UNIVERSITY FOR DEVELOPMENT STUDIES

FACTORS INFLUENCING SECONDARY INFERTILITY AMONG WOMEN IN THE TAMALE METROPOLIS

IN THE NORTHERN REGION OF GHANA

HELEN KUPOKA ABEONGO

2018

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BY

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(UDS/CHD/0120/13)

THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH, SCHOOL OF ALLIED HEALTH SCIENCES, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT.

FEBRUARY, 2018

Declaration

Student

I hereby declare that this thesis is the result of my own original work and as such, no product of this has been produced for another degree in this university or elsewhere.

Candidate's signature..... Date.....

Helen Kupoka Abeongo

I hereby declare that the preparation of and presentation of this thesis was supervised in accordance with the guidelines on supervision of thesis laid down rules and criteria by the University for Development Studies.

Dr. Thomas Bavo Azongo

Principal Supervisor's

Signature..... Date.....

Abstract

Secondary infertility is a serious public health problem and affects the wellbeing of women. The phenomenon of secondary infertility has gained both local and international attention especially in the developing world where women aspiration is usually that, they get an offspring who would replace them when they are no more alive. The study examines the factors that influence secondary infertility among women between the reproductive ages of 15 to 49 years in the Tamale metropolis. Using cross-sectional and descriptive designs, a concurrent mixed method approach, involving both the quantitative and qualitative research methodologies were used. The sample size was 400 respondents who were selected using quota and simple random sampling techniques. In addition, seven key informants (5 medical experts and 2 TBAs) were purposively selected for in-depth interview. Analysis of data involved the application of descriptive statistics. The study found that the factors that influences secondary infertility among respondents as stress or sickness, irregular menses, use of contraceptives, sexually transmitted infections (STIs), late marriage, abortion, inadequate intimacy, food chemicals, and inadequate diets. Some respondents were limited with information on factors influencing secondary infertility. Secondary infertility among women in the Tamale metropolis is a serious public health problem that needs recognition and attention. Awareness creation on prevention and management of secondary infertility should be brought to the doors steps of women whiles the factors influencing this problem be sensitised adequately in the Metropolis.

Acknowledgement

My very awesome heartfelt gratitude goes to the Most High, Almighty God for His love, favours, guidance, mercies, protection and above all His goodness in blessing every aspect of this work from the beginning to its completion. I wish to appreciate greatly my supervisor; Dr. Thomas Bavo Azongo for his encouragement, constructive criticisms, support and diverse contributions in guiding me to the successful accomplishment of this work. I must knowledge the contribution of Dr. Shamsu- Deen Ziblim for the immense suggestion and accepting to read through the work. Without him this thesis would not have seen the light of the day. I am particularly grateful to you for understanding my situation.

I also want to acknowledge the support Dr. Robert Kuganb-lem the former Dean, who encouraged me to undertake a graduate programme. To Mr.BoakyeYiadom, Dr Vida Yakong, Mr. Mustapha Issahaku of blessed memory and all who served as encouragement to me during this study.To my lovely kids, I say thank you, I appreciate you. To my research assistants, thank you very much for supporting me in the data collection. Not forgetting my study participants, Kennedy Konlan, Edward Baba kusaa, Cecilia Tuo, Francis Surtaa among others.

Dedication

I dedicate this work to my parents

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List of Acronyms

CC	Clomiphene Citrate
CHVs	Community Health Volunteers
DHS	Demographic Health Survey
FGDs	Focus Group Discussions
FSH	Follicle Stimulating Hormone
GSS	Ghana Statistical Service
HIV/AIDS	Human Immune Virus/ Acquired Immune Deficiency Syndrome
IVF	In vitro Fertilization
LH	luteinizing hormone
NSAIDs	Non-steroidal anti-inflammatory drugs
PATH	Program for Appropriate Technology in Health
PCOS	Polycystic ovary syndrome
PID	Pelvic Inflammatory Disease
RLS	Resource Limited Settings
SPSS	Statically Package for Social Scientist
SSA	Sub-Sahara Africa
TB	Tuberculosis
TBAs	Traditional Birth Attendants.
UNCPD	United Nations Conference on Population and Development
WFS	World Fertility Sur
WHO	World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

The factors that influence secondary infertility are multiple and cut across several political cultural and social, economic and demographic variables. The complex of these factors makes many couple been diagnosed with secondary infertility. Infertility is a public health problem in middle and low income countries where child bearing is important, but the problem continues to receive little research and policy attention. In many countries, child bearing is an essential part of life. In much of Sub-Saharan Africa, infertility is seen as a personal tragedy with the potential of destabilising entire clans, families or communities (Kadaaga et al., 2014).

Secondary infertility has several negative consequences especially for the affected woman. Generally, the phenomenon brings stress to the affected woman because of the difficulties it causes in her relationship with her husband or family members. In the Tamale metropolis, women with secondary infertility are tagged as witches, prostitutes or “men”. In this situation they are extremely insecure and lonely in their marriages and risk losing their husband through divorce, or to marry another woman or picking girlfriend if the problem is caused by the woman; or infidelity on the part of the woman if the fault is from the man. Moreover, secondary infertile women are resented, constantly worried and unhappy because they feel both personally unfulfilled and socially incomplete (Yebei, 1999).

Infertility is a disease of the reproductive system which affects both men and women with almost equal frequency, Callahan et al., (2008). While there is no universal definition of infertility, a couple is generally considered clinically infertile when pregnancy has not occurred after at least

twelve months of regular unprotected sexual activity, Sohrabvand et al., (2005). In 90% of the cases the cause is identifiable and in 50% of the cases appropriate therapy will result in pregnancy (Callahan et al., 2008).

Infertility is a global phenomenon that affects between 60 million and 168 million people worldwide, Neelofar et al., (2006). The majority of those who suffer live in the developing world. WHO-DHS Comparative Report in 2004 states that more than 186 million ever-married women in developing countries (excluding China) were infertile because of primary or secondary infertility, Rutstein, (2004). This number represents more than one in four ever-married women of reproductive age in these countries. The prevalence of infertility in Pakistan is 21.9% where, primary infertility is 3.9% and secondary infertility is 18.0%, (Hakim et al., 2001).

Infertility is a source of distress for couples as societal norms and perceived religious dictums may equate infertility with failure on a personal, interpersonal, emotional or social level. Women bear the brunt of these societal perceptions in most of the cases. Psychologically, the infertile woman exhibits significantly higher psychopathology in the form of tension, hostility, anxiety, depression, self-blame and suicidal ideation, Fido, (2004). In Latin America, strong social stigma attached to infertility and machismo cause women to blame themselves for infertility Vayena et al, (2001) while in Mozambique, infertile women are excluded from certain social activities and traditional ceremonies, Gerrits, (1997). Social stigma regarding infertility is especially common across South Asia. For e.g. in Andhra Pradesh, India 70% of women experiencing infertility reported being punished with physical violence for their failure, Daar et al., (2002). Women are verbally or physically abused in their own homes, deprived of their inheritance, sent back to their

parents, ostracized, looked down upon by society, or even have their marriage dissolved or terminated if they are unable to conceive (Vanbalen et al., 1993).

In Pakistan, bearing progeny is regarded as part and parcel of a stable marital nexus. Children, particularly sons, are regarded as a source of income and security in old age. A study conducted in Karachi on the psycho-social consequences of secondary fertility. Hakim et al. (2001), revealed that more than two thirds (67.7%) of women, who were unable to give live births or give birth to sons had marital conflicts. These women had been threatened with divorce (20%), husband's remarrying (38%) or were being forced to return to their parent's home (26%) by their in-laws or husbands. They also reported that they were being physically and verbally abused by their husbands and in-laws leading to severe mental stress. It is a common view in Pakistani culture that infertility is not a disorder and being blessed with children is only by God's Will, Cain, (1987). If people don't recognize infertility as a disorder, it may prevent them from seeking timely medical care for the correctable causes of infertility. However, the prevalence and impact of this belief remains undetermined in our population.

