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Predictors of Rapid Repeat Pregnancy in Zimbabwe

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Walden University

College of Health Sciences

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Thenjiwe Sisimayi

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Dr. Michael Schwab, Committee Member, Public Health Faculty
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The Office of the Provost

Walden University
2019

Abstract

Predictors of Rapid Repeat Pregnancy in Zimbabwe

by

Thenjiwe Sisimayi

MSc, University of Zimbabwe, 2011

BSc, University of Zimbabwe, 2006

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

November 2019

Abstract

Rapid repeat pregnancy (RRP) is associated with adverse maternal and infant outcomes and a range of undesirable social and economic challenges for the mother, her baby, and society. Although the consequences of RRP are well known, Zimbabwe—a country with some of the poorest maternal health indicators—has not investigated or made efforts to directly address this problem. This is confirmed by the lack of targeted programs to curb RRP, the unavailability of documented evidence regarding RRP significant risk factors, and the lack of understanding of the extent of RRP in the country. Using social cognitive theory as the theoretical framework, an unmatched case-control study was conducted using data from the Zimbabwe Demographic and Health Survey of 2015 to determine the prevalence of RRP and to assess associations between sociodemographic, sexual-relational, women's health, fertility preference, previous birth outcomes, and social factors and having an RRP in Zimbabwe. Logistic regression analysis showed statistically significant associations between all factors except for women's health characteristics. The prevalence of RRP among women of reproductive age (15–49 years) in Zimbabwe was 50.2%. The high prevalence of RRP and the multiple statistically significant associations reported in this study affirm the need for Zimbabwe to make prevention of RRP a public health priority. Zimbabwe must develop targeted interventions that work in context and integrate these into an ongoing comprehensive family planning program. In-depth research is needed to establish and understand the underlying motivations for having an RRP among Zimbabwean women. Such information may help develop targeted interventions to create social change.

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Dedication

I dedicate this dissertation to all women and girls in Zimbabwe. The lived realities of their maternal health and family-planning challenges motivated my recognition of the need to investigate the depth of the problem and make recommendations that have the potential to generate further evidence to inform interventions that may positively affect their future health.

Acknowledgments

My studies would not have been possible without the Hand of God upon me. I thank God for this achievement and more. In this awesome PhD study I also had a strong support system made up of people I will forever be grateful to for their support and encouragement. To my husband, Chenjerai, I valued your continued presence, encouragement, and support throughout the years of my study. My gratitude also goes to my dissertation committee, Dr. Shinga(irai) Feresu (chairperson), Dr. Michael Schwab (committee member), Dr. Simone Salandy (URR), and Dr. Nancy Rea (program director), whose guidance and mentorship is not only reflected in this document but also the professional growth and drive to go the extra mile that now drive my ambitions. I also appreciate the U.S. DHS Program for the data for my study. I would like to acknowledge the Letten Foundation of Norway for providing me with financial support for my study. I especially thank the late Professor Babill-Stray Pederson whose encouragement and moral support continues to motivate me in many aspects of my professional life. To my mother, your words of encouragement that “true greatness comes to those who pursue it no matter what” drive me forward. Lastly, I acknowledge the true motivation I received from my children who have supported me and look up to me all the time. Thank you.

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Chapter 1: Introduction to the Study

Introduction

A rapid repeat pregnancy (RRP) is one that occurs within a birth interval of up to 24 months (Vieira et al., 2016; Norton, Chandra-Mouli, & Lane, 2017). RRP is a significant reproductive and maternal health problem that remains pervasive worldwide. According to Kucherov and Levi (2016), RRP accounted for one third of all pregnancies in the United States in 2012, and Lewis, Doherty, Hickey, and Skinner (2010) reported a prevalence of 33% in Australia. In low- and middle-income countries (LMIC), data specific to this problem are limited (Maravilla, Betts, Couto e Cruz, & Alati, 2017), but based on reviews of gray literature on interventions that sought to address this problem, Hindin, Kalamar, Thompson, and Upadhyay (2016) believed that RRP in LMIC also occurs at a higher rate.

Although RRPs occur among all age groups of women of childbearing age, they are most frequent among adolescent mothers (Baldwin, Alison, & Edelman, 2013). Norton, Chandra-Mouli, and Lane (2017), found that of the 22.5 million adolescent mothers in developing countries, 4.1 million of these were RRP. There is a general consensus among researchers that RRP is not only associated with adverse maternal, perinatal, and infant outcomes but also a range of long-lasting undesirable social and economic challenges for the mother, her baby, and society. For example, Nerlander, Callaghan, Smith, and Barfield (2015) observed that short interpregnancy interval was associated with preterm delivery among women of reproductive age in the United States. Dallas (2013) also noted similar findings and added that RRP was associated with low

birth weight, heightened chances for succumbing to poverty, and protracted welfare dependence. Other researchers have reported that RRP, especially among adolescents, is associated with spontaneous abortion, obstructed labor, and obstetric fistula (Hindin et al., 2016; Pradhan, Wynter, & Fisher, 2015; Conroy et al., 2016). According to Vieira et al. (2016) the incidence of such adverse outcomes ranges between 30% and 70% depending on the birth interval adopted.

These health risks and realities are often accompanied by—and also become sources of—psychological, social, economic, and other health problems, including death, unsafe abortions, sexual abuse, intimate partner violence, sexually transmitted infection (STI) including HIV, forced and early marriage, stigma, loss of educational opportunities, and poverty (Chandra-Mouli, Armstrong, Amin, & Ferguson, 2015; Kangatharan, Labram & Bhattacharya, 2016).

LMIC are characterized by a high prevalence of adolescent pregnancy (in first and successive births), most of which are unintended and commonly result in adverse health, economic, educational, and developmental outcomes for both mother and child (Conroy et al., 2016). According Albuquerque, Pitangui, Rodrigues, and Araújo (2017), many adolescent mothers are vulnerable to RRP, which further heightens their risks to poor maternal and reproductive health. Unfortunately, developing countries, such as Zimbabwe, that have a high burden of teenage fertility and maternal mortality lack representative data specific to RRP. In circumstances where such indicative data may be available, it is fragmented and not analyzed, reported, or packaged in a way that can be used to inform prevention and other responses to the problem. To close this gap in the

literature, I used the Zimbabwe demographic and health data of 2015, which is available from the U.S. Agency for International Development (USAID; 2019) to determine the burden of RRP and also identify the predictive factors of RRP in Zimbabwe.

Problem Statement

Zimbabwe is a low-income country in sub-Saharan Africa with an estimated population of 13.1 million (Zimbabwe National Statistics Agency [ZIMSTAT] 2012). Of this population, 52% are women and 25% of those women are within reproductive age. These women, along with the rest of the residents of Zimbabwe are predominantly low-income earners with a protracted history of poor maternal health and a multitude of economic, social, and political tribulations. For example, in the past decade, Zimbabwe experienced an increase in its maternal mortality ratio (MMR), reaching a high of 960 per 100,000 live births in 2010. Figure 1 shows that Zimbabwe's MMR was increasing while the overall average of the sub-Saharan region was decreasing. Zimbabwe also has a particularly high adolescent fertility rate, estimated at 120 births per 1,000 women for girls ages 15–19 years (ZIMSTAT, 2014). There also exist marked rural-urban differentials in the adolescent fertility rate in Zimbabwe with rural adolescent girls twice as likely to become pregnant, with an estimated rate of 143 births per 1,000 women, as their urban peers whose rate was estimated at 75 births per 1,000 women (Multiple Indicator Cluster Survey, 2014). Adolescent mothers are known to be at higher risk of experiencing RRP (Norton et al., 2017), which further heightens their risks to adverse maternal health outcomes. They also become vulnerable to social problems, such as

stigma, sexual and gender-based violence, abandonment, forced marriage, and poverty (Aslam et al., 2015; Charles et al., 2016).

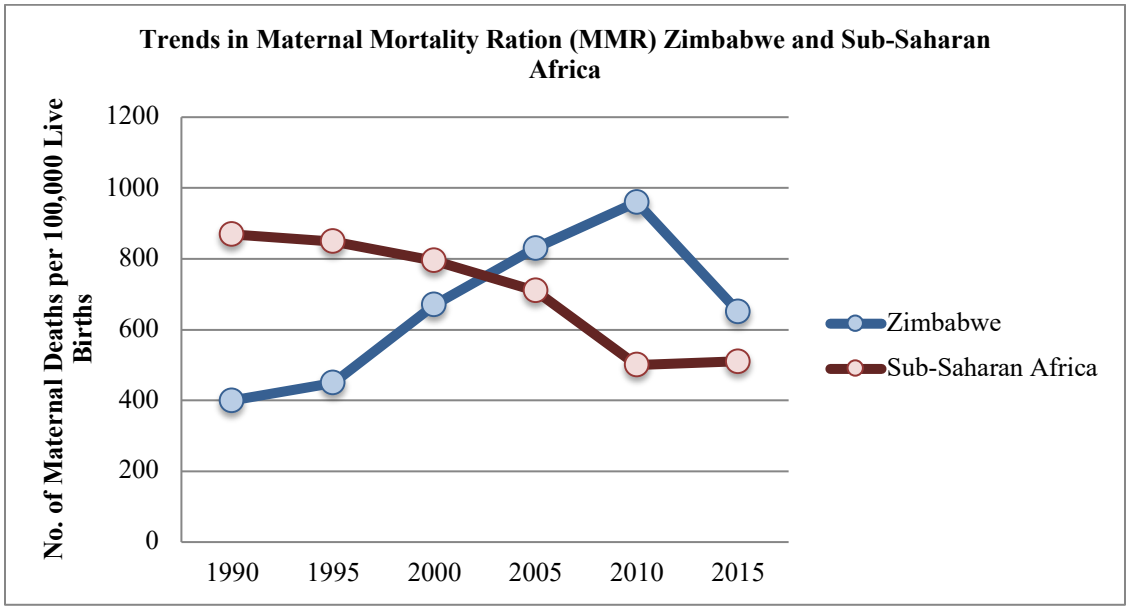

Figure 1. Trends in maternal mortality ratio, Zimbabwe and sub-Saharan Africa, 1990–2015.

Unintended pregnancy also remains prevalent in Zimbabwe with 32% of the women having experienced at least one in the last 5 years preceding the 2015 Zimbabwe Health and Demographic Survey (ZIMSTAT, 2015)

All these statistics on maternal health continued to occur in a country that has generally commendable levels of availability of family planning and other maternal, sexual, and reproductive health services (Government of Zimbabwe [GoZ], 2015). Zimbabwe implements a comprehensive countrywide family planning program, which is integrated into the reproductive, maternal, newborn and child health (RMNCH-A) continuum of care (GoZ, 2015). All pregnant women who attend and seek antenatal care and postnatal care services are exposed to family planning information and available services to help them plan their future reproduction (Zimbabwe National Family Planning

Council-Costed Implementation Plan [ZNFPC-CIP], 2016). Through this approach, the program expects to curb unintended pregnancies, including RRP, and their associated psychosocial, economic, and maternal health risks and problems (GoZ, 2015)

Despite common knowledge of the country's health problems and Zimbabwe's comprehensive integrated FAMILY PLANNING program, which has been under implementation for over 3 decades, there has not been any focused attention seeking to understand the predictors of RRP among Zimbabwean mothers and others in sub-Saharan countries. The actual burden of the problem is unknown and undocumented in Zimbabwe, and there have not been any prevention programs specifically aimed at addressing the problem.

In this study, I identified the social (sociodemographic, fertility preferences, gender-based violence, husband's background, woman's work, and empowerment) and sexual (sexual relational, previous reproductive health and birth outcomes, fertility, etc.) risk factors for RRP. Previous studies on unintended and repeat pregnancy among adolescents have found associations between these factors. For example, Maravilla et al. (2017) found that contraceptive use, educational factors, and history of abortion were highly influential predictors of repeat teenage pregnancy. They lamented the lack of epidemiologic studies in LMICs to enable measurement of the magnitude and characteristics of the repeat teenage pregnancy across various settings. In this study, I assessed if there were any associations between the risk factors and having an RRP not just among adolescents but also among all age groups of women of reproductive age (15–49 years) in Zimbabwe. Additionally, I also determined the prevalence of RRP in

Zimbabwe to address this gap. The results of this study may help inform design and implementation of programs aimed at addressing maternal, reproductive health, and family planning related challenges among Zimbabweans and other people in similar contexts.

Purpose of the Study

The purpose of this study was to identify and describe the social and sexual risk factors for RRP and assess if there were any associations between the risk factors and having an RRP in Zimbabwe. Further, in the study I also sought to determine the prevalence of RRP in Zimbabwe. According to Calvert et al. (2013), RRP carries increased health risks for both the mother and her unborn child. Therefore, identifying the risk factors for RRP is important for characterizing the problem that remains undocumented in Zimbabwe. Once the risk factors are identified and understood, public health practitioners can use the evidence to develop context specific interventions for prevention (Hindin et al., 2016). Documenting the prevalence of RRP in Zimbabwe is essential for evidence to inform appropriate planning for prevention needs (Ward, 2013). At the time I conducted this study, the burden of the problem had not been explicitly documented, hence the paucity of information on this subject as well as near nonexistent targeted prevention interventions. I performed quantitative secondary data analysis using data from the Zimbabwe Demographic and Health Survey (ZDHS; 2015) to identify social and sexual predictive factors for RRP and to identify statistical relationships that I later described and explained in characterizing the problem of RRP in Zimbabwe.

Research Questions and Hypotheses

RQ1: Is there an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$1: There is no association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

H_A1: There is an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

RQ2: Is there an association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$2: There is no association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

H_A2: There is an association between sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

RQ3: Is there an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$3: There is no association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

H_A3: There is an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

RQ4: Is there an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$4: There is no association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

H_A4: There is an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

RQ5: Is there an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$5: There is no association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

H_A5: There is an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

RQ6: Is there an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$6: There is no association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

H_A6: There is an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

Theoretical and/or Conceptual Framework for the Study

I used Bandura's (1986) social cognitive theory (SCT) to assess the predictors of RRP among Zimbabwean mothers. SCT is based on the argument and understanding that human behavior happens in a social context in a dynamic and reciprocal interaction of the person, environment, and behavior as shown in Figure 2. SCT posits that a person acquires and maintains certain behavior based on the social environment where they perform the behavior.

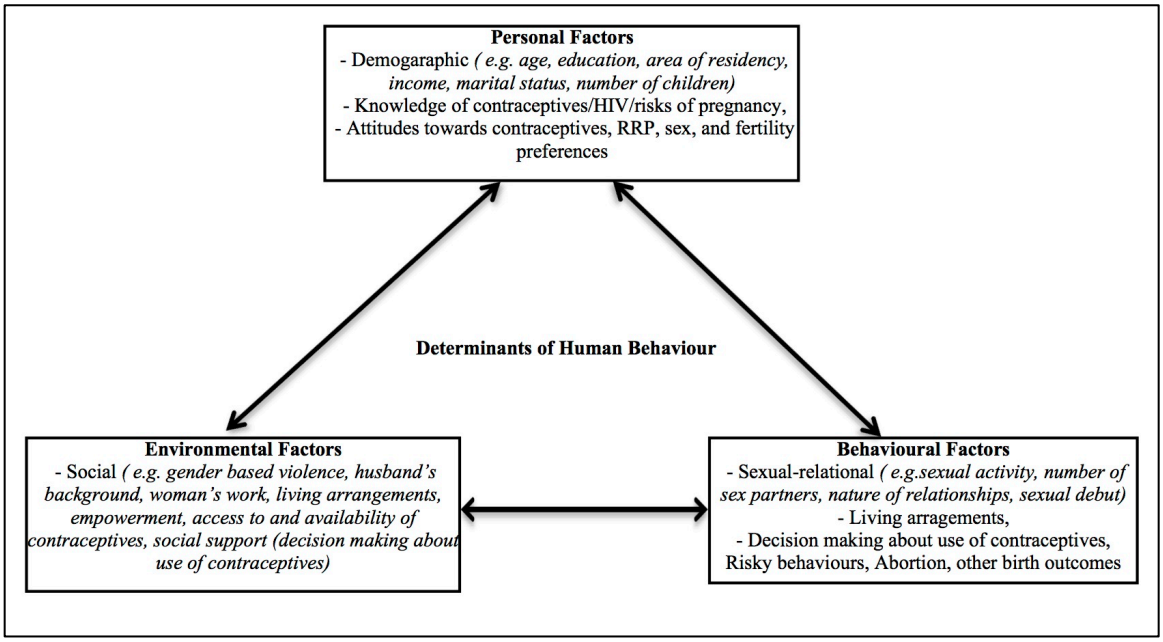

Figure 2. Social cognitive theory.

SCT considers a person's past experiences important in determining whether behavior will be enacted; a person's past experiences influence their future expectations and reinforcements, which eventually determine whether the person will engage in a specific behavior and the reasons they do it. A detailed explanation of how SCT will inform framing of this enquiry is presented in Chapter 2.

