in Malawi and 20 other sub-Saharan territories among women of childbearing living in polygamous households, which had revealed a relationship between DV, female contraceptive use, age, wealth index, education attainment, and religious affiliation as factors influencing DV.

Research Question 2

I examined the relationship between type of union and DV, my analysis found type of union ($p < .001$) under polygynous category concurrences with age ($p = 0.002$) were significantly associated with DV (physical abuse) among females living in northern

Sierra Leone. My findings were consistent with Wencheko and Tadesse (2020), who found a relationship between wife-beating acceptance among 5,184 participants of women of childbearing age living in Ethiopia. Among participants polled, 24 percent of women agreed that wife beating is justifiable depending on religious background.

The relationship of the covariate age added to the current literature findings that showed similar connections between a woman's age and DV, and how young women might choose to stay in an abusive relationship because of shelter and financial stability (Yuksel-Kaptanoglu et al., 2012 & Peterman et al., 2015). This study further confirmed findings by Cools and Kotsadam (2017), Reese et al. (2021), and McClintock et al. (2021), which shown a connection between polygamous union and a woman's risk of experiencing DV during childbearing age.

Additional studies, in Nigeria and Rwanda by Behrman (2019) and Habyarimana et al. (2021) supported strong connection between intimate partner violence and hidden bias among women living in polygamous unions. For example, in Rwanda, approximately 40.4 % of women in childbearing age admitted to experiencing DV because of gender inequality, husband having multiple wives, age, and lack of education attainment. Findings from my study was consistent with previous studies. There were similarities between the targeted population (female), region (sub-Saharan Africa) and data source (DHS secondary dataset).

Research Question 3

Among all analyses in this study, findings revealed type of union ($p < 0.001$; 95% CI), female contraceptive use ($p = 0.046$; 95% CI), and age ($p = 0.002$; 95% CI), when

combined revealed a link between DV among women of childbearing age. However, the type of DV experienced by respondents differed depending on the type of union and female contraceptive used. For example, the risk of physical abuse was relatively higher for females in polygamous unions than in other unions. In contrast, emotional abuse was relatively higher for females in other unions who used contraceptive. My findings were comparable to Olorunsaiye et al. (2017), who found an association between women's perception of DV and contraceptive use among 80,055 women from seven West and Central African countries, including 11,221 respondents from Sierra Leone. With 20% of respondents admitting to contraceptive use, 46% of women approved of wife-beating among female contraceptive users. With that said, my finding, confirmed an association between female contraceptive use and emotional abuse under DV category were consistent with Semahegn and Mengistie (2015) and Tiruye et al. (2020), who found in Ethiopia, more than a quarter of female respondents admitted to experiencing DV, especially emotional abuse while using contraceptive.

Equally, the covariate age in this study aligned with finding in Ethiopia, which indicated an association with age and DV when combined with other factors. For instance, in Ethiopia, women under the age of 18 and married reported more exposure to DV (Semahegn & Mengistie, 2015). Additionally, these results were comparable with Tekkas et al. (2018) study in Turkey, which suggested that woman entering marriage at younger age increases the risk for DV, especially in regions where the perception of gender superiority remains societal norms. This study confirmed and added to previous studies outside of Sierra Leone, which showed a strong correlation between female

contraceptive use and a propensity to DV in India and Bangladesh depending on spouse's education level and income (Rapp et al., 2012). As mentioned before, the finding from my study aligns with the previous literature studies.

The SEM Framework

The SEM framework model anchored this study. This SEM model was chosen because other researchers and the CDC used this model to connect the dots in understanding factors that influence DV (CDC, 2022). As mentioned before, the SEM model provides structural guidance to understand and implement sustainable preventive strategies that can bring change to the population. In this study, all levels of the SEM model (individual, relationship, community, and societal) were used to explore the association with DV *in all three research questions; variables examined using SEM are type of union, F*emale contraceptive use, and domestic violence, covariate age, wealth index, religion, and education attainment.

Individual level

Research questions 1 and 3:(female contraceptive use, age, domestic violence) the intrapersonal level focused on the individual biological and personals and the risk that placed the individual at risk for DV. RQ1: age shown to be strongly associate with DV under the physical abuse category. At this level investigating influential factors such as history of abuse, education level, income level, and witnessing DV as a child. According to Heron et al. (2020), women victims of DV are more likely to stay in relationships to keep their family together, preserve marriage, and economic dependence. Some specific

preventative approaches at this level are life skill training (job), education, safe dating, and healthy relationship skills.