Statistics on the prevalence of infertility vary worldwide; the infertility rate in America was reported as 11.2% in 1965, however, in 2002, it was believed to have decreased to 7.4%, Stephen et al, *(*2006). A review of infertility rates reported in 25 population surveys from 1990-2006 from both developed and developing countries estimated 72.4-120.6 million women aged between 20-44 years, in heterosexual relationships and desiring to have their own biological children were infertile. The same review also estimated that 40-90.4 million of these women received infertility treatment, Boivin et al, (2007). Assisted Reproductive Technology (ART) is now a multi -billion dollar industry, Stanton et al, *(*1991). As population growth remain a concern to global economic

planners, the inherent effects of secondary infertility on the life of couple still remain devastating. This brings to bear the net effects of family planning strategies instituted by various authorities and organisation with the goal of reducing or halting the net population growth. Some societies are under international pressure to reduce population through the acceptance of family planning regimes and reproductive technologies developed and sponsored by developed western countries to regulate fertility in low income countries. Yet even in societies that have accepted the inevitability of population reduction through fertility control, infertility treatment is never considered a viable option, and infertile couples are under pressure to produce at least one child. This is sometimes achieved with the assistance of new but costly reproductive technologies (Van Bela & Inhorn, 2002).

Infertility is defined as the failure to conceive after one year of regular unprotected sexual intercourse, even in the absence of known reproductive pathology. Because some couples who are not infertile may not be able to conceive within the first year of unprotected sex, the World Health Organisation (WHO) recommends the epidemiological definition of infertility. This is the inability to conceive within 2 years of exposure to pregnancy by having unprotected sex in the absence of pathological factors (Tabong & Adongo, 2013). Some couple who have never conceived after exposure to pregnancy and unprotected sexual intercourse with the aim of getting pregnant are said to have primary infertility while secondary infertile couple on the other hand have ever conceived but currently are unable to conceive.

Secondary infertility occurs when a woman who previously conceives, is subsequently unable to conceive despite an unrestricted exposure to pregnancy over a period of 2 years. Sometimes secondary infertility occurs after a couple has already given birth to one or more children, but is now having difficulty producing children again.

The importance of child bearing in Africa cannot be overestimated. Children have been known to produce help and care to parents during old age especially in Africa where our social networking is well established and very assistive. Child bearing is not only a continuation of one's lineage but also a source of economic security. In Resource Limited Settings (RLS) where social security systems are non-existent or weak, parents completely rely on the children they bear for support in their old age (Adewunmi et al., 2012 as cited in Kadaaga et al., 2014).

As issues of secondary infertility remain obscure among couple, little is known of the incidence and prevalence of secondary infertility in most Ghanaian societies. However, thousands of couples every year are affected by secondary infertility, yet this problem remains a little known condition that people rarely talk about and that governments are concerned with. Infertility is often caused by problems of ovulation, damaged fallopian tubes or wombs via physical or pathological means; drugs or medicines and due to aging (Bounty UK Ltd, 2014). In Ghana the prevalence of infertility is reported to be 11.8% among women and 15.8% among men.

Thus even though infertility in general and secondary infertility for that matter is like any other disease that has known causes and known treatment options, the condition of infertility has serious consequences for the psychological and physical wellbeing of affected couples in developing countries including Ghana. In most cases, women bear a large proportion of these consequences due to their weak social status and/or the direct biological role they play in child bearing.

The causes as well as effects of secondary infertility have a toll on the life of both couple. Sometimes investigation of the origin of the difficulty is required to give definitive treatment. In Africa, sometimes these rigorous scientific investigations are not done, yet the woman

(vulnerable) is usually accused to be responsible for the inability to conceive. In Ghana in particular, women without children or with just one child face a lot of physical and emotional abuse. In the case where the problem emanates from the woman, she may be forced out of the marriage or compelled to live in a polygamous marriage arising from the husband marrying another wife to beget him children. Even in the case where the man is the cause of secondary infertility, the woman may still bear the brunt of the problem and be a subject of gossip or scorn in the extended family of the husband in particular and the community in general. Women in this situation are often labelled witches, prostitutes or even "men" (Adongo & Tabong, 2013).

Despite these psychosocial problems women with secondary infertility face, not many studies have been undertaken to investigate particular lifestyle traits of women with secondary fertility problems, their perceptions on what causes the problem and the daily challenges they face as a result of infertility. This study, based on survey data collected on women with secondary infertility (respondents) in the Tamale metropolis of the Northern Region of Ghana, sets out to fill this missing gap. The knowledge generated from the analysis of the data will help the understanding of society in general of the situation these women face and give medical personnel who provide medical services the insight to be able to tackle the problem more effectively.

1.2 Problem Statement

Infertility in developing countries has long been a neglected reproductive health concern, despite the fact that it often has devastating consequences for the women and men involved. The neglect of infertility in formal health care is often explained in terms of population control where decreasing fertility is considered to be more important than treating infertility; the heavy burden of life-threatening conditions like HIV/AIDS and maternal mortality; and the scarcity of health

resources in these countries (Inhorn & Birenbaum-Carmeli, 2008; Okanofua, 1996; Ombelet, 2009; van Balen & Gerrits, 2001 reported by Gerrits & Shaw, 2010).

However, the 1994 United Nations Conference on Population and Development (UNCPD) placed infertility on the International health agenda, by explicitly identifying prevention and treatment of infertility as a reproductive right (Geelhoed et al., 2010).

In sub-Saharan Africa, it is increasingly clear that infertility constitutes a major public health problem with a prevalence of up to 30% mainly attributed to secondary infertility resulting from reproductive tract infections, including post-abortion or post-partum infections and Sexually Transmitted Infections (STIs) (Geelhoed et al., 2010).

In Ghana, though the population and its growth rate are high with limited resources, there is high rate of marriages contracted in the country. Traditionally when one marries, it is expected and hoped that children will be born in the marriage promptly as this is a sign of a blessed marriage. In traditional settings, the marriage is incomplete without children. Moreover without children, the couple is not accorded some level of respect in society and in the extended family.

Secondary infertility also creates conflicts between couples themselves as one partner tends to blame the other partner for being the cause of the problem. This is usually associated with the situation where either of the couple already have children from a previous marriage. Also, secondary infertility usually put couples in a state of fear and tension for the reason being that couples with only one child or two children, live with great fear and tension of the possibility of losing their only child or children, and thus become childless and insignificant to society overnight. This fear and tension poses a risk to the marriage since it is likely to cause much stress

especially on the woman and magnifies the problem of infertility further via stress-related causes.

In Northern Ghana, anecdotal evidence reveal that, having children does not only give you a good name or projects your name for other generations coming to know but also serves as some kind of wealth to the couple. In Northern Ghana and for that matter, Tamale, a family with many children is worth more than a family with many cattle which others normally grade as wealth. The poor family with many children is a very joyful family with greater hope for the future.

It should be known that in developing countries especially, women as a result of their infertile status suffer physical and mental abuse, neglect, abandonment, economic deprivation and social ostracism as well as exclusion from certain social activities and traditional ceremonies (Gerrits, 1997 & Okonofuaa, 1997 as cited in Jumayev et al., 2012).