Nature of the Study

This was an unmatched case-control study of Zimbabwean women of reproductive age (15–49 years) who have had at least two pregnancies and at least one live birth and whose second or successive pregnancy occurred within 24 months of the previous pregnancy, i.e., it was an RRP. Controls were women who had similar characteristics as those of the cases, except they have not had an RRP. I grouped study factors into six categories: (a) sociodemographic (age, education, area of residency,

income, marital status, religion, sex of first child); (b) sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, living arrangements); (c) previous birth outcomes (live births, still birth, abortion, miscarriage); (d) fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning); (e) social factors (gender-based violence, husband's background, woman's work and empowerment); and (f) women's health (previous reproductive health, HIV/AIDS, HIV knowledge, attitudes, and behavior).

The data for this study were obtained online from the DHS program of the USAID (2018). I downloaded the ZDHS data for 2015, ensuring that all variables required for answering the research questions were included in the dataset. For example, the DHS collects demographic, socioeconomic, and reproductive health related issues encompassing fertility and fertility intentions, sexual activity, family planning, gender equality, and HIV status. The available data, which were essential for the current study, allowed for estimating prevalence, establishing correlations, and calculating risk factors in the form of odds ratios. Thus, using these data, statistical relationships can be established and can aid in the description of predictive factors and their significance. (Salazar, Crosby, & DiClemente, 2015; Burkholder, Cox, & Crawford, 2016).

Definitions

Rapid repeat pregnancy (RRP): A pregnancy that occurs within a birth interval of up to 24 months (Norton, Chandra-Mouli, & Lane, 2017; Vieira et al., 2016; Li, n.d).

Women of child-bearing age: Women aged between 15 and 49 years (World Health Organization [WHO], 2006).

Sexual-relational: A broad term used in this study to encompass participants' marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements. It will be one of the major study factors in this research.

Women's health: A study factor encompassing participants' previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior.

Social factors: A study factor encompassing participants' experience of gender-based violence, their husband's background, and woman's work and empowerment, as described and measured in the ZDHS of 2015 (ZIMSTAT, 2015).

Assumptions

I made five assumptions in this study. First, I assumed that the participants the data were collected from provided honest and truthful responses to the questions asked. Second, I assumed that the interviewers recorded the participants' responses accurately at the time of data collection. Third, I assumed that the data entry was done correctly without errors, followed the codebook and was stored in a database that any researcher can interpret. Fourth, I assumed the data were collected in accordance with the standard ethical guidelines for conducting research with human participants and that it remains de-identified and stored properly. Fifth, I assumed that the data contained all the variables of interest, which would enable meaningful assessment of the research questions for this study.

Scope and Delimitations

This study sought to identify the predictors of RRP in Zimbabwe based on secondary data of a nationally representative sample. The data were collected as part of the ZDHS, surveys that are periodically conducted every 5 years for the purposes of obtaining data that will inform the country of its progress and changes in demographic and health indicators. The last ZDHS was undertaken in 2015. This study specifically analyzed data on RRP, which were collected but not analyzed or specifically presented to speak to RRP and inform the design of programs to address RRP and contribute to better maternal and family planning outcomes in Zimbabwe. The assessment of RRP was important for this study because it would bridge the existing gap in the literature and document the magnitude of the burden of the problem in Zimbabwe. The data were limited to women of reproductive age (15–49 years) and were representative of the whole country; as such, findings can be generalized to all women of reproductive age in Zimbabwe. According to USAID (2018), the data are reliable, validated, and can be reliably used as valid evidence of the status of the population's health and demographic status. The dataset contained all the variables of interest for this study, and I believe that it helped me to answer my research questions.

Limitations

This research was based on a case-control study design, which by its nature cannot establish causal relationships between variables under study (Aschengrau and Seage, 2014). This is the study's main limitation, but the objective of this study was not

to establish cause and effect, but to identify associations between variables that can be considered as significant risk factors for having an RRP in Zimbabwe.

Significance

The importance of this study is that it provides a contextual estimate and predictors (social and sexual) of the burden of RRP in Zimbabwe. Despite having a strong integrated family-planning program, Zimbabwe struggles with reducing high fertility observed across all age groups among women of child-bearing age and eliminating successive closely spaced high-risk pregnancies. It is unknown why this happens. Hence, the findings of this study provide some indicative answers to this question. Further, this research focused on an under researched area in the field of family planning (Albuquerque et al., 2017; Maravilla et al., 2017).

Previous studies have mostly dwelt on identifying factors associated with repeat pregnancy amongst adolescents without focusing on the rapidness (pregnancies occurring within 24 months of the previous pregnancy). They have also not looked at this subject among older mothers (20–49 years). Moreover, despite the potential contribution of RRP to Zimbabwe's pervasive MMR, the country has not focused attention on seeking to understand the predictors of RRP. The actual burden of the problem was unknown and undocumented in Zimbabwe, and there had not been any prevention programs specifically aimed at addressing RRP. This study is the first in the Zimbabwean context to specifically seek to assess and explicitly document the burden of RRP and its predictors.

Social Change

This study carries important opportunities for urgently needed social change in Zimbabwe. For example, the study provides insightful information that can be used to inform the development of targeted interventions for family planning to reduce RRP in Zimbabwe and other similar contexts. Reducing RRP would position Zimbabwe as a nation to reap the benefits of well-planned families. At an individual level, this could be a reduction in the amount of time lost due to poor health and reduced welfare dependence and health expenditures. Women could become more productive and secure better economic opportunities, which also contributes to a reduction in gender-based violence and poverty (Luchters et al., 2016; Tocce, Sheeder, & Teal, 2012).

At national level, Zimbabwe may be able to control unsustainable population growth and reduce the public health economic burden, which emanates from pregnancy complications such as miscarriages, unsafe abortions, and preventable deaths (Yazdkhasti, Pourreza, & Pirak, 2015). Additionally, health workers and other public health practitioners can now focus attention to other emerging health issues, such as noncommunicable diseases and comorbidities of HIV, that threaten multitudes of people in developing countries. Zimbabwe is among the list of African countries where women are at high risk of cancer and currently has a cervical cancer burden of 19% (Kuguyo et al., 2017). Addressing the problem of RRP, especially among young mothers, also presents opportunities to reduce exposure to HIV and to reinforce women's rights and autonomy to determine the spacing and number of children they want (Luchters et al., 2016). If this is fulfilled, women in Zimbabwe may also be able to pursue higher

education, secure paid employment, and possibly be able to educate their children (Tocce et al., 2012)

Summary

RRP exposes women to adverse maternal, perinatal, and infant outcomes, and also a range of long-lasting undesirable social and economic challenges for the mother, her baby and society (Nerlander et al., 2015; Dallas, 2013; Hindin et al., 2016; Pradhan et al., 2015; Conroy et al., 2016). Although RRP is pervasive worldwide, there is paucity of information about it in LMIC (Maravilla et al., 2017). Zimbabwe is one such country that has some of the worst maternal and child health indicators but lacks literature on the magnitude of RRP and its potential contributions to the poor maternal health of its population. This had led to the unavailability of targeted interventions that can help prevent RRP from occurring. In this chapter, I provided an overview of the problem of RRP and the nature and purpose of the study.

In this chapter, I stated the specific research questions for this study along with testable hypotheses. The research questions are focused on assessing if there are any relationships between sociodemographic factors, sexual relational factors, women's health, previous birth outcomes, fertility preferences, and social factors, and having an RRP. I described the theoretical framework that guided the presentation of the study. I concluded this chapter with a description of the study's significance and its potential contributions to social change. In the next chapter, I provide a comprehensive review of literature on RRP.

Chapter 2: Literature Review

Introduction

RRP remains a major public health concern worldwide (WHO, 2018; Brown, Ray, Liu, Lunsky, & Vigod, 2018). It is associated with adverse maternal, perinatal, and infant outcomes and also a range of long-lasting undesirable social and economic challenges for the mother, her baby and society (Brown et al., 2018; Nerlander et al., 2015; Dallas, 2013; Hindin et al., 2016; Pradhan et al., 2015; Conroy et al., 2016). RRP also exerts considerable financial costs on the health system as the majority of these pregnancies are unplanned and often end up in unsafe abortions, preterm births, and maternal deaths (Yazdkhasti et al., 2015). In Africa, RRP occurs disproportionately among poor, uneducated girls and signifies disparities in knowledge, uptake, and access to and use of modern contraceptives. Prevention of RRP and unintended pregnancy has been made a public health priority (Peipert, Madden, Allsworth, & Secura, 2014).

In this chapter, I provide a detailed review of literature regarding RRP and its associated health and social problems. In the review, I detail a synopsis of the problem of RRP at the global level and in Zimbabwe and the purpose of this study and its relevance and significance. I also highlight the gaps in the available literature, which informed the need for this study. I also extensively explore literature on the key study variables: sociodemographic factors, sexual-relational factors, women's health, previous birth outcomes, fertility preferences and social factors. Using available literature, I elaborate on how these factors have been understood to influence RRP. I also detail the key

constructs of SCT, which is the theoretical framework for this study, and show how SCT is integrated to guide this research.

Literature Search Strategy

In conducting this literature review, I searched the Walden University Library and a number of databases, including CINAHL and MEDLINE, ProQuest Dissertations, Theses full text databases, and the WHO and CDC libraries. I also used search engines, including Google and Google Scholar. The search terms I used were *rapid repeat pregnancy, unintended pregnancy, family planning, risk factors for unwanted pregnancy, contraceptives, unplanned pregnancy, pregnancy intentions, research methods, inter-pregnancy interval, and social cognitive theory.* I restricted the bulk of my review to articles written in English, peer-reviewed, and published between 2013 and 2018. However, due to little research on RRP in Zimbabwe and other developing countries, I also reviewed gray literature, specifically programmatic reports, country program strategy and policy documents, and government publications, as well as United Nations agency websites and reports also dated 2013–2018. To ensure that information presented could be referenced in my study, I strictly assessed the quality of the work using Al-Jundi and Sakka's (2017) approach for critical appraisal of peer-reviewed articles. I also applied the guidelines for working with gray literature proposed by Adams, Smart, and Huff (2017) and also used the authority, accuracy, coverage, objectivity, date and significance checklist. For the sources regarding the theoretical framework, I reviewed dated and much older articles, which were well-positioned to provide a reliable historical foundation and to adequately guide this inquiry.

Rapid Repeat Pregnancy Overview

There is resounding evidence that RRP is widespread worldwide. According to Kucherov and Levi (2016), in 2012 alone, one third of all pregnancies in the United States were RRP. Gemmill and Lindberg (2013) had earlier observed that from a nationally representative sample of 2,253 women, 35% had become pregnant within 18 months of the previous birth. In their study, teenage mothers (ages 15–19) were more likely to report an RRP and that it was unintended. These findings were also in support of established literature that indicates that adolescent mothers are twice more likely to experience an RRP following the first pregnancy (Maravilla et al., 2017). Lewis et al. (2013) reported an RRP prevalence of 33% in Australia. In Brazil, results of an institutional based study showed a prevalence of 42.6% (Albuquerque et al., 2017), and a similar study conducted in South Africa reported a prevalence of 17.6% (Mphatswe et al., 2016). In LMIC, data specific to RRP are limited (Maravilla et al., 2017). However, based on a review of gray literature on interventions that have sought to address this problem, researchers have indicated that RRP in LMIC occur in significantly higher proportions (Hindin et al., 2016). Their supposition can also be supported with considerations from the findings of Norton et al. (2017), who reported that out of 22.5 million adolescent mothers from 60 USAID-supported LMIC in 2017, 4.1 million had an RRP as their second or higher order child.

In my literature search, I did not find any publication that specifically assessed RRP in Zimbabwe. The burden of the problem and risk factors remain unknown. In circumstances where indicative data on RRP was available—i.e., previous ZDHS—it was

not analyzed, reported, or specifically presented to speak to RRP. Previous researchers have only dwelled on identifying factors associated with unintended pregnancy without focusing on the rapidness (pregnancy occurring within 24 months after the index birth). Unintended pregnancy is acknowledged to be pervasive not just among adolescents but all women of child-bearing age in Zimbabwe. For example, 32% of the women aged 15–49 years experienced at least one unintended pregnancy in the 5 years preceding the 2015 ZDHS (ZIMSTAT, 2015).

Zimbabwe has a particularly high adolescent fertility rate, estimated at 120 births per 1,000 women aged 15–19 in 2015 (ZIMSTAT, 2014). Marked rural-urban differentials exist in the adolescent fertility rate in Zimbabwe, with rural adolescent girls twice as likely to become pregnant with an estimated rate of 143 births per 1,000 women whereas their urban peers' rate was estimated at 75 births per 1,000 women (MICS, 2014). As earlier noted, it is long-established that adolescent mothers are at a much higher risk of experiencing RRP (Norton et al., 2017), which further heightens their risk of adverse maternal health outcomes. In Zimbabwe, for example, ZIMSTAT/IFC (2015) reported that 21% of maternal deaths occurred among teenage mothers. Adolescent mothers also become vulnerable to social problems, such as stigma, sexual and gender-based violence, abandonment, forced marriage, and poverty (Aslam et al., 2015; Charles et al., 2016). According to ZIMSTAT/IFC (2015), 11.4% of teenage mothers experienced physical violence during pregnancy, and many suffered injuries, including burns, dislocations, deep wounds, broken teeth, cuts, bruises, and aches. The dearth of information on RRP justified the need for this study to generate evidence that can inform

the design of targeted programs that will address RRP and contribute to better maternal and family planning outcomes in Zimbabwe and similar contexts.

Contributing Factors for Rapid Repeat Pregnancy

There are multiple factors that contribute to the occurrence of RRP. These factors can be grouped into three clusters suggested in SCT: those that relate to (a) personal level (demographic, e.g., age, education, area of residency, income, number of children, knowledge of contraceptives, HIV, risks of pregnancy, attitude toward contraceptives, sex, fertility preferences); (b) behavioral (sexual-relational, e.g., sexual activity, sex partners, nature of relationships, sexual debut, living arrangements, decision-making about family planning, risky behaviors, abortion, miscarriage, other birth outcomes); and (c) environmental levels (social, e.g., experience of gender-based violence, empowerment, woman's work, husband's background, access to contraceptives).

Personal Factors

Individual/personal factors include those grouped under sociodemographic factors, such as age, marital status, education, area of residency, income, and religion and have been widely documented to be positively correlated with RRP.

Age. Young age at first pregnancy and being a teenage mother is a risk factor for RRP (Baldwin & Edelman, 2013). Maravilla et al. (2017) noted that teenage mothers had a higher risk of RRP within 24 months of their previous birth. Albuquerque et al. (2017) and Conroy et al. (2016) also reported similar findings confirming a long-established reality that young age at first pregnancy and being a teenage mother increases the risk of experiencing RRP. The adverse maternal and neonatal outcomes linked to RRP are also

well documented and appear to disproportionately affect teenagers with varying rates between 30% and 70%, depending on the interpregnancy or birth interval adopted (Vieira et al., 2016). Other studies that support Vieira et al. (2016) include Maravilla et al. (2017), Aslam et al., (2015), and Charles et al., (2016), all of which pointed out that compared to first teenage pregnancy, in general, RRP in teenage mothers leads to elevated risks of preterm births and maternal deaths.

Marital status. There are inconsistent findings regarding the influence of marital status on RRP, especially concerning older or middle-age women, who are generally neglected in research on RRP. Among adolescents, however, cohabiting or living with an index baby's father (of the recent baby) but not married and being sexually active for more than 3 months were statistically significant predictors of RRP in an Australian cohort (Lewis et al., 2013). In a study of HIV-infected women in Kenya, living in the same compound with a husband was associated with increased odds of RRP (adjusted odds ratio (*AOR*): 2.33; 95% confidence interval (CI): 1.14, 4.75. Being in a relationship with an older partner (5+ years) or a partner who wants a child, being in a polygamous marriage or child marriage is also known to increase the risk of RRP among teenage mothers (ZIMSTAT/IFC, 2015). Dallas (2013) and Maravilla et al. (2017) also noted that adolescent mothers who married, lived with, or received support from the fathers of their babies were at a greater risk of RRP.

Education. Experiencing a teenage pregnancy compromises a woman's opportunities for completing secondary education. Women and girls who lack secondary or higher education have a higher risk of RRP compared to those who have that

education. As many first adolescent pregnancies are often unintended and occur while they are in school, teenage mothers drop out of school to care for the babies and often fail to continue with their education thereafter (Albuquerque et al., 2017). Baldwin and Edelman (2013) also found lower education associated with a higher risk of RRP in their systematic review of risk factors for RRP in the United States. Charles et al. (2016) also reiterated that RRP was associated with poor educational attainment. Higher education attainment is known to be strong protective factor against RRP (Maravilla et al., 2017),

Income, area of residency, religion. Albuquerque et al. (2017) identified low income as a risk factor for RRP among women in Brazil. Baldwin and Edelman (2013) observed that low income and general low socioeconomic status were significant predictors of RRP. Charles et al. (2016) reported that poverty and social isolation were significantly associated with RRP. They further indicated that poor socioeconomic status is also seen as both a cause and consequence of teenage pregnancy. Women residing in low-income areas are prone to unintended pregnancy, including RRP. In the United States, Dallas (2013) and Brown, Ray, Liu, Lunsky, and Vigod (2018) reported that RRP is more prevalent in poor African-American neighborhoods and that up to 55% of RRP are unintended. LMIC are disproportionately affected, particularly those countries that are characterized by pronounced levels of poverty; violence against women and girls, including child marriage; and have a generally poor health profile (Duvall, Thurston, Weinberger, Nuccio, & Fuchs-Montgomery, 2014; Maravilla et al.,2017;). Religion also plays a critical role in influencing RRP. In Zimbabwe, Christian women and girls who are affiliated with some apostolic sects, such as Johanne Marange and Johanne Masowe, that

practice child marriage as part of their religion are known to experience early and multiple closely spaced child-bearing (Dzimiri, Chikunda, & Ingwani, 2017) as did Kenyan women who practiced Islam (Ibrahim, 2015).