Relationship

Research questions 2 and 3 (variables: type of union and domestic violence) At this level, the first step was to examine victims' close relationships and identify factors that might influence DV. For female childbearing, intimacy and relationship are vital. During this stage of a woman's life, love and relationship are critical (Gould & Howson, 2021). Husband's history of experiencing violence as a child, social friends, and family acceptance of the behavior. Strategies to help the husband include education on DV, preventative programs, problem-solving skills, and promoting a healthy relationship (Gibbs et al., 2020).

Community

Research questions 1, 2, and 3 (variables: type of union, female contraceptive use, domestic violence) At this level, it identified available resources within the female of childbearing age setting community, including neighborhood, workplace, school, health care center, and social relationships. These preventative strategies include family members, religious leaders, and healthcare providers. Some preventative measures at the community level include creating a safe environment within the community, for example, shelter for victims, neighbors speaking out against violence, creating job opportunities within the community, and addressing cultural norms. Educating healthcare providers on screening women for DV during routine and contraceptive visits (Felix et al., 2020).

Societal

Research questions 1, 2, and 3 (variables: type of union, female contraceptive use, and domestic violence) The broader factors that put women at risk for DV during childbearing at this level. The study's analysis revealed that women in polygamous unions are more likely to report physical abuse. Next, understanding the societal factors that put women at risk, such as education, economic, health, and social policies. First, 60 % of the population are under the age of 25 years; the country went through years of civil wars, which resulted in extensive economic and infrastructural destruction (United States Census Bureau [USCB],2022). In Sierra Leone, they recognize polygamy as a legal marriage; similarly, wives are expected to be obedient to husbands to be viewed as good wives. Second, the wife depends on the husband for financial resources (Beoku-Betts, 2019). Some prevention strategies at this level are promoting societal norms that protect women from violence and strengthening financial security for women by increasing education programs, employment opportunities, and policies in place to protect women from violence (McClintock et al., 2021).

Limitations of the Study

There were several limitations identified in the study. First, the study used a retrospective secondary dataset from the 2019 Sierra Leone Demographic Health Survey with a cross-sectional design. The DHS study included 3,440 women between the ages of 15 to 49 years from Sierra Leone. From the sample size, I selected 930 respondents from the northern region of Sierra Leone, the area with the highest number of respondents who acknowledged their religion as Islam. The study was cross-sectional, so I could not

determine causality by examining the variables in the study. Also, the study was only restricted to women of childbearing age 15 to 49 years.

Another potential barrier was respondents' inability to express their experience openly and comfortably with DV and birth control used. Additionally, there could be a possibility of recall bias. Similarly, I could not account for other confounding factors, such as respondents' level of education, wealth index, and interviewing setting, which might not have been conducive to honest expression. Despite these limitations, the primary investigator of this resource DHS is a reputable organization that collects information on population health. So far, the organization has collected over 400 demographic health surveys from over 90 countries worldwide. Some approaches that the DHS used to prevent a threat to external validity are sample allocation representative of the population and comparison of digital transcripts. This study could be generalized to other developing nations with a similar population demographic.

Recommendations

The first recommendation is to have this study replicated as a qualitative study. This will give a better understanding of DV and how this impacts women during childbearing age. In Sierra Leone, 60% of the population is under the age of 25 years. This study reveals an association between age and DV under physical abuse (USCB, 2022). I recommend conducting a quantitative or qualitative study among females of childbearing age 15 to 25 years living in both rural and urban areas in Sierra Leone.

Additional findings from the study revealed that female contraceptive use was significantly associated with DV in the emotional abuse category. In the 2019 Sierra

Leone DHS report, only one in five women used modern birth control. Likewise, 35% of women discontinued after 12 months (Stats SL & ICF, 2020). I would recommend conducting a quantitative study on female contraceptive use and emotional abuse together. Another suggestion is studying the early cessation of female contraceptive use in less than two years.

Further recommendations are screening for DV during pregnancy, prenatal and postpartum periods. Studies have shown that DV is under report, and a lack of screening was available to women during health care visits (Felix et al., 2020). The WHO (2021) recommends frequent assessment and screening for intimate partner screening during a women's visit to reduce intimate partner violence. I would recommend Sierra Leone's government adopt WHO standardized intimate partner violence screening practices for healthcare practitioners. I also recommend conducting a study focusing on husband perpetrators of DV in different type of unions. Additional recommendations for the government of Sierra Leone are improving policies and laws protecting female victims of violence, educational advancement, and job training program to improve financial stability for women.