For instance, a survey conducted in Southern Ghana revealed that the majority (64%) of women felt stigmatized, and that higher levels of perceived stigma were associated with increased infertility-related stress as well as lower levels of education. Some findings from the qualitative analysis in that study concerned a major difference between primary and secondary infertility in terms of its implications for the affected women (Larsen, 2000).

In Ghana, when one marries and after birth of one or two and no issue again for a long time, the men usually try to marry another woman so that he, as a man can have more children to himself. These children as he believes will one day take care of him at old age. This practice however usually brings about rivalry among the wives and at times causes some conflicts between the women and their children, and may ultimately result in a lifelong conflict between separate

sections of the polygamous family. In such cases, the pressure on the affected women becomes so unbearable that they leave the marriage.

Even though a number of factors including age, damage or blockage to the fallopian tubes, ovulation problems, endometriosis, and problems with sperm production may cause secondary infertility, due to a critical lack of understanding in Ghana, the problem is largely attributed to spiritual causes or curses from God.

As a result of the above view, the clinical treatment of secondary infertility is rarely sought especially among rural populations. Instead couples tend to seek solutions to their problem of secondary infertility from unorthodox sources such as from diviners, *mallams* and prayer camps. Where this seeking for children from these sources fails to produce the desired solutions, child theft and trafficking may be the ultimate consequence.

Estimates of the perception of the causes of secondary infertility are often imprecise because they are based on either demographic (population census) data or health service statistics. Both of these sources of data are limited in serving as the basis for assessing the lifestyle factors, perceived causes and real treatment options sought by affected couples in developing countries because they are often incomplete and based on only reported cases, which constitutes a smaller percentage of the magnitude of the problem. Hospital or clinic-based data do not indicate the real nature of the problem because not all couples suffering from infertility use these services (Larsen, 2000).

Besides, epidemiological infertility research in communities can provide some insight into secondary infertility and give indications for the causes of infertility. This only determines the lifestyle risk factors, causes, challenges and treatment options of secondary infertility in the

medical context and is thus limited in exploring the factors such as the local postpartum customs, contraceptive behaviour, migration patterns etc. to establish the causes of infertility.

This means any reliable estimate of the risk factors, perceived causes, challenges and practical treatment options of infertility in the population will require a direct identification of all couples who suffer from secondary infertility, regardless of whether or not they accessed health services with the problem. Such prevalence data can only be obtained through community-based surveys of a population samples. To the best of my knowledge, no such specific survey-based studies have been conducted in Ghana and no previous study provides estimates of the prevalence of secondary infertility at the districts level especially.

Secondary infertility in Ghana is a condition that also puts the couple in a state of mental torture if after the first birth, there is no issue or especially when the first birth was a stillborn or dies after delivery. (Gurunath et al., 2011)

To bridge this knowledge gap and contribute to knowledge, this study seeks to investigate the factors influencing secondary infertility among women in the Tamale metropolis. It will be conducted among females aged from 15 – 49 years in the Tamale metropolis in the Northern Region of Ghana. In addition, most affected couples in Ghana attribute infertility to spiritual causes and this normally leads them to seeking psycho-medical remedies without considering what consequences may come after it. To help combat the above social problems and avoid their associated consequences, there is the need to create an understanding on the factors that affect secondary infertility in women.

Though research on infertility has been done in Ghana and other countries, scientific research specifically on factors influencing secondary infertility among women in the Northern Region

and more specifically in the Tamale metropolis where having many children is seen as a big asset and wealth for that matter is yet to be done. Therefore, by investigating the factors influencing secondary infertility and documenting the factors responsible for the prevalence of this phenomenon among women in the Tamale metropolis, this study hopes to fill in the gap in this knowledge field.

1.3 OBJECTIVES

The main objective of the study was to examine the factors that contribute to secondary infertility among women in the Tamale metropolis of the Northern Region of Ghana.

Specifically, the study seeks to:

1. To ascertain the sexual behaviour associated with women with secondary infertility in the Tamale metropolis.
2. To investigate the causes of secondary infertility among women in the Tamale metropolis.
3. To examine the challenges women with secondary infertility face in the Tamale metropolis.
4. To assess the common treatment options employed by women facing secondary infertility in their attempt to conceive.

1.4 The Conceptual Framework

Infertility, especially in developing countries such as Ghana, is associated with several factors. These include lifestyle, demographic, socioeconomic, environmental, biomedical and personal. Socio-cultural factors such as age, education, marriage, employment and religious status may be

direct or indirect contributory determinants of infertility since they determined how treatment is sought for the problem. .

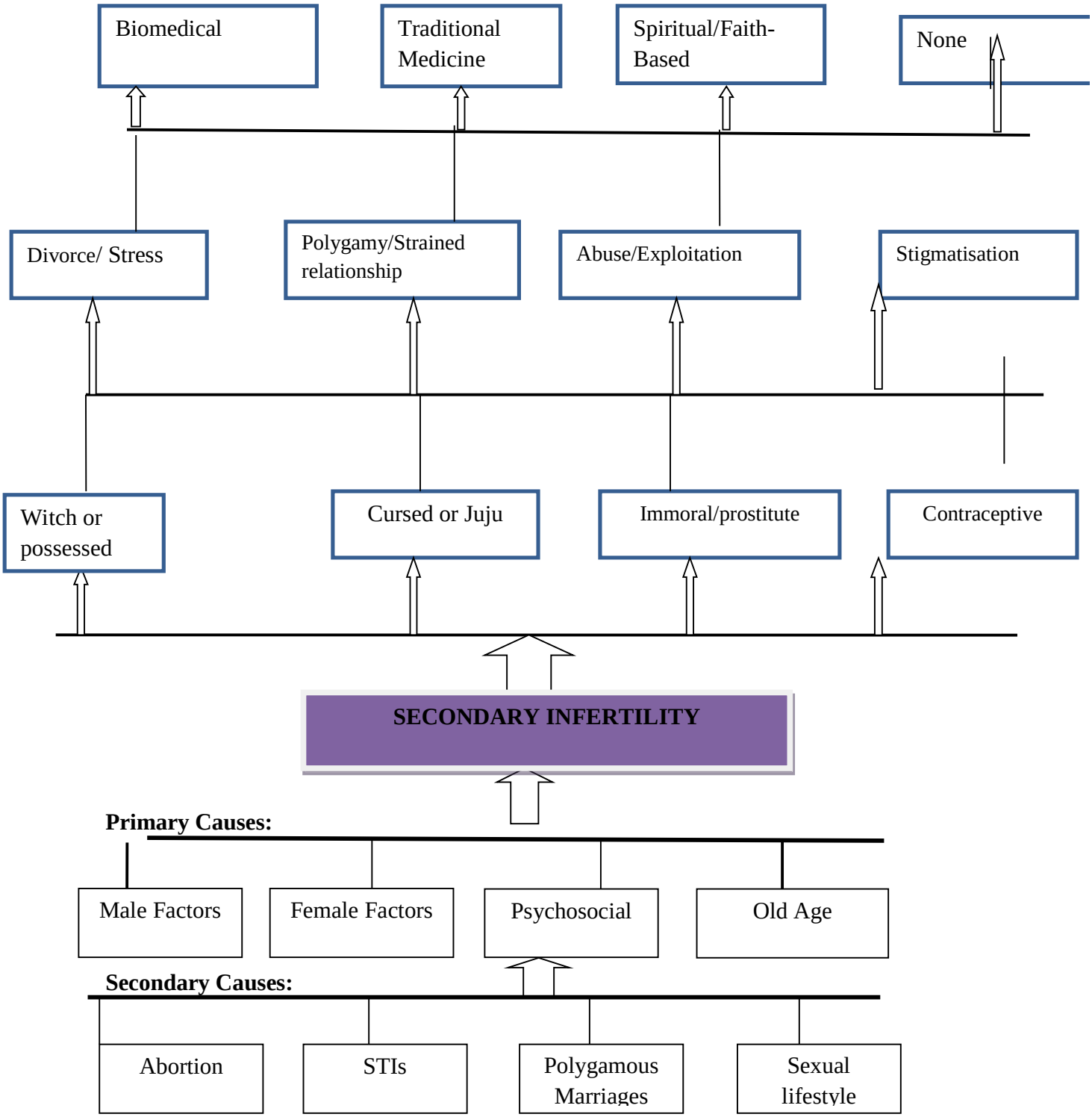
Infertility is of two categories - primary and secondary. Primary infertility refers to the situation where a woman has never been able to conceive even though she is married or is exposed to regular, unprotected sexual intercourse for a long period of time (usually for about 2 years). . In Ghana, a woman who is primarily infertile (total barrenness) is highly stigmatised and does not command respect from society. Secondary infertility on the other hand is the case where a woman after previously conceiving and having one or more life births, is subsequently unable to conceive despite an unrestricted exposure to pregnancy over a period of 2 years. The latter is the focus of this study