Fertility preferences and intentions. Desired number of children, use of contraceptives, decision-making about contraceptives, and knowledge of family planning are some of the factors that also predict RRP. Women who are ambivalent about their intentions to have more children are more likely to have RRP compared to those who report certainty of wanting or not (Hindin et al., 2016; Peipert et al., 2014). Smee et al. (2011) and Li (2015) found that women were more likely to have an RRP if they had not reached their desired number of children but had ambitious future plans, which they strongly perceived delaying pregnancy would interfere with (Aslam et al., 2015b). In a study on barriers and motivations for uptake of contraceptives in eastern and southern Africa, UNFPA (2017) noted that fear of contraceptive side effects and non-use of birth control were associated with unintended pregnancies, which were mostly RRP. Lack of knowledge of contraceptives, lack of capacity to make independent decisions regarding family planning, and a history of no previous pregnancy planning were also factors associated with unintended pregnancy (Baldwin & Edelman, 2013; Richardson, Allison, Gesink, & Berry, 2016). Women and girls who do not use contraceptives, particularly long-acting reversible contraceptives, after delivery have a higher risk of RRP. Albuquerque et al. (2017) observed that non-use of contraceptive methods after delivery was a significant factor associated with RRP among adolescents in Brazil (*OR* 7.40; CI 95% 1.56–3.49)]

Behavioral Factors

Behavioral factors include those grouped under sexual-relational, such as age, marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements. These factors are known to be associated with RRP. The foregoing section already highlighted marital status, living arrangements, and nature of relationships and risk of RRP. Women and girls who engage in frequent sexual activity with one or multiple partners and without consistent use of contraceptives are at a greater risk of RRP (Dallas, 2013). Early sexual debut, particularly women and girls who have their first births before age 16, face higher risks of RRP (Dallas, 2013). Those adolescents whose babies' fathers were not identified, those whose relationships with the fathers of their babies ended within 3 months of the first birth, and those with parenting friends are believed to be at a higher risk of experiencing an RRP (Dallas, 2013; Albuquerque et al., 2017; Maravilla et al., 2017).

Women's health and previous birth outcomes. Factors relating to women's health—including previous reproductive health; HIV/AIDS; HIV knowledge, attitudes, and behavior; and previous birth outcomes—have also been documented to contribute to higher risks of experiencing an RRP. Smee et al. (2014) observed that HIV-infected women were more likely to conceive successive pregnancies in a frequent manner than women who did not have HIV. Other studies also show that women who experience RRP are those who have had miscarriages, stillbirths, and abortions (Mahande & Obure, 2016); birth complications with their previous pregnancy (Wong et al., 2015); and a

malnourished child or death of child in the previous 2 years of the index pregnancy (Kangatharan et al., 2016).

Environmental Factors

Environmental factors include those grouped under social factors such as exposure to gender-based violence, husband's background, woman's work, woman's empowerment, accessibility of contraceptives, social support and reinforcements, social norms and expectations. According to Vieira et al. (2016) women exposed to sexual and gender based violence, intimate partner violence and who are economically disadvantaged are at heightened risk of RRP. Anand, Unisa, and Singh (2017) reported that girls who experienced intimate partner violence were more likely to report an unintended pregnancy. Being highly economically dependent on one's family of origin, having poor family and lack of social support also increase women and girls' risks of having an RRP. Mukanangana, Moyo, Zvoushe, and Rusinga, (2014) and (McCloskey, 2016) also found that women who have no or minimum control over the use of their personal income, or where there is lack of joint decision making on use of household income were prone to gender-based violence and this in turn increase their risks to RRP and poor maternal health.

Implications of Rapid Repeat Pregnancy

The negative consequences of RRP on the population cannot be overstated. These include poor health and costs of treatment, and subsequent poverty to the affected women, their children, family and entire society. Complications resulting from RRP drain large amounts of financial resources from both the mothers and health system. For

example according to Yazdkhasti et al. (2015), the costs of treating a woman for complications of unsafe abortions is significantly higher than that of providing medical safe abortion. In countries such as Zimbabwe and Iran where abortion is illegal, unintended pregnancies are terminated by covert high-risk procedures, which can cause irreversible disabilities or even death to the mother and her child. As RRP often occurs among women of poor socioeconomic status, it further increases their constrained expenditure on preventable health issues, and propagates health and social inequalities (Conroy et al., 2016).

RRP accelerates the decline in the welfare of affected women and girls, which further widens the existing gender inequality. Women and girls simply remain exposed to low education and income levels or undertake unpaid or underpaid jobs. Consequences of RRP that ends in unsafe abortions contribute to souring maternal mortality and morbidity as well as infant and child mortality rates, and also exert huge pressure on the health system expenditure. Credible evidence from various studies also shows that RRP costs governments huge amounts of productive human capital, which should contribute to improvements in economic growth (Yazdkhasti et al., 2015). The absence of women and girls in the labor market attending to negative health outcomes of RRP reduces labor productivity.

Children born out of RRP often suffer poor health too. They become prone to negative psychosocial and physical health disparities, drop out of school and show delinquent behavior during adolescence, and hardly escape poverty. For example, literature shows that when girls drop out of school, they are prone to sexual abuse and

teenage pregnancy. They also become vulnerable to early marriage, where they lack control over their reproductive health and use of contraceptives, and in the end they complete the cycle of poverty. All these negative effects of RRP point to the need to devise and implement effective interventions to prevent RRP. Such interventions can be developed based on evidence informed by identified factors that have strong associations with occurrence of RRP (Norton et al., 2017).

Prevention of Rapid Repeat Pregnancy

Prevention of RRP may help countries increase labor force participation rates, improve academic and professional achievements, enhance economic efficiency, improve quality of life, level of health and reduce crime rates among the affected populations (Yazdkhasti et al., 2015)

The most obvious and widespread way of preventing RRP is through expanding and facilitating access to family planning. Family planning was identified as one of the top 10 public health achievements of the 20th century and to date it remains acknowledged as one intervention that offers multiple developmental gains to women, their families and countries at large (Starbird, Norton, & Marcus, 2016). Its benefits have been consistently observed through reductions in family size, widening opportunities for education, reduced maternal, infant and child deaths, prevention of HIV and STIs, and reduction of gender based violence and gender inequality, and improvements in adolescent health (Starbird et al., 2016). Many governments in developing countries are working closely with non-state actors in to reduce the unmet need for contraceptives as well as increase contraceptive method-mix in order to achieve universal coverage of

contraceptives. They are providing information about different types of contraceptives using multi-media approaches and other innovations to reach various audiences (Aslam et al., 2015b). For example, developing countries are also expanding choices of contraceptives for women i.e. offering LARC, Short Term and permanent methods (ZNFPC-CIP, 2016). There is currently a strong drive to encourage service providers to ensure adequate contraceptive counselling. The WHO and UNFPA (2018) assert that ensuring universal access to contraceptives by all women at risk of pregnancy contributes to a reduction in unintended pregnancy which also includes RRP. In many African countries, governments, with support from civil society organizations community programs that facilitate attitude change and challenge sociocultural, religious and traditional practices that work against uptake of family planning services and promote traditional harmful practices. The contribution of family planning to the obtainment women's social, economic, political and health development is also echoed by the current general consensus among health and human development practitioners that family planning offers the best opportunity for accelerating achievement of the sustainable development goal (SDGs). Unfortunately, despite the known benefits if family planning countries still face challenges with preventing RRP.

Challenges in Prevention of Rapid Repeat Pregnancy

Unfortunately despite the common consensus on the positive contribution family planning to improvements in health and development, many countries, especially LMIC struggle to ensure unlimited availability, access, and utilization of family planning or contraceptives. As a result millions of women experience unintended pregnancy (both

unwanted or mistimed) including RRP in high proportions**.** In Zimbabwe family planning is provided as part of integrated RMNCH-A services where all women who seek antenatal care and postnatal care services are exposed to family planning services and encouraged to make informed choices to prevent unintended pregnancy. This strategy aims to help women prevent unintended pregnancy. Unfortunately the measurement of RRP and associated risk factors has not been done and documented in the country. According to the Policy Brief Report by USAID's Health Policy Project (2015) Zimbabwe's major challenge it faces to prevent unintended pregnancy is lack of adequate funding to secure and distribute family planning commodities. The family planning program in Zimbabwe heavily relies on donor funding and support from CSO as the government funding always falls short. Further, due to resource constraints, the Government of Zimbabwe lacks capacity to fully implement programs and policies that provide equitable family planning services to at women at risk and mothers before and soon after delivery (Duvall et al., 2014).

Poor countries also lack adequate infrastructure and trained health personnel to offer the services (Duvall et al., 2014). On the service demand side, consumer attitude towards contraceptives, preference for short term methods, traditional- cultural and religious barriers present challenges for uptake and utilization of available services. The Zimbabwean situation is not significantly different from other countries in the region. Hence Zimbabwe needs to invest in the implementation of programs and policies that accelerate provision of unlimited equitable family planning services and address the socio-economic factors that act as fertile ground for occurrence of RRP.

Theoretical Framework

As specified in Chapter 1, the theoretical framework adopted to assess the predictors of RRP among Zimbabwean mothers is SCT, as proposed by Bandura (1986). This SCT theory is premised on the argument and understanding that the human behavior happens in a social context in a dynamic and reciprocal interaction of the person, environment and behavior as shown in the Figure 3.

The theory posits that a person acquires and maintains certain behavior based on the social environment in which they perform the behavior. In his explanation of the SCT, Bandura (1986) stated that:

> It defines human behavior as a triadic, dynamic, and reciprocal interaction of personal factors, behavior, and the environment. Because of this interaction between the environment and personal characteristics, it is believed that human expectations, beliefs, and cognitive competencies are developed and modified by social influences and physical structures within the environment.

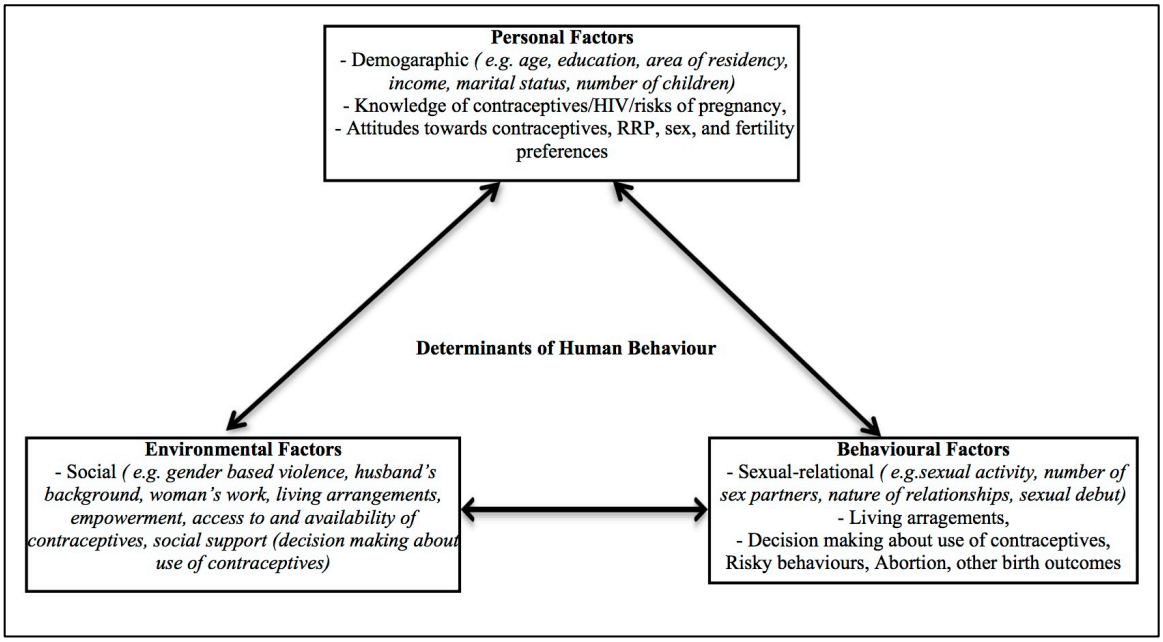

Figure 3. Social cognitive theory

SCT considers the person's past experiences as important in determining whether behavior will be enacted. Thus, according to the SCT a person's past experiences influence their future expectations and reinforcements, which eventually determine whether the person will engage in a specific behavior and the reasons why they do it. This theory applies to this study in the sense that for example, one can argue that personal factors e.g. a mother's fertility preferences may be influenced by the nature of relationship she has with her sexual partners (behavioral) and can be reinforced by living arrangements or nature of social support she receives regarding family planning (environmental). Personal factors such as knowledge of, and attitudes towards contraceptives, and knowledge of risks of RRP or pregnancy in general may determine woman's sexual-relational behavior. For instance, if relationships are poor or unstable, she may avoid sexual encounters when she is not on any contraceptive. Social factors

found in the environment such as experience of gender-based violence; husband's background and support for use of contraceptives, accessibility, and availability of contraceptives within the community may have an influence on whether a mother will adopt a contraceptive, discontinue use or have an RRP or not (Barden-O'Fallon, Speizer, Calhoun, & Corroon, 2018).

SCT also includes the concepts of self-efficacy, which basically speak to one's confidence in their ability to successfully implement or perform behavior. With regards to this study, a mother may choose to have an RRP as a way of compensating a previous loss of pregnancy or as a way of demonstrating that they can they can achieve their set goals regarding their preferred number of children, which would be a demonstration of their self-efficacy (Smee et al., 2011; Akelo et al., 2015).

SCT has been vastly used in health promotion including family planning research and in the implementation of programs that seek to prevent unintended pregnancy and promote uptake of contraceptives. Richardson et al. (2016) elaborated on the self-efficacy construct of SCT to demonstrate how it applies to use of contraceptives. Their study showed that lack of self-efficacy acted as a barrier to uptake of contraceptives. Other studies with similar findings recommended that interventions seeking to promote family planning should promote self-efficacy (Peak and Hove, 2012).

Application of the Theoretical Framework

If indeed human behavior happens in a social context in a dynamic and reciprocal interaction of the person, environment and behavior, as Bandura (1986; Bandura, 1999) proposed, then one can argue that a mother may desire to have an RRP to conform to the

society's expectation about child bearing and number and sex of children, improve connection to the family of choice, or to facilitate stability in the relationship with their partner (Smee et al., 2011; Akelo et al., 2015). In this way, the individual would be behaving in a way in which they encounter and interact with the environment they live in. Women may also have an RRP as a way of compensating a previous loss of pregnancy or as a way of demonstrating that they can achieve their set goals regarding their fertility preferences. In this way, they would be enacting a behavior based on their assessment self-efficacy to successfully perform their intended behavior and achieve their envisaged outcomes. In the context of this study I will use the theory's argument of the reciprocal interaction of the person, environment and behavior to thoroughly examine the predictors of RRP. That is, personal (e.g. socio-demographic, fertility preferences, knowledge etc.) and environmental (e.g. social, , gender-based violence, access to contraceptives etc.), and behavioral (sexual-relational, risky behaviors, use of contraceptives) factors will be assessed to ascertain which of them can independently predict occurrence RRP among women of reproductive age in Zimbabwe.

Summary

This literature review has synthesized the available information of the problem of RRP at a global level, and exposed the paucity of information on the same at the Zimbabwean country level. Literature on RRP in sub-Sahara Africa is scarce and in Zimbabwe no studies explicitly looking at RRP have been published at this time. The available literature revealed that there is substantial research done on repeat and unintended pregnancies with most of it specifically biased towards adolescents, and with

minimal focus on the rapidness of the repeat pregnancies. The few available research studies on RRP is focused on poor or marginalized minority groups of adolescents, and neglected middle-aged women who are also vulnerable to RRP (Johnson-Mallard et al., 2017). Further, much of such research is based on data from developed countries, with only a few from developing countries and none from Zimbabwe. Among the reviewed studies, the majority identified factors associated with repeat and unintended pregnancies regardless of whether it was an RRP or not. Some identified promising interventions for addressing this problem. Of concern is that many of the studies though quantitative in nature, used relatively smaller sample sizes, which limited their generalizability. Nonetheless, this literature review noted the factors associated with RRP to include young, poor income, low level of education, marital status, inconsistent use of contraceptives, and non-use of LARC. There is wide acknowledgement of the positive contribution of family planning in human development. Countries have committed and pledged to achieve universal access to family planning as a way of facilitating planned parenthood, however funding for large scale prevention and health promotion interventions is lacking. Additionally, personal and environmental factors also play a huge part in enabling uptake of contraceptives. Unfortunately, lack of conclusive information to guide targeted interventions persists. There is need for further enquiry to enhance our understanding of RRP and help develop prevention programs that work to mitigate RRP. This review confirmed the relevance of, and need for this study to close the existing gap in literature. This study will assess the predictors of RRP in Zimbabwe using the SCT as a guiding theoretical framework. Secondary Data from the ZDHS of

2015 will be used in this assessment. In Chapter 3, I detail the methodological approach that I employed in answering the research questions for this study.