Implications for Professional Practice and Social Change

DV continues to be a health and safety issue for women between the age of 15 to 49 years. Findings from the study provided additional information on factors that might influence or placed a woman at a higher risk for DV during their childbearing age. The finding revealed a link between a woman's age and type of union and DV in the physical abuse category; likewise, female contraceptives shown to be associated with DV in the

emotional abuse category. These results are relevant to bringing about social change by providing healthcare professionals with the skills to assess for broader risk factors that might influence or place an individual at a greater risk for DV. This section covered recommendations that might enhance professional practice and potential interventions that might impact and bring about positive social change.

Professional Practice

This research study provided additional insight and added to prior scholarly research on DV. Plus, the connection between DV and underlying factors such as type of union and female contraceptive use could influence women's health and safety, especially those in childbearing age 15 to 49 years. Equally, these findings could benefit public health professionals in assessing, developing, and implementing preventative measures that could impact risk factors and lead to declining DV cases. In public health practice, using a secondary dataset can be cost-effective, especially in areas with limited resources. This study's access to the 2019 Sierra Leone dataset was beneficial because the primary source had already trained their field workers on collecting sensitive data, such as DV. Without having access to this dataset, it would be challenging to interview a woman privately, especially in a strongly patriarchal society. Also, in a previous study conducted in Nigeria, Kenya, and Mozambique, women admitted not discussing domestic abuse because of fear and lack of privacy (Fagbamigbe et al., 2020).

To build on previous studies and address the current findings identified from this study, I recommend further involvement from public health professionals, healthcare workers, community leaders, and policymakers to develop programs geared toward

training healthcare providers on screening for DV. additional programs that can help are educating couples on relationship skills and introduce school programs educating students early on violence and preventative measures.

Plus, providing women with appropriate programs centering on empowerment, including educational attainment and job training, can lead to sustainable employment. As public health leaders, the practical approach to bringing about change is to use our voices to advocate for programs that are sustainable and readily accessible to victims. Getting victims to access safe housing collaborating with healthcare providers to encourage using long-acting birth control methods such as IUD insertion, Implanon, and injectable. The empirical implication might include updating and implementing policies and laws protecting DV victims.

Moreover, DV can have an impact on the entire population. Therefore, to improve population health and reduce DV against women of childbearing age. Also, professional can apply the SEM model as a compass to understand factors within an individual space that places them at risk for DV, such as marital relationship or reproductive health choice. So, they can develop programs that gear to address the current need of the victims. Likewise, professionals need to get the input of DV victims when developing and implementing interventions.

Positive Social Change

This study provided insight into the factors that might influence DV. To bring about positive social change within Sierra Leone communities and spread behavioral changes to other regions of Africa. Likewise, implementing recommendations to

introduce sustainable programs that strengthen women's health safety and prevent DV. There will be an opportunity for social change within the Sierra Leone community as leaders and key stakeholders commit to tackling DV by initiating strong policies around gender equality and strengthening the legal system to hold perpetrators accountable for their actions and providing women with the tools to advance in their professional career and gaining financial stability. Implementing these changes will help reduce DV and increase health and safety for childbearing women at the highest risk for DV between the ages of 15 to 24, which aligns with the population of Sierra Leone, which is 60% under the age of 25 years (USCB, 2022).

Conclusion

In the study, I examined for an association by applying two predictor variables (type of union and female birth contraceptive use) and the outcome variable type of DV. A cross-sectional design was used, along with a retrospective secondary dataset from the 2019 Sierra Leone Demographic Health Survey. I selected the northern region of Sierra Leone with the highest number of polygamous unions. I controlled for age, religion, wealth index, and education attainment. I used the SPSS software tool to run a multinomial logistic regression to analyze for a relationship in my three research questions with a set alpha of 0.5 and 95% CI.

Findings from the study showed a strong connection between age, type of union, and a woman's risk for physical abuse under the type of DV category. Further, findings revealed that women who use female contraceptives are more likely to experience emotional abuse under the type of DV category. From these findings, I recommended

implementing programs and policies using the SEM as a model for strategies and preventive measures. These findings are ways that policymakers and healthcare professionals can collaborate to develop and establish programs to control and prevent DV throughout the broader community. The integration of preventative programs to tackle DV is critical, such as policy changes, addressing social norms that support a patriarchal society, protecting women's rights from gender inequality, and empowering women to advance their education to have financial stability. Also, the government of Sierra Leone can consider the future study recommendations for females of childbearing age between 15 to 25 years to gather more insight into factors that might influence DV in this specific age group.

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