Secondary infertility may be caused by male or female factors or both. The male factors leading to secondary infertility include: inadequate sperm production, anti-sperm antibodies, poor sperm motility, undeveloped testicles, glandular diseases, nutritional deficits, obstruction in the seminal ducts, advanced age and erectile dysfunction (Yebei, 1999). The female factors include ovulatory problems, tubal blockage, hostile cervical mucus (antibodies), STIs, irregular ovulation and fibroid. In addition, psycho-physical factors such as stress, anxiety and illnesses may also influence fertility in both men and women (Yebei, 1999). In terms of respect from society, secondary infertility, even if the child dies after birth, is better than primary infertility.

In Tamale metropolis and Ghana as a whole, there are numerous perceptions (views) of the causes of secondary infertility. These may be based on cultural, social or religious beliefs that often hinder the seeking of biomedical treatment options by affected couples. Secondary infertility in the study area is often attributed to witchcraft or evil spirits, *juju* (evil spiritual

forces), curses from the gods or enemies, use of contraceptives, dreams of sex with a spirit husband and immoral lifestyles by the affected women. As stated above, these perceptions often hinder the seeking of especially biomedical solutions to the problem of secondary infertility. Affected couple, who perceive that the problem is spiritual, rather seek solutions from spiritualists until it is often too late for biomedical solutions to be effective. (Jumayev et al., 2012).

Figure: 1.1 Conceptualising the Courses, effects and Treatment Option of Secondary Infertility.



Source: researcher's own construct.

Secondary infertility is caused by both primary and secondary causes. The primary causes are those that are natural causes that are without the involvement or a particular lifestyle of the person in question. These causes comes as a result of the natural or biological makeup of the person in question, or as causes that will definitely happen come what may like that of old age, male factors, female factor. For these ones, they are part of the person's life and no one can escape that because they are natural. The secondary causes are the causes that come as a result of the negligence or due to the lifestyle of the person in question. Secondary causes can be prevented to some extent. It is not a question of 'born with it' or a natural makeup of the person in question. Secondary causes include; abortion, STIs, polygamous, sexual lifestyle behaviour, etc. as shown in figure 1.1. These secondary causes can be preventable or treatable.

The perceptions of the person's affected usually associates it with different perceptions the society has about secondary infertility. It is usually perceived that association with, 'witch craft', 'curses or juju, 'immoral/ prostitute', 'contraceptives', etc. Mostly the affected usually associate the causes to secondary infertility to witch craft, curses or juju, immoral life lived by victims, contraceptives usage.

The effects of secondary infertility on the affected woman are different and they include, divorce/stress, abuse/exploitation, polygamy/ strained relationships, social stigma etc. With secondary infertility, even if the woman has a child or more alive, the inability for subsequent births makes them insecure in the marriage or makes them insecure with their partners getting married to another woman.

Upon the realization of infertility, several interventions are sought by the infertile woman. The first intervention is usually biomedical treatment. If their attempt to secure biomedical treatment

fails, the affected women may diversify their options to include the use of alternative medicine, herbal medicine and spiritual healers.

Depending on how long the problem persists, the search for treatment could either be simple; or expensive, complex and time consuming. It may also lead to the inclusion of less utilised strategies to solve the problem. The seeking for solutions to infertility may lead to many cases, of exploitation or sexual abuse of the women involved. At the moment, legal adoption is not a common practice in the Tamale metropolis.

Because of the importance of children in Ghanaian society, most women facing secondary infertility in the Tamale metropolis have a strong desire to have children because motherhood is considered a major role of women and a respected female identity in the metropolis and Ghana at large. Thus, affected couples especially the women look for treatment in various ways and are willing to try anything that will yield the desired solution of having children. Verdumen (1997) identifies four health-seeking of infertile Ghanaian women. These are choosing one strategy, choosing different strategies sequentially, choosing different parallel strategies and doing nothing (Yebei, 1999).

1.5 Justification of the study

Even though infertility is just a condition, the problem often leads to “marital demise, physical violence, emotional abuse, social exclusion, community exile, ineffective and iatrogenic therapies, poverty, old age insecurity, increased risk of HIV/AIDS, and death” in developing countries like Ghana (Gerrits & Shaw, 2010). This is due to lack of a comprehensive understanding of the psychosocial and biomedical determinants of secondary infertility, which in turn results from the lack of empirical and political interest in infertility problems.

To this end, this study's attempt to assess the lifestyle and social correlates of secondary infertility among women in the Tamale metropolis, and the views of affected women on the causes of and treatment options for secondary infertility in the study area. By creating understanding in and providing reliable estimates of the above very serious but often less considered problem in Ghana, then a comprehensive and systematic infertility care design and planning of prevention and treatment through the establishment of efficient treatment, management and referral systems may be created. This way, the issues of stigmatization and unorthodox and often dangerous treatment services will be reduced, and coping mechanisms for couples facing this problem provided.

By providing an in-depth insight into the risk factors, causes, challenges and treatment regimens of secondary infertility in Ghana, this study will make a significant contribution in putting secondary infertility on the national reproductive health care agenda. The study hopes to convincingly show the way affected women experience, explain and deal with infertility socio-culturally and economically, as well as point out patronised health care systems for this problem. Such knowledge may be useful for the national population policy and will facilitate the evaluation of the demographic impact of family planning in the country.

In addition, this study endeavours to present suggestions for future social or medical science research on this problem. These future studies are expected to also lead to the improvement of public health and special care initiatives resulting in the enhancement of infertility care in the Tamale Metropolis, the Northern region and Ghana as a whole.

Findings from the study will generate vital information which will serve as a tool for NGOs (both national and international), policy makers, development partners and others interested in

tackling infertility problems in Tamale and other parts of Ghana. If this materializes, it will eventually reduce infertility rate as well as its related problems in the family and the entire society.

In the academia, the study will contribute significantly to knowledge and existing literature on infertility by serving as reference material for further studies among students, policy makers, development partners, NGOs, researchers and others who are interested in helping curb the fertility issues in Ghana especially Tamale and other part of the world. The outcome of the research would as well serve as basis for further research since the study would propose researchable areas related to fertility after of the study.

Eventually, recommendations would be made by the researcher based on the findings from the study. These would assist in coming out with interventions to aid in minimizing infertility in the country.