Chapter 3: Research Method

Introduction

The purpose of this study was to identify and describe the social and sexual risk factors for RRP and assess if there are any associations between the risk factors and having an RRP in Zimbabwe. I also sought to determine the prevalence of RRP in Zimbabwe. According to Calvert et al. (2013), RRP carries increased health risks for both the mother and her unborn child. Therefore, identifying the risk factors for RRP is important for characterizing the problem, which remains undocumented in Zimbabwe. Once the risk factors are identified and understood, public health practitioners can use the evidence to develop context specific interventions for prevention (Hindin et al., 2016). Documenting the prevalence of RRP in Zimbabwe is essential to inform appropriate planning for prevention needs (Ward, 2013). At the time of this study, the burden of the problem had not been explicitly documented, hence the paucity of information on this subject as well as near nonexistent targeted prevention interventions. In this chapter, I provide a succinct description and justification of the research design and the associated methodology I used to test the hypotheses and answer the research questions. I also detail the data analysis plan and address the ethical considerations related to the execution of this study.

Research Designs and Rationale

This was a purely quantitative research study adopting an unmatched case control study design, using secondary data from the ZDHS of 2015. The historical data were

obtained from USAID (2019). The 2015 ZDHS provided the most recent nationally representative demographic and health data.

Description of the ZDHS Dataset

The ZDHS dataset contains data on basic demographic and health indicators including sociodemographics; marriage and sexual activity; fertility and fertility preferences; family planning; infant, child and maternal health; HIV/AIDS; domestic violence and women's empowerment; and adult and maternal mortality. Data were collected from a sample of over 11,000 households (urban and rural) of eligible women aged 15–49 years and men aged 15–54 years. USAID (2019) provides unrestricted survey data files for legitimate academic research after formal registration online. I downloaded the data files in various file formats, e.g., SPSS, Stata, SAS data file, and they came with a recode manual and the questionnaires used for data collection. I obtained access to the datasets and downloaded an SPSS data file for women 15–49 years only, along with the recode manual and the women's questionnaire. The dataset contained all the variables of interest for this study and the data were de-identified (USAID, 2019).

The Unmatched Case-Control Study Design

I chose an unmatched case-control study design and considered it appropriate for addressing my research questions. It offered the most economical way to study the association exposure and disease (Aschengrau & Seage, 2014). Using this approach, I was able to identify and enroll cases of RRP and also identified and enrolled a sample of the population that produced the cases (the control) and compared them (Aschengrau & Seage, 2014). This design also saved me time as both the exposure and outcome of

interest have already occurred and were documented at the time participants enrolled, i.e., RRP already occurred. I was able to assess the frequency and distribution of women who experienced an RRP and also analyze the association between RRP and sociodemographic, sexual-relational, previous birth outcomes, fertility preferences, social factors, and women's health**.** This study design was also favored in the context that attempting primary data collection would have required large amounts of money and would have been a waste of scarce resources as data to answer the research questions were already available. The study design allowed me to establish the associations between study and outcome factors and calculate prevalence and odds ratios (Aschengrau and Seage, 2014).

Identification of Cases

This study enrolled Zimbabwean women of reproductive age (15–49 years) who had at least two pregnancies and at least one live birth. Cases were women who have had their second or higher order pregnancy as an RRP. I relied on prevalent cases because the data could not establish incidence (Aschengrau & Seage, 2014). An RRP is a pregnancy that occurs within 12–24 months of the previous pregnancy.

Identification of Controls

Controls were women who have similar characteristics as those of cases except they had not had an RRP. Both cases and controls were identified and enrolled from the ZDHS 2015 dataset. This dataset was considered reliable, accurate, and in a good position to facilitate identification of many true cases of RRP in a quick and efficient way.

Study Variables

The study outcome factor/dependent variable was having an RRP and was measured in a dichotomous manner where coding Yes = 1 and No = 0. Study factors/independent variables were grouped into six categories: (a) sociodemographic (age, education, area of residency, income, marital status, religion); (b) sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, living arrangements); (c) previous birth outcomes (live births, still birth, abortion, miscarriage); (d) fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning); (e) social factors (gender-based violence, husband's background, woman's work and empowerment); and (f) women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior).

Study Population

The study was undertaken using secondary data from a nationally representative sample of women of reproductive age in Zimbabwe. Data were collected from all 10 provinces of Zimbabwe, covering both the rural and urban areas (USAID, 2019). The study population included all Zimbabwean women of reproductive age (15–49 years). The sample comprised of all women who have had at least two pregnancies and at least one live birth.

Sampling and Sampling Procedures

The study enrolled all women who met the inclusion criteria, i.e., all women who had at least two pregnancies including those who were currently pregnant. These women

were then categorized according to whether they had an RRP (cases) or not (controls). From the database of all women, I excluded the non-eligible women, i.e., those who did not meet the inclusion criteria, e.g., those who had never been pregnant or had only been pregnant once. From the remaining eligible women, I identified the cases and the controls. I used data for all women who met the inclusion criteria. These participants included all women who had had at least two pregnancies and those who reported that they were currently pregnant.

I calculated the sample size using EPI INFO version 7.2.2.6. The calculated sample size for this study was 2,111: 704 cases and 1,407 controls. I considered the possible risk of confounding and missing values and added a contingency of 25%, which increased the sample size to 2,639, represented as 880 (704 + 176) cases and 1,759 (1,407 + 352) controls. In similar studies (Maravilla et al., 2017; Vieira et al., 2016), researchers have reported age as a significant risk factor for RRP, so in calculating sample size for this study, I used age as a major risk factor. In this regard, this sample size assumed a hypothetical proportion of controls and cases with exposure of 10% and 14.3%, respectively. Maravilla et al. (2017) and Vieira et al. (2016) also established these sampling parameters. I estimated an odds ratio of 1.5, based on a two-sided 95% confidence level and 80% power to detect the smallest differences that might exist. Figure 4 shows the sample size calculation using EPI INFO version 7.2.2.6.

Unmatched Case-Control Study (Comparison of ILL and NOT ILL)

Two-sided confidence level:	95%
Power:	80 %
Ratio of controls to cases:	2
Percent of controls exposed:	10 %
Odds ratio:	1.5
Percent of cases with exposure:	14.3 %

	Kelsey	Fleiss	Fleiss w/ CC
Cases	649	669	704
Controls	1298	1338	1407
Total	1947	2007	2111

Figure 4. Sample size calculation using EPI INFO version 7.2.2.6

Table 1 is the data extraction template I used to create a database specific to my study. The template detailed the data regarding all the variables required to answer the research questions. The table shows the variables of interest to this study and where they were found and coded in the ZDHS database.

Table 1

Data Extraction Template

Variable name	ZDHS code
Sociodemographic factors	
Age	V013
Education	V106
Area of residency	V025
Income	V190
Marital status	V501
Religion	V130
Age of respondent at first birth	V212
Sexual relational factors	
Sexual activity	V767A
Sexual partners	V854A
Nature of relationship with sexual partner(s)	V767A
Sexual debut	V525
Living arrangements	V504
Women's health	
Previous reproductive health	V750; V763A–G
HIV/AIDS knowledge	V751; V824
HIV/AIDS attitudes	V774A-C; V775–V780; V825
HIV/AIDS behavior	V781A–C
Previous birth outcomes	
Ever had a terminated pregnancy	V228; V234
Currently pregnant	V213
Fertility preferences	
Knowledge of family planning	V301
Use of contraceptives	V302
Decision-making about use of contraceptives	V632
Preferred waiting time for birth/another child	V603
Desire for more children	V605
Husband's desire for children	V621
Decision-making about use of contraceptives	V632
Fertility preference	V602
Current contraceptive method/use + intention	V602; V364
Social factors	
Experience of gender-based violence	D101A-F
Husband's background	V701
Woman's work and empowerment	V716; V739; V741; V743A-F
Experience of gender-based violence	D128; D113–4; S110AA

Operationalization of Variables

The 2015 ZDHS dataset contained all the independent and dependent variables of interest for this study as highlighted in the previous paragraphs. The dependent variable

for this study was whether a participant has ever had RRP or not. This information was extracted from the dataset based on participants' responses to questions regarding previous birth outcomes. This variable was considered a binary dependent variable coded as yes/no.

There were six independent variables, all with covariates and they included: (a) sociodemographic (age, education, area of residency, income, marital status, religion); (b) sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, living arrangements); (c) previous birth outcomes (abortion/miscarriage, currently pregnant); (d) fertility preferences (use of contraceptives, decision-making about use of contraceptives, knowledge of family planning); (e) social factors (gender-based violence, husband's background, woman's work and empowerment); and (f) women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior).

Sociodemographic Characteristics

Age was determined based on respondents' answers to the questions about their month and year of birth or completed years. This variable was categorized into five-year age groups for descriptive purposes (Andrade, 2017). Thus the categories are 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, and 45–49. It was imperative to ascertain age of participants as there is evidence that suggests that younger age is associated with RRP and increased risk of maternal and infant complications and mortality (Yazdkhasti et al., 2015).

Education was ascertained through analysis of data regarding participant's responses to question about their highest level of education. In literature, there are observations that maternal mortality and levels of education may influence choice of contraceptives and utilization of family planning services (Islam et al., 2016; Pazol, Zapata, Tregear, Mautone-Smith & Gavin, 2015). In this study, level of education was categorized as no education, primary, secondary and higher.

Area of residency may determine access to family planning and educational services. In Zimbabwe rural dwellers generally have a disproportionate level of access to health facilities, which are the main sources of contraceptives. Some of the areas are deemed hard to reach due to geo-location and poor road network. There is also an observation that rural adolescents are at higher risk of teenage pregnancy and female teenage marriage than their urban counterparts (ZIMSTAT, 2015). This variable was categorized into rural and urban.

Income was measured based on a calculated wealth index, which categorizes into five categories (poorest, poorer, middle, richer, richest). The importance of measuring income is that income has been observed to have an influence on access to contraceptives and health services. In Zimbabwe, health user fees are considered a major barrier to access to health care services, hence family planning services in all government owned health facilities are subsidized and offered free of charge. It was important for this study to examine this variable and ascertain if it is a predictor of RRP.

Marital status was based on the participant's responses regarding their current marital status (currently married, separated, divorced, widowed, co-habiting/currently

living with a man, not in union). This variable was essential in the assessment of predictors of RRP as there are inconsistent findings regarding the influence of marital status on RRP especially concerning older or middle-age women, who are generally neglected in research on RRP. Evidence on relating to adolescents in other countries is however firm and suggests that, cohabiting or living with an index baby's father (of the recent baby) but not married, being sexually active for more than 3 months were statistically significant predictors of RRP (Lewis et al., 2013). This study presented an opportunity to show if marital status was predictive of risk of RRP or not in Zimbabwe.

Religion is known to have an influence in health seeking behavior and is of paramount importance in determining uptake of family planning services. Zimbabwe is a religiously diverse country and identifying which of the various religions are influential in RRP and this information can be useful in developing targeted interventions for prevention of RRP.

Sexual-Relational Variables

Sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, living arrangements are the covariates that were measured in this study. They have been documented as predictive of RRP in previous studies.

Previous birth outcomes referred to whether one had stillbirth, abortion, or a miscarried or was currently pregnant. Their association with RRP is well detailed in Chapter 2. Understanding their connection with the risk of RRP will enable health workers customize family planning counselling messages and reproductive health education.

Fertility preferences referred to use of contraceptives, decision-making about use of contraceptives, and knowledge of family planning are some of the factors that may have an influence on whether one will have an RRP or not. Lack of knowledge about family planning limits one's potential for use of contraceptives to safely space or limit their number of children. It also leaves them with minimal capacity to decide and make an informed choice of type of contraceptive to adopt. In this study, these were examined to ascertain which are true predictors of RRP in the Zimbabwean context.

Social Factors

Experience of gender-based violence is known to be positively associated with poor maternal and child health. This study ascertained if it is also associated with RRP. I believe that it is vital to assess this in the Zimbabwean context where gender-based violence is highly prevalent to inform possible interventions that address both gender-based violence and RRP.

Women's Health Factors

These factors included variables linked to the participant's previous reproductive health, HIV knowledge, attitudes and behavior. Studies with HIV infected women show that women's HIV status acts as a significant predictor of frequent successive pregnancies.

Table 2

Study and Outcome Variables

Variable type	Variable name	Level of measurement
Dependent	RRP status	Dichotomous
Independent	Sociodemographic	
	Age	Nominal
	Education	Nominal
	Area of residence	Dichotomous
	Income	Nominal
	Marital status	Nominal
	Religion	Nominal
	Sexual-relational	
	Sexual activity	Nominal
	Sexual partners	Continuous
	Nature of relationship with partner(s)	Nominal
	Sexual debut	Continuous
	Living arrangements	Nominal
	Previous birth outcomes	
	Currently pregnant	Dichotomous
	Abortion	Dichotomous
	Miscarriage	Dichotomous
	Fertility preferences	
	Use of contraceptives	Dichotomous
	Decision-making about use of contraceptives	Nominal
	Knowledge of family planning	Nominal
	Social Factors	
	Experience of gender-based violence	Dichotomous
	Husband's background	Nominal
	Participants' work and empowerment	Nominal
	Sex of first child	Dichotomous
	Women's Health	
	Previous reproductive health	Nominal
	HIV/AIDS	Dichotomous
	HIV knowledge, attitudes and behavior	Nominal

Data Analysis Plan

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25. This is a software package used for statistical analysis of data. The software provides for comprehensive data management, which covers all coding and recoding, and hypothesis testing. Data for this study was appropriately analyzed to adequately answer each research question as follows:

RQ1: Is there an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$1: There is no association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

H_A1: There is an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

In addressing RQ1, I ran a frequency distribution of the sociodemographic factors and compare the two groups. I established the means and standard deviations for all continuous variables. I conducted a logistic regression and calculated crude and adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences.

RQ2: Is there an association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$2: There is no association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual

debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

H_A2: There is an association between sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

In addressing research question 2, I ran a frequency distribution of the sexual-relational factors and compare the two groups. I conducted a logistic regression and calculated crude and adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences.

RQ3: Is there an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe?

H_03: There is no association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

H_A3: There is an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

In addressing RQ 3, I ran a frequency distribution of the women's health factors and compared the two groups. I conducted a logistic regression and calculated crude and

adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences.

$H_0$4: There is no association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

H_A4: There is an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

In addressing RQ 4, I ran a frequency distribution of the previous birth outcome factors and compared the two groups. I conducted a logistic regression and calculated crude and adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences

$H_0$5: There is no association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

H_A5: There is an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

In addressing RQ 5, I ran a frequency distribution of the fertility preferences factors and compared the two groups. I conducted a logistic regression and calculated crude and adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences

RQ6: Is there an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$6: There is no association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

H_A6: There is an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

In addressing RQ 6, I ran a frequency distribution of the social factors and compared the two groups. I conducted a logistic regression and calculated crude and adjusted odds ratios to ascertain the relationship between the independent and dependent variables. I made comparisons between the cases and controls using an alpha level, p-value of 0.05 and 95% confidence intervals, to arrive at conclusions of whether there are any statistically significant differences

Validity and Reliability

Aschengrau and Seage (2014) emphasized the importance of validity and reliability of data and stated that these are essential to ensure credibility of the study findings. If neglected they may lead to incorrect association between exposure and disease. As I was using secondary data, I took cognizance that there could be threats to validity, which could compromise my study. As such I made efforts to ensure identification of potential threats and putting measures to minimize it. I assessed the data for both internal and external validity by conducting a critical appraisal of the data. I assessed the quality control measures that were employed in the sampling of participants, the population, and sample that was obtained, the data collection strategy that was used, response rate, data entry, coding and all the quality control measures that were applied. I observed that the data was valid and reliable. For example, I could reproduce the original summary statistics and there were correct numbers of observations and variable. The methods used are consistent with standard scientific research expectations and data is generalizable.

Ethical Considerations

This study used only secondary data to answer all the research questions. The data were collected by USAID through their DHS Program in 2015 in compliance with all the necessary and expected ethical procedures and observations for conducting research with human participants. This included strict adherence to requirements for respect for persons, beneficence and justice. All participants provided informed consent in writing, and confidentiality was assured. The data are properly documented, stored in an ethical

manner and only accessible to individuals upon application and obtaining clearance. I applied and obtained access to the datasets and downloaded an SPSS data file for women 15–49 years only, along with the recode manual and the women's questionnaire. Before proceeding to undertake the analysis for this study, I applied for clearance from the Walden University Institutional Review Board, and I also applied for ethical clearance to the Medical Research Council of Zimbabwe (MRCZ) and in both circumstances clearance was granted.

Summary

In this chapter, I described the research design and approach that will be applied in undertaking the study. I described the data that I used, calculated the sample size and described the data analysis plan for each of the research questions. I also detailed the validity and reliability issues for the study. I concluded with some details for ethical considerations. In Chapter 4, I tested the hypothesis and provide data analysis findings.

Chapter 4: Results

Introduction

The purpose of this study was to identify and describe the social and sexual risk factors for RRP and assess if there are any associations between the risk factors and having an RRP in Zimbabwe. I also sought to determine the prevalence of RRP in Zimbabwe. I used secondary data to answer the research questions. The sample size was 5,744. In this chapter, I present a report of the study findings. I first report the descriptive statistics using frequencies and percentages on the independent and dependent variables as shown in tables. I further report for each research question, the crude odds ratio (*OR*) and adjusted odds ratios (*AOR*) along with their and confidence intervals (CI). The study had six research questions, and I present the statistical findings in relation to each research question, specifying which factors were statistically significant at 95% CI. Below are the research questions and hypotheses that I tested.

RQ1: Is there an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$1: There is no association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

H_A1: There is an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

RQ2: Is there an association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$2: There is no association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

H_A2: There is an association between sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

RQ3: Is there an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$3: There is no association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

H_A3: There is an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

RQ4: Is there an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$4: There is no association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

H_A4: There is an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

RQ5: Is there an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$5: There is no association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

H_A5: There is an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

RQ6: Is there an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$6: There is no association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

H_A6: There is an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

Data Analysis

I adopted an unmatched case-control study design to test the hypotheses. I used secondary data from the ZDHS of 2015. I obtained this historical data from USAID (2019). The results of this study are based on the frequency distributions and the logistic regression analysis that I performed on the data. The calculated sample size required for this study was 2,639 (880 cases and 1,759 controls). However, the actual obtained was 5,744 (2,882 cases and 2,862 controls)

Results

RQ1: Is there an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe?

H_01: There is no association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

H_A1: There is an association between sociodemographic factors (age, education, area of residency, income, marital status, religion) and having a rapid repeat pregnancy in Zimbabwe.

Table 3 shows the sociodemographic characteristics of the study participants. The total sample size was 5,744. Cases constituted 50.2% of the total sample size. The

majority (24.3%) of the women were aged 30–34, affiliated with the apostolic sect (46.8%). Most of the participants were married (79%); 59.8% had achieved secondary education, resided in rural areas (66.3%), and were from Harare (15.7%) followed by Manicaland province (13.6%).

When comparing the frequency distribution between the two groups in terms of age, I observed that there were more cases than controls in the younger age groups, 15–19 years (76.7%) and 20–24 years (56.9%). The majority of the cases had no education (62.1%) and lived in the rural areas (55%). In both groups, 50% of the participants were married. In terms of religion, the majority of cases were affiliated with the apostolic sect. Most of cases came from Manicaland and Midlands provinces, as shown in Figure 5.

Table 3

Sociodemographic Characteristics of the Study Participants

Independent variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Age (years)						
15–19	30	.5	7	23.3	23	76.7
20–24	561	9.8	242	43.1	319	56.9
25–29	1210	21.1	662	54.7	548	45.3
30–34	1393	24.3	756	54.3	637	45.7
35–39	1140	19.8	573	50.3	567	49.7
40–44	879	15.3	404	46.0	475	54.0
45–49	531	9.2	217	40.9	313	59.1
Education						
No education	117	2.0	44	37.9	72	62.1
Primary	1089	31.5	727	40.2	1082	59.8
Secondary	3434	59.8	1839	53.6	1594	46.4
Higher	384	6.7	251	65.4	133	34.6
Area of residency						
Urban	1937	33.7	1149	59.3	788	40.7
Rural	3807	66.3	1713	45	2094	55
Marital status						
Never in union	90	1.6	63	69.2	28	30.8
Married	4537	79	2269	50	2268	50
Living together	186	3.2	84	45.2	102	54.8
Widowed	386	6.7	172	44.4	215	55.6
Divorced	347	6	178	51.3	169	48.7
Separated	198	3.4	97	49.2	100	50.8
Religion						
Traditional	42	0.7	20	47.6	22	52.4
Roman Catholic	332	5.8	190	57.4	141	42.6
Protestant	814	14.2	464	57	350	43
Pentecostal	1256	21.9	730	58.1	526	41.9
Apostolic sect	2689	46.8	1174	43.7	1515	56.3
Other Christian	243	4.2	104	42.8	139	57.2
Muslim	28	0.5	14	50	14	50
None	335	5.8	161	48.2	173	51.8
Other	6	0.1	3	50	3	50
Region						
Manicaland	778	13.6	322	41.4	456	58.6
Mash. Central	573	10	307	53.7	265	46.3
Mash. East	583	10.2	278	47.6	306	52.4
Mash. West	753	13.1	384	51.1	368	48.9
Mat. North	276	4.8	124	44.9	152	55.1
Mat. South	225	3.9	113	50.2	112	49.8
Midlands	715	12.5	312	43.6	403	56.4
Masvingo	692	12.1	333	48.1	359	51.9
Harare	903	15.7	555	61.5	348	38.5
Bulawayo	245	4.3	133	54.3	112	45.7

Note: * may vary due to missing values in some variables

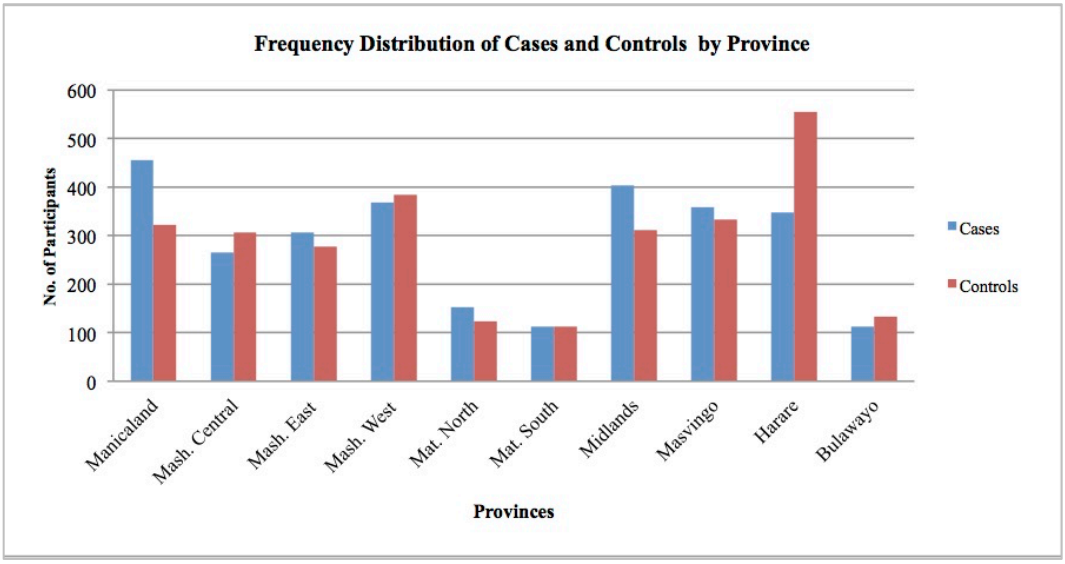

Figure 5. Frequency distribution of cases and controls by province.

Table 4 displays the socioeconomic characteristics of the sample. Overall, the majority were not working (50.6%), and most of these were cases (52.5%). Sixty-three percent of the cases ranked poorest, compared to 36.8% of the controls. Among those who had some form of earnings, the majority (29%) earned less than their partners, and more cases (59.5%) had a husband/partner who did not bring in any money.

Table 4

Socioeconomic Characteristics of the Study Participants

Independent variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Respondent currently working						
Yes	2836	49.4	1481	52.2	1355	47.8
No	2908	50.6	1381	47.5	1527	52.5
Wealth index						
Poorest	1170	20.4	430	36.8	740	63.2
Poorer	1086	18.9	495	45.6	591	54.4
Middle	1027	17.9	489	47.6	539	52.4
Richer	1303	22.7	727	55.8	576	44.2
Richest	1159	20.2	722	62.3	437	37.7
Owns a house alone/jointly						
Does not own	2631	45.8	1407	53.5	1225	46.5
Alone only	462	8	190	41.2	271	58.8
Jointly only	2494	43.4	1198	48	1296	52
Alone and jointly	158	2.7	67	42.7	90	57.3
Respondent earns more than husband or partner						
More than him	325	5.7	177	54.5	148	45.5
Less than him	1679	29.2	893	53.2	786	46.8
About the same	390	6.8	215	55.1	175	44.9
Partner does not bring in money	75	1.3	30	40.5	44	59.5

Note: * may vary due to missing values in some variables

Table 5 shows the results of the crude odds ratios (*OR*) and the adjusted odds ratios (*AOR*) of the sociodemographic characteristics. I performed binary logistic regression to calculate both the *OR* and *AOR* and their respective confidence intervals (CI). I first calculated the *OR* and CI comparing the cases and controls within each independent variable. After obtaining the *OR*, I controlled for possible confounding between the variables by computing *AOR*s. I specifically adjusted for age, area of residency, education, marital status, religion, and region in assessing the association between the sociodemographic factors and having an RRP. I included all six independent variables in the model comparing the cases and controls.

The results of the logistic regression analysis showed that except for the age-group 25–29 years, all other age groups were statistically significant at 95% CI using the 30–34 years age group as reference. Women in the 15–19 years age–group were 3.4 times more likely to have an RRP compared to those in the 30–34 years age group. In terms of education, attaining primary and higher education (reference – secondary education) was statistically significant at 95% CI, i.e. primary education (AOR: 1.42; 95%CI: 1.25–1.61) and higher education (AOR: .762; 95% CI: .605–.961). This means that those who have attained primary education are 1.4 times more likely to have an RRP compared to those who have attained secondary education. However those with higher education are 24% less likely to have an RRP compared to those who have achieved secondary education. Never being in a union (reference – married) (AOR: .434; 95%CI: .270–.697), living in urban area (AOR: .732; 95%CI: .623–.859) (reference – rural), being affiliated to either Roman Catholic (AOR: .656; 95%CI: 516–.836), Protestant (AOR: .664; 95%CI: .560–.788), or Pentecostal AOR: .672; 95%CI: .580–.778) (reference – Apostolic sect) was also significant a 95% CI with participants in these categories being less likely to have an RRP compared to those in the reference categories. Further coming from Manicaland (AOR: 1.35; 95%CI: 1.072–1.713), Midlands (AOR: 1.437; 95%CI: 1.147–1.800), or Mashonaland Central Provinces (AOR: .730; 95%CI: 565–.942), (reference – Harare) was also statistically significantly associated with having an RRP.

Table 5

Crude Odds Ratios and Adjusted Odds Ratios of the Sociodemographic Characteristics

Independent variables	*OR*	95% CI	*AOR*	95% CI
Total	5744*			
Age (years)				
15–19	4.196	1.762–9.995	3.472	1.434–8.403
20–24	1.561	1.281–1.901	1.414	1.153–1.733
25–29	.981	.841–1.146	.933	.796–1.094
35–39	1.175	1.005–1.375	1.182	1.006–1.389
40–45	1.395	1.178–1.653	1.374	1.152–1.637
46–49	1.711	1.398–2.096	1.689	1.362–2.093
30–34	Reference		Reference	
Education				
No education	1.893	1.295–2.769	1.400	.943–2.078
Primary	1.716	1.529–1.926	1.423	1.255–1.614
Higher	.612	.491–.763	.762	.605–.961
Secondary	Reference		Reference	
Area of residency				
Urban	.561	.502–.627	.732	.623–.859
Rural	Reference		Reference	
Marital status				
Never in union	.442	.282–.694	.434	.270–.697
Separated	1.034	.777–1.374	1.110	.828–1.490
Living together	1.219	.908–1.636	1.207	.890–1.637
Widowed	1.253	1.016–1.544	1.072	.858–1.339
Divorced	.952	.765–1.184	1.033	.824–1.294
Married	Reference		Reference	
Religion				
Traditional	.854	.465–1.571	.739	.397–1.377
Roman Catholic	.576	.457–.725	.656	516–.836
Protestant	.583	.498–.684	.664	.560–.788
Pentecostal	.558	.487–.639	.672	.580–.778
Other	.719	.136–3.813	.715	130–3.931
Other Christian	1.029	.789–1.341	1.052	795–1.392
Muslim	.752	.356–1.590	.903	.418–1.950
None	.834	.664–1.047	.833	.658–1.055
Apostolic	Reference		Reference	
Region				
Manicaland	2.259	1.857–2.747	1.355	1.072–1.713
Mash. Central	1.375	1.112–1.700	.730	565–.942
Mash. East	1.755	1.422–2.167	1.090	.852–1.394
Mash. West	1.527	1.256–1.858	.998	.798–1.249
Mat. North	1.941	1.478–2.548	1.122	.822–1.531
Mat. South	1.581	1.179–2.121	1.082	.781–1.499
Midlands	2.058	1.686–2.513	1.437	1.147–1.800
Masvingo	1.716	1.404–2.096	1.083	.852–1.377
Bulawayo	1.341	1.009–1.784	1.313	977–1.763
Harare	Reference		Reference	

Note: * may vary due to missing values in some variables

Table 6

Crude Odds Ratios and Adjusted Odds Ratios of the Socioeconomic Characteristics

Independent variables	*OR*	95% CI	*AOR*	95% CI
Total	5744*			
Respondent currently working				
Yes	1.209	1.090–1.341	.879	.708–1.092
No	Reference		Reference	
Wealth Index				
Poorest	2.847	2.407–3.368	3.377	2.337–4.881
Poorer	1.972	1.666–2.334	3.361	2.370–4.766
Middle	1.821	1.535–2.160	2.351	1.657–3.334
Richer	1.309	1.114–1.539	1.237	.875–1.747
Richest	Reference		Reference	
Owns a house alone or jointly				
Alone only	.805	.721–.898	.948	.795–1.132
Both alone and jointly	1.317	1.077–1.611	1.495	1.021–2.188
Jointly only	1.245	.899–1.724	1.833	1.189–2.826
Does not own	Reference		Reference	
Respondent earns more than husband or partner				
More than him	1.030	.766–1.384	1.077	.796–1.458
Less than him	1.080	.865–1.347	1.134	.903–1.424
Partner does not bring in money	1.789	1.082–2.957	1.676	1.001–2.806
About the same	Reference		Reference	

Note: * may vary due to missing values in some variables

In terms of socioeconomic characteristics, participants' wealth status was statistically significant at 95% CI with both being poorest (AOR: 3.37; 95%CI: 2.33–4.88) (reference–richest) having the highest odds of having an RRP compared to being richest. Women who jointly owned a house were 1.8 times more likely to experience an RRP (AOR: 1.83; 95%CI: 1.18–2.82) compared to those who did not own. The odds of having an RRP were 1.6 times among those whose partner/husband did not bring in money (AOR: 1.67; 95%CI: 1.00–2.80) (reference –about the same).

Research Question 2

RQ2: Is there an association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$2: There is no association between sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

H_A2: There is an association between sexual-relational (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, and living arrangements) and having a rapid repeat pregnancy in Zimbabwe.

Table 7 shows the sexual-relational factors of the study participants. The majority (67.8%) was in the age group of 15–19 years when they had their sexual debut and when they had their first birth (54.9%). The participants' most recent sex partner was spouse (80%) followed by a boyfriend who was not living with the participant (7.4%). Only 11.1% of the participants reported that they used a condom every time with their most recent sex partner. Participants who can refuse sex constituted 59% and so were those who can ask their partner to use a condom (59.3%). In terms of living arrangements, 63.6% of the participants lived with their partners.

Table 7

Frequency Distribution of the Sexual-Relational Factors

Independent Variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Age at first birth						
14 or less	140	2.4	50	35.7	90	64.3
15–19	3155	54.9	1451	46	1704	54
20–24	2112	36.8	1176	55.7	936	44.3
25–29	299	5.2	169	56.5	130	43.5
30–34	37	0.6	15	40.5	22	59.5
35–39	1	0	1	100	0	0
Relationship with most recent sex partner						
Spouse	4597	80	2301	50.1	2295	49.9
Boyfriend not living with respondent	427	7.4	229	53.6	198	46.4
Casual acquaintance	18	0.3	11	61.1	7	38.9
Commercial sex Worker	2	0	1	50	1	50
Live-in partner	110	1.9	50	45.5	60	54.5
Other	2	0	0	0	2	100
Sexual debut						
14 or less	397	6.9	152	38.3	245	61.7
15–19	3897	67.8	1849	47.4	2048	52.6
20+	1451	25.3	862	59.4	589	40.6
Point concurrent sexual partners						
Yes	12	0.2	4	33.3	8	66.7
No	36	0.6	17	47.2	19	52.8
Cumulative concurrent sexual partners						
Yes	37	0.6	16	43.2	21	56.8
No	10	0.2	4	40	6	60
Used condom every time with most recent sex partner						
Yes	638	11.1	310	48.6	328	51.4
No	231	4	133	57.6	98	42.4
Can refuse sex						
Yes	3399	59.2	652	50.9	1699	50
No	1281	22.3	629	49.1	1700	50
Can ask partner to use condom						
Yes	3406	59.3	1727	50.7	1679	49.3
No	1257	21.9	591	47	666	53
Living arrangements						
Lives with partner	3653	63.6	1809	49.5	1844	50.5
Staying elsewhere	1070	18.6	543	50.7	527	49.3

When comparing the frequency distribution of the sexual-relational factors of the study participants between the cases and controls, I noticed that the number of

participants who had their first birth at age 14 or less was higher among the cases (64.3%) than controls (35.7%).