1.6 Organization of the Study

This study is organized into six chapters. Chapter one deals with the introduction of the study which is made up of the background, problem statement, objectives of the study as well as the justification/significance of the study. Chapter two reviewed literature related to the topic under investigation.

The study area and methodology employed for the study is discussed in Chapter Three. This includes description of the study area, sampling procedure, method of data collection and analysis. Results from the field survey are presented and discussed in Chapter Four and Five respectively. The last chapter (Chapter Six) presents the summary, conclusions come out with

some recommendations which when taken into consideration will enhance policy formulation and direction on the subject of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the topic of investigation. It review is in line with the study .objective. This is done to help identify the knowledge gap and which will serve as a guide to achieve the study objectives.

2.2 An Overview of Infertility

Infertility has been defined as failure to conceive after one year of regular unprotected sexual intercourse in the absence of known reproductive pathology (Dovom et al., 2014; WHO, 1987 as cited in Tabong & Adongo, 2013). Fertility-health.com, (2015) defines secondary infertility as the inability for a couple to conceive, or to carry a pregnancy to term, following the birth of one or more biological children

Secondary infertility refers to a couple's inability to conceive a baby, even though they've had at least one child in the past, either together or with a previous partner. Couples who experience this condition may confront a range of physical and emotional frustrations, despite the fact that they've been able to successfully reproduce in the past, Bounty (UK) Ltd, (2014).

Cooper et al. (2010) also explained infertility as the inability of a couple to achieve pregnancy over an average period of one year (in a woman under 35 years of age) or 6 months (in a woman above 35 years of age) despite adequate, regular (3-4 times per week), unprotected sexual intercourse. The American Society for Reproductive Medicine (ASRM) adjusted the definition of infertility as the failure to become pregnant after 12 months or more of continuous and unprotected sexual intercourse and it is suggested to begin the evaluation and treatment based on

clinical history and physical examinations in over 35 years women, after 6 months (Kawwass et al., 2013).

Infertility may also be referred to as the inability to carry a pregnancy to the delivery of a live baby (Olooto et al., 2012). However, infertility is considered two years by epidemiologists (Gurunath et al., 2011). According to them, many couples who are infertile through one-year period, with a little patience, develop into fertile in the second year; therefore, they are more circumspect in defining infertility (Safarinejad, 2008; Gurunath et al., 2011). Infertility is the failure to conceive within a certain period of time. For the male, this definition is particularly problematic, as it relies on an outcome for his female partner, who may have reproductive issues of her own (Abarikwu, 2013). They added that infertility can be defined clinically as the inability of a couple trying to conceive to do so within one year. With this wide spread variations as to the definition of infertility among various authorities, the concise and acceptable definition most definitely depend on the coupe involved, the nature of the problem identified, the socio economic and cultural dynamics of the community in question and the relative time expected to conceive by an average couple.

With these views in mind, the world health organisation is attempting to give a more universally acceptable definition for infertility. The issue of infertility then can be regarded as a concept influence by the perception of the couple and the community of habitation than receiving a recognised medically inclined terminological definition. Because some couples, who are not infertile, may not be able to conceive within the first year of unprotected sex, the World Health Organisation (WHO) recommends the epidemiological definition of infertility, which is the inability to conceive within two years of exposure to pregnancy (WHO, 1987 as cited in Tabong & Adongo, 2013).

Demographic analyst and statistical service officers are also trying to give definition to the term infertility. How true these remains is still enshrined in the fact that couple are unable to conceive after a period of unprotected sexual intercourse with the objective of getting pregnant. The discrepancy largely is embedded in the time frame required to indicate that a couple can be diagnosed as been infertile. The demographers define infertility as failure to give live birth in women who had active sexual intercourse not using any contraceptive method (Mohammadi et al., 2005).

In addition to biological and organic factors inducing infertility, several demographic, socio-economic and anthropometric factors have been reported as the factors that mainly affected infertility. Age, age of marriage, place of living, race, adiposity has influence on infertility are commonly mentioned in some studies (Safarinejad, 2008). However, each of these individual variables actually influences the concept of infertility within a particular locality with vary. The combination of these factors eventually influences health outcomes and chances of conceiving or carrying a pregnancy to successful term. As some women have given birth to one or two and currently struggling to make a pregnancy or keep one to term, there are others who have never been pregnant or wish to be pregnant or have never carried a pregnancy to a successful term.

The two main concepts of infertility broadly, there are two main groups of infertility and they are primary and secondary infertility. Primary infertility is defined differently based on the variable of waiting period length. Primary infertility refers to infertility of a woman who has never conceived before. On the other hand, secondary infertility refers to infertility of a woman who has conceived at least once before. An epidemiological definition considers secondary infertility to mean couples who fail to achieve a pregnancy after 1 year of regular coitus without use of

contraception. A modified demographic definition considers secondary infertility as the inability of a premenopausal woman to have a live birth after 5 years of exposure (PATH, 1997).

Olooto et al. (2012) pointed out that infertility can be due to the woman, the man, or both; primary or secondary. In primary infertility, the couples have never been able to conceive; while in secondary infertility there is difficulty in conceiving after having conceived (either carried the pregnancy to term or had a miscarriage). According to the study, secondary infertility is not present if there has been a change of partners within the one year period, which has its associated peculiar chances to be infertile (Olooto et al., 2012).

Abarikwu (2013) also indicated that infertility can be classified as primary infertility when no pregnancy has ever occurred or secondary if it occurred after one or more pregnancies. Approximately 15% of couples attempting their first conception meet with a failure, and another 10% face secondary infertility (Geidam et al., 2008).

Over the past twenty years, fertility problems have increased dramatically. One in six couples now finds it difficult to conceive and a quarter of all pregnancies can end in a miscarriage (Olooto et al., 2012). More and more couples are now turning to fertility treatments to help them have a family (Glenville, 2012). Olooto et al. (2012) pointed out that cervical infertility (CI) involves inability of spermatozoa to get to the uterus due to damage to the cervix or cervical factors such as cervical stenosis (Tan and Bennett, 2007); antisperm antibodies (Francavilla et al., 2007); inadequate, hostile or non-receptive cervical mucus (Farhi et al., 2007), and cervical infections from sexually transmitted diseases (Chlamydia, gonorrhoea, trichomonas, mycoplasma hominis and ureaplasma urealyticum).

2.3 Perception and Perspectives of Infertility

In Africa, infertility is seen almost exclusively as a woman's problem. A study in northern Ghana by Tabong and Adongo (2013) reports that: "It's always the woman's fault" in matters of infertility. From the literature, there appears to be gender bias in research on management of infertility as many studies have often focused on the women, reinforcing the belief that infertility is mainly caused by female factors. In Kenya, infertility is assumed to be a female disorder and husbands rarely accompany wives to infertility clinics (Feldman-Savelsberg, 1994 as cited in Tabong & Adongo, 2013).

Sami et al., (2012) study in Karachi, Pakistan revealed that, women with secondary infertility were more likely to be the house wives, and had carried out inappropriate practices for delivery, postpartum and menstrual care. Among the cases, 87% of women were housewives and 12.5% were employed as compared to 76% and 24% respectively for controls. Literacy status of women in both the groups was more or less similar and illiteracy was not significantly associated with secondary infertility (Sami et al., 2012).

Anecdotal evidence indicates Northern Ghanaians believe in pronatalism to the extent that childlessness is highly stigmatised and this is a well-entrenched perception in the area. Childlessness is not simply the absence of children, which can create problems for couples. At times not bearing sons, or having only one child constitute a form of infertility where community norms dictate that large families are preferable and that sons are indispensable. Tabong & Adongo (2013) refer to the phenomenon where couples give birth to only girls as "tertiary infertility".

Many couples reported that their initial reaction to the diagnosis of infertility was characterised by denial. “It cannot be true” was a common phrase many infertile individuals reported having used when they were first told about their infertility status.

The large extent of stigmatisation associated with the problem makes many women seek remedy from varied sources including traditional herbal services providers. In many parts of Sub Saharan Africa (SSA) such as among the Yoruba of southwest Nigeria, infertility may be due to spiritual problems. In these areas, infertility is regarded as a non-natural state affair. Therefore, affected couples frequently seek preventive and treatment alternatives for infertility from herbal and spiritual specialists, or from spiritual churches (Koster-Oyekan, 1999). In Africa, aside biomedical causes of infertility, traditional explanations of infertility are still socially important. The meaning assigned to infertility is for a considerable part mediated by socio-cultural factors that vary among regions. Empirical research in Ghana and other parts of Africa and Asia have cited perceptions of both biomedical and traditional or religious causes of infertility. The commonly traditional causes of infertility include supernatural causes, voodoo, curses by ancestors or deities, evil spirits and witchcraft (van Balen 2000; Geelhoed, Nayembil, Asare, Schangen van Leeuwen, & van Roosmalen 2002; Dyer, Abrahams, Hoffman, & van der Spuy 2002 etc in Donkor, 2008.

2.3.0 Religious Perspectives

The religious and cultural perspectives of infertility can be challenging for some clients. In Kuwait, the Islamic religion believes that most things come from Allah (God) and expresses acceptance of God's will by utterances like 'insha'allah' meaning God willing, 'al-hamdu li-llah' meaning thanks be to God, Lubke (1991). An infertile couple might be consoled because Allah wishes for them to be childless. In Kuwait it is customary to identify adults by placing the prefix

'Abu' or 'Om' with their child's name, for example, Abu Khalid or Om Mohammed meaning Father of Khalid or mother of Mohammed respectively. This custom serves a reminder to the infertile couple of their social obligations to procreate and results in personal frustration.

2.3.1 Cultural perspectives

Some studies discuss the effect of pressure from family members and the community affecting the quality of life of infertile couples, Aliyeh (2007). Men and women are believed to react differently to infertility. Infertile wives are said to experience greater emotional disturbances than their husbands because, during the process of female socialization, pregnancy and childbirth are considered as the most important function of the wife. Females, therefore, take more responsibility for fertility evaluation even when they are sure that their husbands are the cause of their childlessness (Hjelmstedt, 1999).

Some of the investigations and treatment for artificial reproductive technology are performed on females, so they directly face the success or failure of treatment. Men are said not to react in the same way as women because male socialization discourages them from expressing feelings openly. However, if there is evidence that the man is the cause of the reproductive impairment, he would be more distressed than his wife (Mikulincer et al., 1998).

2.4 The Incidence of Infertility: The Global Perspective

According to studies conducted by Adamson et al. (2011); Boivin et al. (2007); and Stephen (1998), about 60 – 80 million couples are affected by infertility in the world and the figure is still increasing. The World Health Organization (WHO) (2004) found in a demographic study conducted on developing countries that about 186 million women were infertile. Volgsten et al.,

(2008) reported the prevalence of primary infertility in developed and less developed countries to be 6.6-26.4% and 5-25.7% respectively.

Similarly, Boivin et al. (2007) further pointed out that the incidence of infertility in both less developed and developed countries were respectively between 6.9-9.3% and 3.5-16.7%. Zeng and Wu (2000) also reported the prevalence of primary infertility in China to be 9%, America to be 10-15%, Siberia to be 16% and Australia to be 19%. Between 8 and 12% of couples around the world have difficulty conceiving a child at some point in their lives, and in some areas that figure reaches one-third or more of couples (Sciarra, 1991 & WHO, 1991).

According to Ekwere et al. (2007), it has been estimated that infertility of couples affects 10-15% of the general population. The prevalent rate varies between and within countries (Abarikwu, 2013). For instance, in the United Kingdom and the United States of America it is estimated to be 6% and 10% respectively (Ugwuja et al., 2008).

In Denmark, it is estimated to be in the region of 15.7% (Schmidt et al., 1995). In Nigeria and some parts of Sub-saharan Africa including the Republic of Sudan and Cameroon, infertility rate could exceed 30% (Larsen, 2000; Okonofua et al., 1997 and Adetoro & Ebomoyi, 1991). Some studies reported in South-eastern Nigeria, have demonstrated a 65% and 35% prevalent rate for primary and secondary infertility respectively (Ikechebelu et al., 2003). Similarly, some countries, most notably Kenya, Gabon, Botswana, Zimbabwe and many other African countries, have shown a trend toward lower fertility (Okonofua, 2003; Araoye, 2003; Larsen, 2000 and Agyei-Mensah, 1996).

The high level of infertility in Africa is due largely to reproductive tract infections which may be associated with abnormal semen parameters and low sperm count (Okonofua, 2003; Ugwuja et

al., 2008 and Ikechebelu et al., 2003). In about 60% of all couples experiencing infertility, male factor is responsible in about 40% of the couples (Araoye, 2003). The male factor is associated with a greater percentage of cases of primary rather than secondary infertility (Araoye, 2003). This was reported to be as high as 59% in France (Thonneau et al., 1991), 35% in Nigeria1, 26%–32 % in the UK and Kashmir Valley in India, and about 36% in South Africa, Indonesia and Finland (Mehta et al., 2006 and Fisch & Goluboff, 1996).

Studies such as Vahidi (2009), Barouti et al. (1999), Noorbala et al. (2004) and Mohamad & Ardalan (2009) estimated primary and lifetime infertility to be between 2.8-3.4% and 21.9-24.9% respectively. Safarinejad (2008) indicated that the rate of primary infertility varies greatly according to different reports and it ranges betwen 8-21.9%. Also, the WHO estimated infertility in the world to be 8-12%. However, Dovom et al. (2014) pointed out that reports on secondary infertility rate are scarce. Most infertile couples around the world suffer from primary infertility, which means that the woman has never conceived (Cates, 1985). Sub-Saharan Africa is a striking exception to this pattern: in this region most couples (52 percent) suffered from secondary infertility, that is, a woman cannot conceive even though she previously has conceived. Latin America also has a relatively high rate of secondary infertility: 40 percent. In contrast, only 23 percent of infertile couples in Asia and 16 percent in North Africa suffered from secondary infertility (Cates, 1985).

According to a study conducted by Dovom et al. (2014) in Iran, the estimated prevalence of secondary infertility was 7.8%. Other studies found secondary infertility in different countries to be 7% in Scotland, 23% in some African countries such as Central African Republic (Bhattacharya et al., 2009 and Larsen, 2000). Dovom et al. (2014) pointed out that the differences in the prevalence of secondary infertility could be attributed to the cause of it.

Secondary infertility may be caused in some countries by genital infections; Sexually Transmitted Infections (STIs) are responsible for more than half of their secondary infertility (Dhont et al., 2011). Orji (2008) indicated that secondary infertility may be caused by mismanagement of previous pregnancies that will lead to problems in future pregnancies including insecure abortions, long-term rupture of amniotic sac, post- delivery infections as well as retention of placenta in uterus and its subsequent infections.

Abarikwu (2013) indicated that data available over the past 20 years reveal that in approximately 30%-50% of the cases of infertility, the cause is found in the man alone, and in another 20%, the causes are found in both (Demetrius, 2006) and in 50%-70%, the causes are found in the female alone (Ekwere, 2007). Experience shows that many of these supposedly "infertile" couples will eventually conceive, even without treatment. For example, 38% of couples attending an infertility clinic in India conceived before any treatment began, and another 27% conceived before their treatment was completed (Singh, 1996).