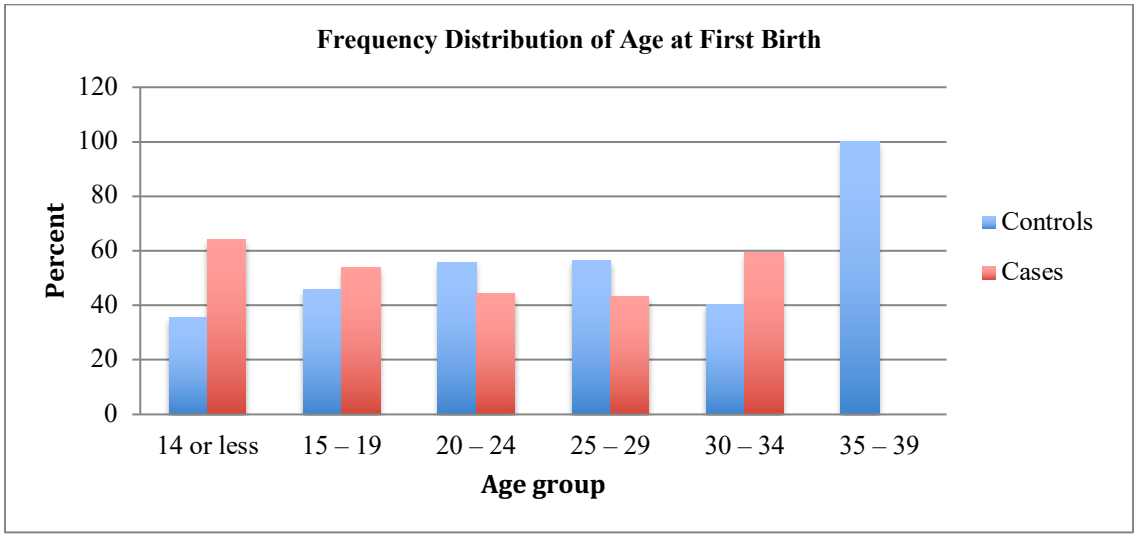

Figure 6. Frequency distribution of age at first birth.

I also observed a similar trend with respect to age at first sex where the proportion of cases was higher (61.7%) than that for controls (38.3%) among the 14 or less age group. More cases cannot ask their partner to use a condom compared (53%) to controls (47.0%). However, 50% in both groups, cases and controls can refuse sex.

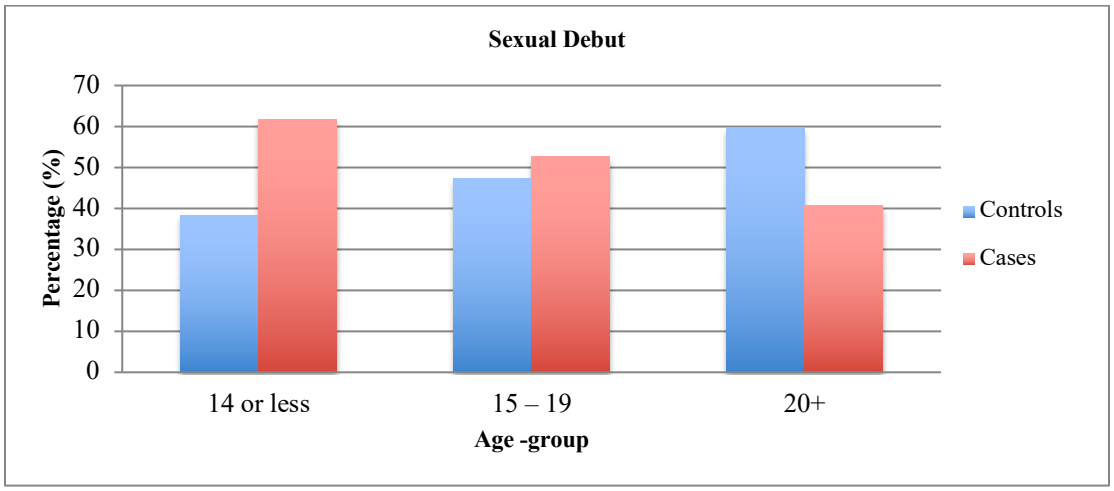

Figure 7. Frequency distribution of age at sexual debut.

Table 8

Odds Ratios and Adjusted Odds Ratios of the Sexual-Relational Factors

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Age at first birth				
14 or less	.439	.307–.627	.697	.452–1.07
20–24	.424	.280–.642	.752	.460–1.23
25–29	.830	.394–1.74	1.389	.631–3.05
30–34	.000	.000 –.	.000	.000–.
35–39	.648	.455–.923	.827	.544–1.25
15–19	Reference		Reference	
Relationship with most recent sex partner				
Commercial sex worker	1.437	.112–18.462	1.157	.778–1.721
Live-in partner	1.217	.832–1.77	1.808	.717–4.556
Boyfriend not living with respondent	.869	.713–1.060	.000	.000–.
Spouse	Reference		Reference	
Age at first sex/sexual debut				
14 or less	.424	.337–.532	.515	.384–.689
20+	.686	.555–.849	.753	.585–969
15–19	Reference		Reference	
Point concurrent sexual partners				
Yes	.566	.142–2.259	.019	.000–1.741
No	Reference		Reference	
Cumulative concurrent sexual partners				
Yes	.982	.238–4.050	4.316	.540–34.482
No	Reference		Reference	
Used condom every time				
Yes	.694	.513–.941	.718	.080–6.411
No	Reference		Reference	
Respondent can refuse sex				
Yes	1.226	.661–2.274	1.727	.816 -3.653
No	Reference		Reference	
Respondent can ask partner to use a condom				
Yes	1.161	1.020–1.322	1.167	1.020–1.336
No	Reference		Reference	
Currently residing with husband/partner				
Yes	1.052	.918–1.205	1.069	.928–1.231
No	Reference		Reference	

Table 8 shows the results of the crude odds ratios (OR) and the adjusted odds ratios (AOR) of the sexual relational characteristics. I performed binary logistic regression to calculate both the crude and adjusted odds ratios and their respective confidence intervals (CI). I first calculated the OR and CI comparing the cases and

controls within each independent variable. After obtaining the crude odds ratios, I controlled for possible confounding between the variables by computing adjusted odds ratios. In assessing the association between the sociodemographic factors and having an RRP, I adjusted for age at first birth, sexual debut, used condom every time, Respondent can refuse sex, Respondent can ask partner to use a condom, living arrangements, relationship with most recent sex partner, point concurrent sexual partners, and cumulative concurrent sexual partners. I included all the nine independent variables in the model comparing the cases and controls.

The results of the logistic regression analysis showed that age at sexual debut, was the only factor associated with having an RRP. Age at sexual debut was statistically significant at 95%CI. Thus, for the age–groups 14 or less (AOR: .515; 95% CI: .384–.689) and 20+ years (AOR: .753; 95% CI: .585–969) using 15–19 years age group as reference. This means that those who had their sexual debut at age 14 or less were 48% less likely to have an RRP compared to those in the 15–19 years age group, and those in the 20+ years age group were 25% less likely to have an RRP compared to those in the 15–19 years age group.

Research Question 3

RQ3: Is there an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$3: There is no association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

H_A3: There is an association between women's health (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior) and having a rapid repeat pregnancy in Zimbabwe.

Table 9 displays the frequency distribution of the women's health factors. The table shows that majority (97.4%) of the participants had not had any sexually transmitted infections (STI) in the past 12 months. Among the few that had had any STI in the past 12 months, 50.8% were cases. The majority of participants who had never been tested for HIV were cases (68.3%), and there were more cases (58.8%) than controls (46.2%) that agreed that they would be ashamed if a family member had HIV. A greater proportion of the participants who were tested for HIV but never received the test results were controls (58.5%). Among those who had never heard of AIDS 78.8% were cases. The majority of participants who believed that HIV is transmitted through supernatural means were also cases (51.7%). More cases than controls believed HIV cannot be transmitted during pregnancy (50.2%), delivery (56.6%) and breastfeeding (50.8%).

Table 9

Frequency Distribution of Women's Health Factors

Independent Variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Ever had any STI last 12 Months						
Yes	133	2.3	65	49.2	67	50.8
No	5594	97.4	2789	49.9	2805	50.1
Ever heard of STI						
Yes	5718	99.5	2857	50	2861	50
No	26	0.5	5	19.2	21	80.8
Ever heard of AIDS						
Yes	5711	99.4	2855	50	2857	50
No	33	0.6	7	21.2	26	78.8
HIV Transmitted during pregnancy						
Yes	5180	90.2	2595	50.1	2585	49.9
No	447	7.8	222	49.8	224	50.2
HIV Transmitted during delivery						
Yes	5241	91.2	2651	50.6	2590	49.4
No	302	5.3	131	43.4	171	56.6
HIV Transmitted during breastfeeding						
Yes	4898	85.3	2485	50.7	2414	49.3
No	545	9.5	268	49.2	277	50.8
Ashamed if someone in family has HIV						
Agree	564	9.8	260	46.2	303	58.8
Disagree	5139	89,5	2593	50.5	2546	49.5
Ever been tested for HIV						
Yes	5267	91.7	2711	51.5	2556	48.5
No	478	8.3	151	31.7	326	68.3
Know a place to get tested for HIV						
Yes	5494	99.8	2815	51.2	2679	48.8
No	14	0.2	2	14.3	12	87.5
Can get HIV by witchcraft or supernatural means						
Yes	296	5.1	143	48.3	153	51.7
No	5316	92.5	2663	50.1	2653	49.9
Received HIV Test Result						
Yes	5213	90.8	2679	51.4	2534	48.6
No	54	0.9	31	58.5	22	41.5

Note: * may vary due to missing values in some variables

Table 10 shows the results of the crude odds ratios (OR) and the adjusted odds ratios (AOR) of the women's health characteristics. I performed binary logistic regression

to calculate both the crude and adjusted odds ratios and their respective confidence intervals (CI). I first calculated the OR and CI comparing the cases and controls within each independent variable. After obtaining the crude odds ratios, I controlled for possible confounding between the variables by computing adjusted odds ratios. In assessing the association between the women's health factors and having an RRP, I adjusted for ever had any STI last 12 months, Ever heard of STI, Ever heard of AIDS, HIV transmitted during pregnancy, HIV Transmitted during delivery, HIV transmitted during breastfeeding, ashamed if someone in family has HIV, ever been tested for HIV, know a place to get tested for HIV, received HIV test result, and can get HIV by witchcraft or supernatural means. I included all the 11 independent variables in the model comparing the cases and controls. The results of the logistic regression analysis showed that none of the factors were statistically significant at 95%CI.

Table 10

Odds Ratios and Adjusted Odds Ratios of the Women's Health Factors

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Ever had any STI last 12 Months				
Yes	.975	.691–1.376	.821	.569–1.184
No	Reference		Reference	
Ever heard of STI				
Yes	3.876	1.491–10.079	3.882	1.493–10.095
No	Reference		Reference	
Ever heard of AIDS				
Yes	3.478	1.529–7.911	2.439	.479–12.42
No	Reference		Reference	
HIV Transmitted during pregnancy				
Yes	1.014	.836–1.230	1.024	.842–1.245
No	Reference		Reference	
HIV Transmitted during delivery				
Yes	1.331	1.054–1.682	1.210	.923–1.586
No	Reference		Reference	
HIV Transmitted during breastfeeding				
Yes	1.065	.892–1.271	.933	.761–1.144
No	Reference		Reference	
Ashamed if someone in family has HIV				
Agree	.841	.707–1.002	.954	.783–1.162
Disagree	Reference		Reference	
Ever been tested for HIV				
Yes	2.288	1.873–2.795	1.251	.955–1.637
No	Reference		Reference	
Know a place to get tested for HIV				
Yes	6.971	1.442–33.693	4.942	.987–24.733
No	Reference		Reference	
Can get HIV by witchcraft or supernatural means				
Yes	.927	.733–1.172	.861	.668 -1.110
No	Reference		Reference	
Received HIV Test Result				
Yes	.745	.432–1.287	.766	.431 -1.361
No	Reference		Reference	

Note: * may vary due to missing values in some variables

Research Question 4

RQ4: Is there an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$4: There is no association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

H_A4: There is an association between previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant) and having a rapid repeat pregnancy in Zimbabwe.

Table 11 reports the frequency distribution of the women's previous birth outcomes. Out of the 293 women who were currently pregnant 167 were cases and 126 were controls. The majority of the women who ever had a terminated pregnancy were controls (51.6%).

Table 11

Frequency Distribution of Women's Previous Birth Outcomes

Independent variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Currently pregnant						
Yes	293	5.1	126	43	167	57.0
No	5451	94.9	2736	50.2	2715	49.8
Ever had a terminated pregnancy						
Yes	912	15.9	471	51.6	442	48.4
No	4832	84.1	2391	49.5	2441	50.5

Note: * may vary due to missing values in some variables

To assess if there is any association between women's previous birth outcomes and having an RRP, I performed binary logistic regression to calculate both the crude and

adjusted odds ratios and their respective confidence intervals (CI). I first calculated the OR and CI comparing the cases and controls within each independent variable. After obtaining the crude odds ratios, I controlled for possible confounding between the variables by computing adjusted odds ratios. I included all the two independent variables in the model comparing the cases and controls. The results of the logistic regression analysis showed that being currently pregnant was statistically significant at 95%CI (AOR: .074; 95%CI: .588–.945) using the (reference – no). As can be seen from Table 12, women who were currently pregnant were 26% less likely to have an RRP compared to those who were not.

Table 12

Odds Ratios and Adjusted Odds Ratios of the Women's Health Factors

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Currently Pregnant				
Yes	.747	.590–.947	.746	.588–.945
No	Reference		Reference	
Ever had a terminated pregnancy				
Yes	1.088	.945 1.254	1.091	.947–1.247
No	Reference		Reference	

Note: * may vary due to missing values in some variables

Research Question 5

RQ5: Is there an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$5: There is no association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

H_A5: There is an association between fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning) and having a rapid repeat pregnancy in Zimbabwe.

The frequency distribution of women's fertility preferences is displayed in Table 13. The majority of women (54.3%) reported that they wanted no more children, and of these 53.2% were cases and 46.8% were controls. Amongst those who were undecided 50.8% were controls and 49.2% were cases. The most commonly reported contraceptive was the pill (37.9%) with the majority of the pill users being the controls. More women who were not using any contraceptive were cases (56%) compared to controls (44%). A higher proportion of women who did not intend to use any contraceptives in the future were cases (64.2%). Decision-making for using contraception was mostly joint between the participants and their partners (45%) and more controls (52.8%) compared to cases (47.2) reported joint decision-making.

Table 13

Frequency Distribution of Women's Fertility Preferences

Independent variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Fertility preference						
Have another	2280	39.7	1232	54	1048	46
Undecided	244	4.2	124	50.8	120	49.2
No more	3120	54.3	1460	46.8	1660	53.2
Sterilized	58	1	21	36.2	37	63.8
Declared infecund	42	0.7	25	59.5	17	40.5
Desire for more children						
Wants within 2 yrs.	730	12.7	400	54.8	330	45.2
Wants after 2+ yrs.	1459	25.4	777	53.3	682	46.7
Wants, unsure timing	90	1.6	54	60.0	36	40.0
Undecided	244	4.2	124	50.8	120	49.2
Wants no more	3120	54.3	1460	46.8	1660	57.6
Sterilized	58	1	21	36.2	37	63.8
Decision maker for using contraception						
Mainly respondent	614	10.7	325	52.9	289	47.1
Mainly partner	214	3.7	98	45.8	116	54.2
Joint decision	2597	45.2	1370	52.8	1226	47.2
Other	18	0.3	10	55.6	8	44.4
Knowledge of contraceptive						
Knows no method	8	0.1	1	22.2	7	77.8
Knows only traditional method	3	0.1	0	0	3	100
Knows modern method	5733	99.8	2860	49.9	2872	50.1
Current contraceptive method						
Not using	1864	32.4	821	44	1043	56
Pill	2175	37.9	1279	58.8	896	41.2
IUD	42	0.7	18	42.9	24	57.1
Injections	587	10.2	269	45.7	319	54.3
Male condom	278	4.8	156	56.1	112	43.9
Female sterilization	56	1	21	37.5	35	62.5
Male sterilization	2	0	0	0	2	100
Periodic abstinence	4	0.1	2	50	2	50
Withdrawal	48	0.8	12	25	36	75
Other traditional	2	0	0	0	2	100
Implants	663	11.5	278	41.9	385	58.1
Lactational amenorrhea	16	0.3	5	29.4	12	70.6
Female condom	8	0.1	3	37.5	5	62.5
Unmet need						
Unmet need for spacing	216	3.8	77	35.6	139	64.4
Unmet need for limiting	361	6.3	139	38.5	222	61.5
Using for spacing	1750	30.5	999	57.1	751	42.9
Using for limiting	2130	37.1	1042	48.9	1088	51.1

Spacing failure	46	0.8	16	35.6	29	64.4
Limiting failure	15	0.3	7	46.7	8	53.3
No unmet need	583	10.1	287	49.2	296	50.8
Not married and no sex in last 30 days	451	7.9	213	47.2	238	52.8
Infecund, menopausal	180	3.1	76	42.2	104	57.8
Contraceptive use and intention						
Using modern method	3827	66.6	2027	53	1800	47
Using traditional method	53	0.9	14	25.9	40	74.1
Non–user–intends to use later	1089	19	544	50	545	50
Does not intend to use	775	13.5	277	35.8	497	64.2

Note: * may vary due to missing values in some variables

Table 14 shows the results of the crude odds ratios (OR) and the adjusted odds ratios (AOR) of the women's fertility preferences characteristics. I performed binary logistic regression to calculate both the crude and adjusted odds ratios and their respective confidence intervals (CI). I first calculated the OR and CI comparing the cases and controls within each independent variable. After obtaining the crude odds ratios, I controlled for possible confounding between the variables by computing adjusted odds ratios. I specifically adjusted fertility preference, desire for more children, decision maker for using contraception, knowledge of contraceptive, unmet need, and current contraceptive method in assessing the association between the women's fertility preferences factors and having an RRP. I included all the six independent variables in the model comparing the cases and controls.