Similarly, a Chilean study found that only 4 percent of women were infertile after their first eight years of marriage, although 26 percent had experienced a delay in conception that lasted longer than 12 months (Fuentes & Devoto, 1994). If a good assessment or examination were available for male reproductive function, independent of the female, a practical definition of male infertility would be "the condition of the subset of males with a positive assay within the set of couples that fail to conceive within one year." Such an assay does not currently exist (Abarikwu, 2013).

Infertility affects both men and women. Yet women, particularly developing country women, may bear the sole blame for barren marriages; in many areas infertility is a socially acceptable basis for divorce by the husband (Singh, 1996; Leke, 1993 and Yeboah, 1993).

2.5 Prevalence of Infertility in Ghana

It is estimated that, between 8 and 12% of couples worldwide have difficulty conceiving a child at some point in their lives. In some areas, about 1/3 of couples may face this difficulty (PATH, 1997). The prevalence of infertility may be empirically established via demographic studies that measure infertility using the subsequent infertility estimator (Larson, 2000).

Infertility in SSA constitutes a major public health problem with prevalence up to 30% (Ericksen & Brunnette, 1996; and Larsen 2000). Infertility in SSA is most commonly secondary infertility in form and result from reproductive tract infections such as post-abortion and post-partum infections, and STIs. In SSA, an estimated 52% of couples suffer from secondary infertility.

The Demographic Health Survey (DHS) and the World Fertility Survey (WFS) have demonstrated that the prevalence of infertility in SSA ranges from 11 to 27%. Another study based on 2137 respondents in Northern Ghana discovered that infertility was reported by 295 (13.8%) of the respondents, with self-reported infertility among women being 127 (11.8%) of whom six (0.6%) are primary infertility and 121 (11.2%) are secondary infertility, while 168 (13.5%) men self-reported infertility and this comprised 72 (6.8%) primary and 96 (9.0%) secondary infertility (Geelhoed et al, 2002). Thus in northern Ghana, the prevalence of infertility among women is 11.8% while that among men is 13.5%. In both cases, the percentage of secondary infertility is higher.

Studies showed that infertility is prevalent in sizeable areas of sub-Saharan Africa. Primary infertility exceeds 3% in less than a third of the 28 countries analysed, but elevated levels of secondary infertility prevail in most countries (Larsen, 2000).

The type and prevalence of infertility varies widely from one country to the other. In Sub-Saharan Africa, secondary infertility is the most prevalent type of infertility (Cates et al., 1985 as cited in Alhassan et al., 2014).

The prevalence of primary infertility is calculated as the number of women in an infertile union divided by the number of women in both infertile and fertile unions, where women in a fertile union have successfully had at least one live birth and have been in the union for at least five years at the time of the survey. The prevalence of secondary infertility is calculated as the number of women in an infertile union divided by the combined number of women in infertile and fertile unions. Women in a fertile union have successfully had at least one live birth in the past five years and, at the time of the survey, have been in a union for at least five years following their first birth (Mascarenhas et al., 2012).

The prevalence of secondary infertility spans a wide range in sub-Saharan Africa. Cameroon and Central African Republic rank among the countries with the highest prevalence of secondary infertility reaching, respectively, 20 and 25% of women age 20–44. Secondary infertility is also prevalent in Lesotho, Mozambique and Mauretania, where it counts 25, 21 and 21% of women age 20–44. The lowest levels of secondary infertility prevail in Burundi, Rwanda and Togo, where 5–7% of women age 20–44 have secondary infertility. The remaining countries analysed have secondary infertility in the middle range from 10% to 18% for women age 20–44 (Larsen, 2000).

Mascarenhas et al., (2012) revealed that globally, the prevalence of primary infertility was higher among women aged 20–24 years (2.7%) in 2010 compared to women aged 25–29 years (2.0%); and women aged 30–44 years (ranging from 1.6% to 1.7% in 2010). Prevalence of secondary

infertility increased sharply with age, from 2.6% in women aged 20–24 years to 27.1% in women aged 40–44 years.

Within the Sub-Saharan Africa region, the prevalence was lowest in East Africa and Southern Africa. Kenya, Zimbabwe, and Rwanda all had low prevalence of primary infertility in Sub-Saharan Africa in 2010 (1.0%–1.1%). In contrast, some countries, mostly in central Sub-Saharan Africa, had very high prevalence: Equatorial Guinea, Mozambique, Angola, Gabon, Cameroon, and the Central African Republic all had prevalence of 2.5% or greater (Mascarenhas et al., 2012).

2.6 Causes of Infertility

According to Chavkin (2013), women, who are having difficulty conceiving subsequently after having given birth, have a very difficult burden to bear. They often do not think of themselves as infertile since they already have conceived in the past. Having a child once is not a magic portion that guarantees eternal fertility however. There is evidence to suggest that it is possible to get pregnant once and then experience difficulties the second time around. The author stated that, a diagnosis of secondary fertility may be rendered if a couple who have already given birth without the use of medical support or fertility medications finds itself unable to get pregnant or experiences recurrent miscarriages and infertility.

For women over 35 years, evaluation is recommended if you have been unable to conceive after six months. The causes of secondary infertility are similar to the causes of primary infertility. However, the workup should focus on specific factors that have changed with you or your partner since having your first child. Infertility treatment is focused on the specific cause of the

problem, and reviewing your recent history is very important in making a diagnosis (Goldstein, 2011).

Also, some problems can develop after the birth of the first child. For example, a caesarean section may cause uterine adhesions, or a womb infection or retained placenta can both cause scarring. Unfortunately, conditions like this can make it harder to conceive. Boivin et al. (2007) pointed out that differences in the prevalence of infertility in different countries and even in a region as well as different biological and epidemiological factors is rooted in definitions used in each study.

2.6.0 Medication for Secondary Infertility

Several drugs or medicines can also affect fertility in the following ways: non-steroidal anti-inflammatory drugs (NSAIDs) arising from long term use, or higher doses of NSAIDs such as ibuprofen or aspirin; chemotherapy which has the potential to affect the ovaries; neuroleptic medicines often employed in the treatment of psychosis; spironolactone usually used to treat fluid retention with effects on fertility short term; and the use of illegal drugs such as cocaine and marijuana by reproductive women. According to Dovom et al. (2014), the prevalence rate of infertility is as a result of health problems.

Smoking tobacco or marijuana by either partner reduces the likelihood of pregnancy. Smoking also reduces the possible benefit of fertility treatment. Miscarriages are more frequent in women who smoke. Smoking can increase the risk of erectile dysfunction and a low sperm count in men. For women, there is no safe level of alcohol use during conception or pregnancy. Alcohol use increases the risk of birth defects, and may contribute to infertility. For men, heavy alcohol use

can decrease sperm count and motility**.** Also, overexposure to certain environmental factors, such as pesticides and other chemicals, and radiation can cause infertility.

2.6.1 Advanced Age

The woman's age is one of the most common reasons for secondary infertility. Although a woman like Claire may have had no problem getting pregnant a few years ago, those interim years can change things. It is critical to understand that a woman is born with all of the eggs she will ever have. As a woman ages, her ovarian reserve will diminish. This means that her egg quantity and egg quality will decrease, while the chance of miscarriage increases. This is true whether or not she conceived easily in the past (Chavkin, 2013).

Infertility in women is linked to their age. Most commonly, fertility in women declines during their mid-thirties. Usually, among women who are 35, it is most likely that about 95% will get pregnant after three years of having regular unprotected sex. While for women aged 38, only 75% will get pregnant in the same time period (Bounty (UK) Ltd, 2001- 2014).