The results of the logistic regression analysis are shown in Table 14. Four of the six independent variables were statistically significant at 95% CI. A preference of having no more children was statistically significant at 95% CI (AOR: 1.33; 95%CI: 1.144–1.554). Being sterilized (AOR: 2.570; 95%CI: 1.370–4.823) were statistically significant

at 95% CI using have another as reference. In terms of desire for more children (reference – wants after 2+ years) women who wanted no more was statistically significant at 95% CI, i.e. (AOR: 1.200; 95%CI: 1.058–1.362). Thus the women who wanted no more children had 1.2 times the odds of having an RRP compared to those who wanted after 2+years. The unmet need for limiting (reference – using for spacing) (AOR: 1.396; 95%CI: 1.229–1.585), Using modern method (AOR: .482; 95%CI: .409–.0569) (reference – Does not intend to use), Non-user - intends to use later (AOR: .566; 95%CI: .467–.687) was also statistically significantly associated with having an RRP. Those using a modern method were 52% less likely to have an RRP compared to those who did not intend to use any contraceptive.

Table 14

Odds Ratios and Adjusted Odds Ratios of Women's Fertility Preferences

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Fertility Preference				
Undecided	1.141	.876–1.485	1.058	.735–1.523
No more	**1.336**	**1.199–1.489**	**1.333**	**1.144–1.554**
Sterilized	**2.049**	**1.192–3.524**	**2.570**	**1.370–4.823**
Declared infecund	.818	.440–1.523	3.669	.389–34.583
Have another		Reference	Reference	
Desire for more children				
Wants within 2 years	.939	.786–1.123	.847	.706–1.016
Wants, unsure timing	.759	.492–1.170	.738	.477–1.142
Undecided	1.106	.843–1.450	1.072	.816–1.409
Wants no more	**1.296**	**1.14–1.468**	**1.200**	**1.058–1.362**
Sterilized	**1.987**	**1.15–3.429**	**2.148**	**1.244–3.709**
Declared infecund	**.793**	**.42–1.481**	**.478**	**.252–.908**
Wants after 2+ years	Reference		Reference	
Decision maker for using contraception				
Mainly partner	1.335	.977–1.825	1.319	.960–1.813
Joint decision	1.006	.843–1.200	1.036	.867–1.238
Other	.874	.340–2.241	.501	.181–1.391

Mainly respondent	Reference		Reference	
Knowledge of any method				
Knows only folkloric method	3.964	.737–21.307	1.895	.345 –10.419
Knows only traditional method	16.483	.000–.	838.673	.000–.
Knows modern method	Reference		Reference	
Unmet need				
Never had sex	2.416	1.800–3.244	1.192	.591–2.403
Unmet need for spacing	2.128	1.687–2.685	.952	.488–1.859
Unmet need for limiting	**1.387**	**1.221–1.575**	**1.396**	**1.229–1.585**
Using for limiting	2.351	1.275–4.334	1.354	.556–3.300
Spacing failure	1.403	.503–3.913	.780	.232–2.629
Limiting failure	1.368	1.133–1.650	.691	.356–1.341
Not married and no sex in last 30 days	1.487	1.208–1.830	.634	.329–1.224
Infecund, menopausal	1.831	1.341–2.499	.638	.320–1.273
Using for spacing	Reference		Reference	
Contraceptive use and intention				
Using modern method	**.495**	**.421–.580**	**.482**	**.409–.0569**
Using traditional method	1.629	.866–3.066	1.678	.889–3.167
Non-user -intends to use later	**.559**	**.463–.675**	**.566**	**.467–.687**
Does not intend to use	Reference		Reference	

Research Question 6

RQ6: Is there an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe?

$H_0$6: There is no association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

H_A6: There is an association between social factors (gender-based violence, husband's background, woman's work and empowerment) and having a rapid repeat pregnancy in Zimbabwe.

The results of the frequency comparisons between cases and controls are shown in Tables 15. I grouped the social factors into themes hence creating sub-categories: control, gender abuse, and empowerment. Cases had higher frequencies of being controlled by their husbands/partners compared to controls. For example 50.2% of the cases reported that their partners were jealous if participants talked to other men, 52.1% were accused of unfaithfulness, and 52.1% would not be permitted to meet female friends, 52.4% limit the participant's contact with her family, and insist in knowing where the participant is (51.2%).

Table 15

Frequency Distribution of Social Factors (Control)

Independent Variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Husband/partner jealous if respondent talks with other men						
Yes	2284	39.9	1137	49.8	1147	50.2
No	2280	39.7	1131	49.6	1148	50.4
Husband/partner accuses respondent of unfaithfulness						
Yes	1046	18.2	501	47.9	545	52.1
No	3550	61.8	1786	50.3	1764	49.7
Husband/partner does not permit respondent to meet female friends						
Yes	720	12.5	343	47.6	377	52.4
No	3880	67.6	1947	50.2	1933	49.8
Husband/partner tries to limit respondent's contact with her family						
Yes	551	9.6	267	48.5	284	51.5
No	4048	70.5	2022	50	2026	50
Husband/partner insists on knowing where respondent is						
Yes	2236	38.9	1091	48.8	1145	51.2
No	2365	41.2	1199	50.7	1166	49.3

Note: * may vary due to missing values in some variables

In terms of type of earnings where participants worked 61.2% of the cases were not paid compared to 38% of the controls within the same category. Decision-making about spending respondent's earnings was mostly done jointly between the respondent

and her partner among the controls (54.8%) compared to cases (42.2%). I also observed the same for where such decision is done by husband/partner alone where the frequencies were higher for controls (57.1%) compared to the cases (42.9%).

Table 16

Frequency Distribution of Social Factors (Empowerment)

Independent Variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Decision making about spending respondent's earnings						
Respondent alone	821	14.3	410	49.9	412	50.1
Respondent & Husband	1539	26.8	844	54.8	695	42.2
Husband alone	33	2.3	76	57.1	57	42.9
Someone else	3	0.1	0	0	3	100
Type of earnings where respondent works						
Not paid	178	3.1	69	38.8	109	61.2
Cash only	2551	44.4	1421	55.7	1130	44.3
Cash and in kind	634	11	269	42.4	365	57.6
In kind only	71	1.2	28	40	42	60
Person who decides on respondent's health care						
Respondent alone	1653	28.8	847	51.2	806	48.8
Respondent & Partner	2392	41.7	1223	51.1	1169	48.9
Partner alone	647	11.3	270	41.7	377	58.3
Someone else	28	0.5	10	35.7	18	64.3
Other	2	0	1	50	1	50
Person who usually decides what to do with money husband/partner earns						
Respondent alone	581	10.1	284	48.9	297	51.1
Respondent & partner	3159	55	1638	51.9	1521	48.1
Partner alone	701	12.2	316	45.1	385	54.9
Other	17	0.3	5	31.3	11	68.8
Partner has no earnings	190	3.3	78	41.1	112	58.9

Note: * may vary due to missing values in some variables

Amongst those who have ever experienced sexual violence from the husband/partner 56.6% were cases, and 54.3 % of the cases had never reported sexual

violence. The majority of women who reported that they were afraid of their Husband/partners most of the time were cases (59.2%) compared to 40.8% who were controls. Cases had higher frequencies in all the five circumstances where participants were asked if beating was justified i.e. goes out without telling husband (54.6%), refuses sex (56.5%), burns food (56.5%), neglects children (54.9%) or argues with husband (57.1%).

Table 17

Frequency Distribution of Social Factors (Gender Abuse)

Independent Variables	Total (*N*=5744*)	(%)	Controls (*n* = 2862)	%	Cases (*n* = 2882)	%
Beating justified if wife goes out without telling husband						
Yes	1237	21.5	562	45.4	675	54.6
No	4484	78.1	2283	50.9	2201	49.1
Beating justified if wife neglects children						
Yes	1131	19.7	510	45.1	621	54.9
No	4593	80	2342	51	2251	49
Beating justified if wife argues with husband						
Yes	401	7	172	42.9	229	57.1
No	5334	92.9	2687	50.4	2647	49.6
Beating justified if wife burns food						
Yes	897	15.6	390	43.5	507	56.5
No	4810	83.7	2447	50.9	2362	49.1
Beating justified if wife refuses to have sex with husband						
Yes	897	15.6	390	43.5	507	56.5
No	4810	83.7	2447	50.9	2362	49.1
Husband/Partner's desire for children						
Both want same	1944	33.8	1031	53	913	47
Husband wants more	1329	23.1	586	44.1	743	55.9
Husband wants fewer	824	14.3	429	52.1	395	47.9
Sexual Violence from husband/partner						
Yes	580	10.1	252	43.4	328	56.6
No	4022	70	2038	50.7	1984	49.3
Ever reported sexual violence						
Yes	371	6.5	179	48.2	192	371

No	868	15.1	397	45.7	471	54.3
Emotional Abuse by husband/partner						
Yes	1471	25.6	671	45.6	800	54.4
No	3132	54.5	1619	51.7	1512	48.3
Respondent afraid of Husband/partner						
Never afraid	3433	59.8	1750	51	1683	49
Most of the time afraid	352	6.1	144	40.8	209	59.2
Sometimes afraid	817	14.2	397	48.5	421	51.5

Table 18 shows the results of the crude odds ratios (OR) and the adjusted odds ratios (AOR) of the women social characteristics. I performed binary logistic regression to calculate both the crude and adjusted odds ratios and their respective confidence intervals (CI). I first calculated the OR and CI comparing the cases and controls within each independent variable. After obtaining the crude odds ratios, I controlled for possible confounding between the variables by computing adjusted odds ratios. I included all the independent variables in each sub-category in the model comparing the cases and controls to establish if there is an association between the women social factors and having an RRP. The results of the logistic regression analysis for sub category of control are shown in Tables 18. None of the independent variables were statistically significant at 95% CI.

Table 18

Odds Ratios and Adjusted Odds Ratios of the Women's Social Factors (Control)

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Husband/partner jealous if respondent talks with other men				
Yes	1.006	.896–1.130	1.088	.948–1.249
No	Reference		Reference	
Husband/partner accuses respondent of unfaithfulness				
Yes	.908	.791–1.043	.920	.783–1.082
No	Reference		Reference	
Husband/partner does not permit respondent to meet female friends				
Yes	.904	.771–1.060	.911	.743–1.118
No	Reference		Reference	
Husband/partner tries to limit respondent's contact with her family				
Yes	.942	.788–1.125	1.034	.828–1.290
No	Reference		Reference	
Husband/partner insists on knowing where respondent is				
Yes	.000	.000–.	.000	.000–.
No	Reference		Reference	

The results of the logistic regression analysis for sub-category of empowerment are shown in Table 19. Where decision making about spending respondent's earnings was done by the participant's husband/partner alone was statistically significant (AOR: 1.49; 95%CI: 1.013–2.197) when using respondent and husband/partner as reference. The results are also statistically significant at 95% CI for where the person who usually decides what to do with money husband/partner earns is respondent alone (AOR: 1.327; 95%CI: 1.144–1.554), and where it is respondent and other person other than the partner/husband (AOR: 1.417; 95%CI: 1.105–1.816) when respondent and husband/partner as reference.

Table 19

Odds Ratios and Adjusted Odds Ratios of Women's Social Factors (Empowerment)

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Decision making about spending respondent's earnings				
Respondent alone	214.182	.000–.	280.178	.000–.
Husband/partner alone	**1.332**	**.921–1.926**	**1.492**	**1.013–2.197**
Someone else	1.092	.764–1.561	1.364	.925–2.010
Respondent and husband/partner	Reference		Reference	
Type of earnings where respondent works				
Not paid	1.164	.828–1.636	1.257	.865–1.828
Cash only	.587	.493–.700	.657	.538–.802
In-kind only	1.105	.670–1.823	1.281	.722–2.272
Cash and in-kind	Reference		Reference	
Person who decides on respondent's health care				
Respondent alone	.995	.878–1.128	.905	.748–1.095
Husband/partner alone	1.456	1.222–1.736	1.180	.920–1.512
Someone else	1.884	.863–4.113	.564	.150–2.120
Respondent and husband/partner	Reference		Reference	
Person who usually decides what to do with money husband/partner earns				
Respondent alone	**1.125**	**.942–1.342**	**1.327**	**1.014–1.736**
Respondent + other person	**1.311**	**1.112–1.545**	**1.417**	**1.105–1.816**
Husband/partner alone	2.238	.806–6.214	1.134	.286–4.497
Someone else	1.556	1.155–2.096	2.304	.770–6.894
Respondent and husband/partner	Reference		Reference	

The results of the logistic regression analysis for sub-category of gender abuse are shown in Table 20. The statistically significant variables in this sub-category were being afraid of husband/partner most of the time (AOR: 1.584; 95%CI: 1.195–2.102) (reference – never afraid) and experiencing emotional abuse by husband/partner were statistically significant (AOR: .820; 95%CI: .720–.935) using reference – no).

Table 20

Odds Ratios and Adjusted Odds Ratios of Women's Social Factors (Gender Abuse)

Independent variables	OR	95% C.I.	AOR	95% C.I.
Total	5744*			
Beating justified if wife goes out without telling husband				
Yes	.804	.708–.912	.917	.783–1.073
No	Reference		Reference	
Beating justified if wife neglects children				
Yes	.790	.693–.900	.932	.789–1.100
No	Reference		Reference	
Beating justified if wife argues with husband				
Yes	.742	.642–.857	.869	.724–1.043
No	Reference		Reference	
Beating justified if wife burns food				
Yes	.738	.601–.906	.936	.740–1.183
No	Reference		Reference	
Beating justified if wife refuses to have sex with husband				
Yes	.743	.643–.858	.858	.721–1.020
No	Reference		Reference	
Husband/Partner's desire for children				
Husband wants more	**1.433**	**1.246–1.649**	**1.456**	**1.247–1.699**
Husband wants fewer	1.042	.885–1.226	.998	.835 –1.194
Both want some	Reference		Reference	
Sexual Violence from husband/partner				
Yes	.749	.628–.892	.780	.605–1.007
No	Reference		Reference	
Ever reported sexual violence				
Yes	1.106	.867–1.411	1.082	.846–1.384
No	Reference		Reference	
Emotional abuse by husband/partner				
Yes	**.784**	**.693–.888**	**.820**	**.720–.935**
No	Reference		Reference	
Respondent afraid of Husband/partner				
Most of the time afraid	**1.509**	**1.207–1.885**	**1.584**	**1.195–2.102**
Sometimes afraid	1.102	.946–1.284	1.147	.958–1.374
Never Afraid	Reference		Reference	

Summary and Transition

I assessed the predictors of RRP in Zimbabwe using the secondary data from the ZDHS of 2015, which I obtained from the USAID DHS Program. In this assessment I sought to establish if there were associations between sociodemographic factors, sexual relational factors, women's health, previous birth outcomes, fertility preferences, and social factors and having an RRP in Zimbabwe. I have presented my findings in this chapter reporting the frequencies, crude odds ratios and adjusted odds ratios for all the variables in relation to having an RRP. I also described and explained levels of association between the independent variables and having an RRP.

The prevalence of RRP in Zimbabwe was 50.2%. I found statistically significant associations at 95% CI between some of the independent variables and RRP. I also observed that the strengths of the associations differed. For example, within the socio-demographic factors, age was statistically significant for all age groups except the 25–29 years age group. However the levels of association differed where the odds of having an RRP were higher in the 15–19 years age group (OR 3.4) and getting lesser with increasing age. In terms of education the odds of having an RRP reduced with increasing level of education. On the sexual relational factors, the only independent variable that was statistically significant was sexual debut, where the odds of having an RRP were lower for the age groups 14 or less and 20+ compared to 15–19-years-olds. There were no statistically significant associations between any of the women's health factors and RRP. In terms of previous birth outcomes, those who were currently pregnant were less likely to have an RRP compared to those who were not (AOR: .074; 95%CI: .588–.945).

Using a modern method of contraception was associated with lower odds of having an RRP (AOR: .482; 95%CI: .409–.0569). Women who decide alone (AOR: 1.327; 95%CI: 1.144–1.554), or with someone else other than their husband or partner (AOR: 1.417; 95%CI: 1.105–1.816) on how to spend money the husband or partner earns had higher odds of having an RRP compared to those who decide together with their husband/partner. Similarly, those women whose husbands or partners decided alone on spending the participant's earnings had 1.4 times the odds of having an RRP (AOR: 1.49; 95%CI: 1.013–2.197). In Chapter 5, I will present the interpretation of these findings in detail, and highlight strengths and limitations of the study. I will also detail the social change implications of these findings and provide conclusions and recommendations based on these findings.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to identify and describe the social and sexual risk factors for RRP and assess if there are any associations between the risk factors and having an RRP in Zimbabwe. Additionally, I sought to determine the prevalence of RRP in Zimbabwe. I conducted this study within a context where Zimbabwe, despite implementing a comprehensive countrywide family planning program in the past 3 decades, continues to suffer high MMR. Zimbabwe routinely collects data that can be used to measure the prevalence and factors associated with RRP through 5-yearly demographic and health surveys, but such data is not analyzed or presented in a way that can adequately inform context-specific targeted interventions for the prevention of RRP and other related reproductive health challenges in the population. With RRP being a well-acknowledged factor associated with high MMR, it was imperative that its prevalence and risk factors be identified and understood in the Zimbabwean context. To address this gap in the literature, I conducted an unmatched case-control study and determined the prevalence and documented the predictors of RRP in Zimbabwe. I used de-identified secondary data from the ZDHS of 2015, which I obtained from USAID (2019). The data were collected from a nationally representative sample of Zimbabwean women aged 15–49 years. The sample size for this study was 5,744, with 50.2% of these being cases.

In my analysis, I grouped the independent factors into six themes, each with covariates: (a) sociodemographic factors (age, education, area of residence, religion,

marital status, religion, wealth, employment); (b) sexual-relational factors (marital status, sexual activity, sexual partners, nature of relationship with sexual partners, sexual debut, living arrangements); (c) women's health factors (previous reproductive health, HIV/AIDS, and HIV knowledge, attitudes, and behavior); (d) previous birth outcomes (terminated pregnancy/abortion/miscarriage, currently pregnant); (e) fertility preferences (desired number of children, use of contraceptives, decision-making about contraceptives, knowledge of family planning); and (f) social factors (gender-based violence, husband's background, woman's work and empowerment).

I quantitatively analyzed the data using SPSS Version 25 and reported the frequency distributions of the study factors and their covariates. I also performed logistic regression to determine which factors were independently associated with RRP in Zimbabwe. I found statistically significant associations at 95% CI between some of the independent variables and RRP. However, the strengths of the observed associations differed. In the following section, I provide an interpretation of the findings. I also discuss these findings, highlight the social change implications, and offer recommendations for future research and possible interventions.

Interpretation of Findings

RRP exposes women to adverse maternal, perinatal, and infant outcomes and also a range of long-lasting undesirable social and economic challenges for the mother, her baby, and society (Nerlander et al., 2015; Dallas, 2013; Hindin et al., 2016; Pradhan et al., 2015; Conroy et al., 2016). Although RRP is pervasive worldwide, there is a dearth of information about it in LMIC (Maravilla et al., 2017). Zimbabwe is one such country that

has some of the worst maternal and child health indicators, but the literature is lacking on the magnitude of RRP and its potential contributions to the poor maternal health of Zimbabwe's population. This is the first study to document the prevalence of RRP and to identify and describe the predictors of RRP in Zimbabwe. In my literature review, I identified multiple factors associated with RRP and established the link in the reciprocal relationship that exists between the personal, behavioral, and environmental factors as proposed by SCT. In this chapter, I review them in the context of my study findings.

Sociodemographic Characteristics

In the assessment of the association between sociodemographic factors and having an RRP, age, education, area of residence, income, marital status, and religion were statistically significantly associated with having an RRP. In this study, younger women 15–19 years had higher odds of having an RRP compared to those in the older age group of 30–34 years (AOR: 3.472; 1.434–8.403). Those with no education or lower levels of education were more likely to have an RRP compared to those with secondary education. These results are consistent with the existing literature. For example, Maravilla et al. (2017), Baldwin and Edelman (2013), and Albuquerque et al. (2017) reported that teenage mothers had higher risks of having RRP. In terms of education, higher education attainment is known to be a protective factor against RRP (Maravilla et al., 2017).

With regards to marital status, my results showed that women who had never been in a union were 56.6% less likely to have RRP compared to those who were married (AOR: .434; 95%CI: .270–.697). In the literature, cohabiting, being married, and being in

a child marriage or polygamous marriage were statistically significant predictors of RRP (Maravilla et al., 2017; Lewis et al., 2013; Dallas, 2013).

Religion also appears to have a predictive effect. Women who were affiliated with Roman Catholic, Protestant, and Pentecostal churches were less likely to have RRP compared to those affiliated to the apostolic sect. This is consistent with previous findings from Dzimiri et al. (2017), who noted that Christian women and girls who are affiliated to some apostolic sects, such as Johanne Marange and Johanne Masowe, in Zimbabwe—which practice child marriage as part of their religion—are known to experience early and multiple closely spaced childbearing.

Sexual Relational Characteristics

In examining the sexual relational characteristics of the sample, I observed that age at sexual debut was statistically significant at 95% CI. Women who had their sexual debut at age 20+ years were 25% less likely to have an RRP compared to those who were in the 15–19 year age group at the time of their sexual debut. This is consistent with previous research, which has reported that early sexual initiation is associated with inconsistent use of contraceptives and RRP (Dallas, 2013). Surprisingly, my findings also showed that those women who had their sexual debut at age 14 or less were 48% less likely to have an RRP compared to those in the 15–19 year age group at the time of their sexual debut. I could not find any logical explanation for this result and this can be an aspect requiring further investigation.

Fertility Preference Characteristics

Wanting no more children and being sterilized were also statistically significantly associated with higher odds of having an RRP. Although the reasons for undergoing sterilization and wanting no more children remain unknown for this study, these findings suggest that such women may have had several RRP and many children, hence the need to limit future pregnancies. Further studies may be undertaken with such women to establish their reasons, which may be beneficial for intervention development.

Women who had the unmet need for limiting (i.e., women at risk of pregnancy who do not want any more children but are not using any contraceptives) were 1.3 times more likely to have an RRP compared to those who were using contraceptives for spacing (AOR: 1.396; 95% CI: 1.229–1.585). Using modern contraceptives was also predictive of having an RRP (AOR: .482; 95%CI: .409–.0569). Reports from Baldwin and Edelman (2013) and Richardson et al. (2016) also showed similar findings, where they observed that women who do not use contraceptives after delivery, particularly long-acting reversible contraceptives, are at higher risk of RRP than women who use contraceptives after delivery. Albuquerque et al. (2017) observed that non-use of contraceptives after delivery was a significant factor associated with RRP among adolescents in Brazil.

Women's Health Characteristics

Regarding the women's health category, none of the independent variables was statistically significant at 95% CI.

Previous Birth Outcomes Characteristics

On previous birth outcomes, women who were currently pregnant were less likely to have an RRP (AOR: .074; 95% CI: .588–.945). Unfortunately, this study could not establish the actual spacing of the current pregnancy with the previous one. Contrary to findings from Mahande and Obure (2016) and Wong et al. (2015), ever having a terminated pregnancy was not statistically significant at 95% CI.

Social Characteristics

Women's social characteristics were subdivided into three sub-categories: control, gender abuse, and empowerment. In the subcategory of control, none of the independent variables were statistically significant at 95% CI. However, in the subcategory of empowerment, women whose husband/partner unilaterally decided on how the participant's earnings were spent had higher odds of having RRP (AOR: 1.49; 95%CI: 1.013–2.197). Further women who decided alone on what to do with money their husband/partner earns were 1.3 times more likely to have an RRP (AOR: 1.327; 95%CI: 1.144–1.554).

Regarding gender abuse, those women who reported being afraid of their husband/partner most of the time was a significant predictor of RRP (AOR: 1.584; 95%CI: 1.195–2.102). Experiencing emotional abuse by husband/partner was also statistically significant at 95%CI (AOR: .820; 95%CI: .720–.935). These results are consistent with findings and arguments brought forward by Anand, Unisa, & Singh, (2017) and Vieira et al. (2016) who firmly stated that women exposed to gender-based

violence, intimate partner violence and who are economically disadvantaged are at heightened risk of RRP.

Interpretation of the Findings

The Social Cognitive Theory (SCT) is based on the argument and understanding that the human behavior happens in a social context in a dynamic and reciprocal interaction of the person, environment and behavior. The theory posits that a person acquires and maintains certain behavior based on the social environment in which they perform the behavior. Based on the findings of this study, one can argue that the findings support this claim to some extent. For example, it is logical to believe that women who are always afraid of their partners may find it difficult to negotiate use of contraceptives, hence less negotiating power to delay successive pregnancies. Similarly, in an environment where sexual debut occurs at an early age, individual behavior will result in early child bearing and higher risk of RRP. In view of these, it is possible for public health practitioners to make use of the constructs of the SCT to design interventions within the three domains of personal, behavioral and environmental factors. The interventions can be designed in a way that specific strategies complement each other.

Limitations of the Study

This study relied on secondary data to identify associations between variables that are significant predictors of having an RRP in Zimbabwe. I used de-identified secondary data from the ZDHS of 2015, which I obtained from the USAID (2019). As such one cannot entirely rule out possible bias that may have been introduced by researchers when they collected the data, and when data was entered into the database from which I

extracted my variables of interest. Questions regarding sex and sexuality, income, HIV testing, and gender abuse often introduce social desirability. It is possible that some answers may not have been entirely correct. Nonetheless, I took cognizance of these possibilities before undertaking this study. I assessed the data for both internal and external validity by conducting a critical appraisal of the data. I assessed the quality control measures that were employed in the sampling of participants, the population, and sample that was obtained, the data collection strategy that was used, response rate, data entry, coding and all the quality control measures that were applied. I was convinced that data are reliable, validated and can be reliably used as valid evidence of the status of the population's health and demographic status. I had also anticipated missing data and confounding for some variables and addressed this by increasing my sample size by 25%. Therefore, I am confident that these findings can be generalized to the Zimbabwean.

Recommendations

This study presents important findings that contribute to the literature on RRP in Zimbabwe regarding the prevalence and predictors of RRP. The prevalence of RRP among women of reproductive age (15–49 years) in Zimbabwe is 52.2%. This means that out of every 100 women of reproductive age 52 have an RRP. There is a need to reduce this prevalence. In a country context where MMR is as high as 650 per 100,000 live births, and in a world where RRP is known as a factor that contributes to this problem, such a prevalence cannot be ignored. This is an opportune time for public health practitioners to engage women of reproductive age in counseling about the risks if RRP and offering services that promote prevention. An entry point could be within the current

on-going national RMNCH-A program. An RRP risk assessment or screening tool that includes the identified risk factors for RRP may be applied to all women attending antenatal care and postnatal care clinic visits. Then an algorithm, which classifies those at high risk of RRP, may be used to direct which intervention each woman would best benefit from. The findings of this study also showed that the use of modern methods of family planning reduces the risks of RRP, therefore family planning programs in Zimbabwe should expose women to these methods.

Further, the results of this study show that higher educational attainment is protective of RRP. With this knowledge, the need to promote women and girls' education is imperative. Interventions that seek to reduce RRP should make it possible for girls to complete their secondary and tertiary education. Typically this would include activities that discourage early sexual debut and early childbearing, as these tend to compromise prospects of attaining higher education. Gender abuse must also be aggressively prevented. The algorithm suggested in the foregoing paragraph, which classifies those at high risk of RRP for specific interventions, may also be used to screen or identify women at risk of or who are experiencing gender abuse. Such women should be supported with relevant services that protect them from abuse.

There is also a need to conduct further studies to ascertain which combination of interventions integrating the factors associated with RRP as identified in this study works. Once this is done, such a package may then be scaled up with necessary adjustments. This study could not make any follow-up interviews to clarify or help explain some of the findings to give a more detailed explanation; hence I recommend a

mixed methods study using both qualitative and quantitative data to obtain a more complete understanding of risk factors for RRP is recommended. For example, it would be helpful for public health practitioners to understand the underlying motivations for women who may be aware of the risks associated with RRP but still go ahead with it. Future studies may also seek to establish the extent to which such RRP is intended or unintended by different categories of women. Such information may help develop targeted interventions.

Furthermore, the findings of this study must be widely disseminated in Zimbabwe, Southern Africa region and beyond. This dissemination could be done through various audience specific platforms such as publications in peer-reviewed journals, presentations in the national symposium and regional conferences, policy briefs for the health ministry in Zimbabwe, and the use of having poster presentations, and through the use of social media platforms. Dissemination of these study findings may help in resource mobilization for the development of interventions that address RRP.

Implications for Social Change

The findings of this study carry important opportunities for social change in Zimbabwe. The findings provide insightful information about the extent of the problem of RRP. Prevalence is now established and documented. This information can be used to inform the development of targeted interventions for family planning to reduce RRP in Zimbabwe and other similar contexts.

At the individual level, women who are educated and have attained higher education become less dependent on welfare programs. If fewer women experience RRP,

there are benefits to society through reduced health care spending. Further, women could become more productive and secure better economic opportunities, which also contributes to a reduction in gender-based violence and poverty (Luchters et al., 2016; Tocce et al., 2012).

Further, at the national level, Zimbabwe may be able to control unsustainable population growth, reduce the public health economic burden, which emanates from pregnancy complications such as miscarriages, unsafe abortions and preventable deaths that are associated with RRP (Yazdkhasti, Pourreza, & Pirak, 2015).

Additionally, health workers and other public health practitioners will focus their attention on other emerging health issues such as noncommunicable diseases and comorbidities of HIV that threaten the multitudes of people in developing countries. For example, at present, Zimbabwe is among the list of African countries with women at high risk of cancer and currently has a cervical cancer burden of 19% (Kuguyo et al., 2017). Addressing the problem of RRP especially among young mothers also presents opportunities to reduce exposure to HIV, and reinforce women's rights and autonomy to determine the spacing and number of children they want (Luchters et al., 2016). If this is fulfilled, women in Zimbabwe may also be able to pursue higher education, secure paid employment and possibly be able to educate their children, and break the cycle of poverty (Tocce et al., 2012).

Conclusions

RRP is well documented as one of the major factors exacerbating adverse maternal health outcomes. It is a source and also sustains other social, economic and

psychosocial problems for the population (Chandra-Mouli, Armstrong, Amin, & Ferguson, 2015; Kangatharan, Labram & Bhattacharya, 2016). The findings of this study show that as many as 52.2% of pregnancies in Zimbabwe are RRP, and this makes the prevention of it a public health priority. Further, the identification of the factors associated with RRP in the context of Zimbabwe presents an opportunity to develop targeted interventions for RRP prevention. In this study, I assessed the associations between sociodemographic, sexual-relational, women's health, fertility preference, previous birth outcomes, and social factors and having an RRP in Zimbabwe. The findings of the study showed that there were statistically and socially significant associations between these factors, however, the strengths of associations differed with other factors showing high likelihood while others showed a reduced likelihood of having an RRP. As Zimbabwe already implements a comprehensive countrywide family planning program, which is integrated into the RMNCH-A continuum of care (GoZ, 2015), it has an opportunity to review the strategies used in this program and incorporate the recommendations proffered in this document as informed by evidence towards preventing RRP.

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Appendix A: Data Abstraction Form

Variable name	ZDHS code
Sociodemographic factors	
Age	V013
Education	V106
Area of residency	V025
Income	V190
Marital status	V501
Religion	V130
Age of Respondent at first birth	V212
Sexual-relational factors	
Sexual activity	V767A
Sexual partners	V854A
Nature of relationship with sexual partner(s)	V767A
Sexual debut	V525
Living arrangements	V504
Women's health	
Previous reproductive health	V750; V763A–G
HIV/AIDS knowledge	V751; V824
HIV/AIDS attitudes	V774A-C; V775–V780; V825
HIV/AIDS behavior	V781A–C
Previous birth outcomes	
Ever had a terminated pregnancy	V228; V234
Currently pregnant	V213
Fertility Preferences	
Knowledge of family planning	V301
Use of contraceptives	V302
Decision-making about use of contraceptives	V632
Preferred waiting time for birth/another child	V603
Desire for more children	V605
Husband's desire for children	V621
Decision-making about use of contraceptives	V632
Fertility preference	V602
Current contraceptive method/use + intention	V602; V364
Social factors	
Experience of gender-based violence	D101A-F
Husband's background	V701
Woman's work and empowerment	V716; V739; V741; V743A-F
Experience of gender-based violence	D128; D113–4; S110AA