Fertility declines with age. Female fertility is at its peak between the ages of 18 and 24 years (Agboola, 2004), while, it begins to decline after age 27 and drops at a somewhat greater rate after age 35 (Carl, 2007). This makes age the most important factor in female infertility. Ovulatory dysfunction is more common in younger than old couples (Miller, 1992).

Dovom et al. (2014) found that the age of marriage of women has a clear effect on the prevalence increase of infertility. The impact of age on infertility is along with physiological changes occurring in ovaries with ageing. The failure rate of advanced reproductive treatments also increases alongside ageing (Centers for Disease Control and Prevention, 2001 and Hashemi et al., 2012). Dovom et al. (2014) pointed out that there is controversy on adverse effect of

ageing of men on their reproductive capacities; however it has been shown that aging in men is associated with an increase in sulfur, copper and calcium intake by sperm cells that will reduce the quality of semen and induce genomic abnormalities (Mohamad, 2009; Kidd et al., 2014 and Schmid et al., 2013). Dovom et al. (2014) in their study found no association between spouse's age and male infertility.

Dovom et al. (2014) also reported that infertility increases about two times among women with more than 9 years of education. This adverse effect of higher education on infertility was also reported by Skirbekk (2008). The study indicated that the adverse effect of higher education may not be directly related to infertility but possibly it may increase age of marriage or age of attempting for pregnancy.

2.6.2 Delaying childbearing

Since the mid-1960s there has been a trend, especially among higher educated women, of delaying childbirth while they established their career goals. In order to put off having a child until she is established in her career, has paid off student loans and, perhaps purchased a house many women use abortion as a back-up for contraceptive failure. Quite apart from any possible abortion-related cause, she may simply find that her optimum time for conceiving has come and gone without her realising it (Naftolin, 999).

2.6.3 Abortion and Secondary infertility

The growing rates of infertility and secondary infertility (infertility after a woman has had one child) can be attributed to many things, but many medical experts and researchers are reluctant to name surgical abortion as a possible causal factor. Because abortion is such a controversial issue, any expert who speaks up and links abortion with negative side-effects is regarded as a secret

"pro-lifer" and is in danger of committing professional "suicide." Such a scientist or researcher risks being shunned by colleagues and ridiculed in the media and professional journals. Many advocates of abortion deny that there is a link between abortion and future infertility, except when the abortion is illegal. There is usually a qualifier, however, that says *legal* abortion should not affect future fertility "where there are no complications." "Another case series with West African women, involved eleven with secondary infertility lasting 2-15 years' duration. All these women had a previous pregnancy termination performed between 10 and 26 weeks gestation. Diagnosis of retained foetal bone was made with transvaginal ultrasound in all cases. Hysteroscopy was then performed to remove the bone fragments, and eight out of the eleven women subsequently conceived spontaneously (Obstet, 2000).

Multiple abortions

In some cases, multiple dilations and curettages (D&C) may cause some scarring at the top of the cervix or inside the uterus. Any procedure that dilates the cervix, which is a necessary step during most abortions, can weaken it. It can affect the ability of an embryo to implant into the uterus or the ability of your cervix to support a pregnancy. Women who have had more than one abortion and get pregnant again later on, may find that they have what's known as an incompetent cervix? a cervix that starts dilating prematurely (Obstet, 1997)

2.6.4 Infections

While many abortion advocates deny future infertility can be due to an abortion, they do mention that it could have resulted from a sexually transmitted infection/disease that was present at the time of the abortion. It is indeed likely that following an abortion the main risk to fertility is the development of Pelvic Inflammatory Disease (PID), which is an inflammation uterus, fallopian tubes and ovaries. Any use of instruments on the cervix, such as during a D&C, can lead to a

greater spread of these organisms and, therefore, the risk of PID. A Scandinavian study found that women with previous or existing Pelvic Inflammatory Disease had a decrease in fertility following an abortion (Obstetrics & Gyn, 1979).

STIs are a leading cause of infertility. They are often asymptomatic but may display few symptoms, with the risk of failing to seek proper treatment in time to prevent decreased fertility (American Society for Reproductive Medicine, 2009). Some of the identified STIs (such as syphilis, trichomoniasis, chancroid, Chlamydia, gonorrhea, herpes simplex virus, human papilloma virus, HIV, lymphogranuloma venerum) are treatable while many are not, with HIV virus being the most serious sexually transmitted infection as it eventually leads to death. STIs can also be transmitted vertically from mothers to children during pregnancy and childbirth.

2.6.5 The Estrogenic connection

A growing body of scientific evidence suggests that while a number of factors may be to blame for rising infertility rates, one of the greatest could be because of an excess of estrogen. An excess of the estrogen hormone can effect ovulation in women and some experts also believe that uterine fibroids, endometriosis, ovarian cysts and infections of the reproductive organs, all of which can impair fertility in women, are often the result of estrogen overload. While many experts would agree that excess estrogen can be a causal factor in infertility, most would avoid all suggestion that abortion may also be a contributing cause because of the 'politics' involved. By 7 to 8 weeks gestation, a pregnant woman's blood already contains six times more estradiol (an estrogen hormone) than it did at the time of conception, more than twice the highest level attained in the non-pregnant state. Whereas after pregnancy, many women breastfeed, thus suppressing the production of estrogen, many girls/women may conceive again within 12 months

after having an abortion. Having repeat abortions, especially in young females, may well be a reason for future fertility (Naftolin, 1999).

2.6.6 Retention of foetal tissue

In a first trimester abortion the doctor sometimes performs what is known as an "incomplete abortion" accidently leaving some tissue in the uterus. When foetal tissue is left behind in the womb it can rot and cause a severe infection that can cause permanent damage to the female reproductive organs. This can result in sterility or miscarriage of future pregnancies (Obstet & Gynaecol, 1997).

In addition to the above factors suggested by Women's Health (2016) as potential direct or indirect causes of infertility in women, the literature has clearly identified a series of modifiable lifestyle factors, such as psychological stress, smoking, alcohol and caffeine consumption, poor diet, obesity, and insufficient exercise that could potentially impact fertility in the general population. The available evidence suggests that social factors, such as stress, anxiety or sudden weight loss after a crash diet inhibit normal gonadotropin-releasing hormone secretion, leading to ovulation failure (Homan et al., 2007; Oslen, 1991; Tultrups et al., 2003 & Fritz, 2010 as cited in Jumayev et al., 2012).

According to the PATH (1997), everywhere there is often a core of about 5% of couples who suffer from anatomical, genetic, endocrinological, and immunological problems leading to infertility, while the remaining 95% may be infertile largely due to some preventable conditions, such as sexually transmitted infectious, parasitic diseases, health care practices and policies, and the exposure of the affected persons to potentially toxic substances in the diet or the environment. The factors that contribute to these conditions may also vary from region to region.

A study by WHO showed that infections either from a Sexually Transmitted Infections (STIs) or after childbirth or abortion-related infections were the major causes of infertility in SSA.

The cause of infertility may be from both men and women. In a study of 5800 infertile couples across 22 countries, it was revealed that in more than 50% of the cases, men are either the sole cause or contributory factor to infertility (PATH, 1997). Overall female causes accounted for between 25 and 37%, male causes between 8 and 22%, and both male and female causes between 21 and 38% (Larsen, 2000).

Reproductive tract infections, particularly Sexually Transmitted Infections (STIs), are the leading preventable causes of infertility. A WHO multinational study found that 64% of infertile women in sub-Saharan Africa had diagnoses that could be attributed to infection, about double the rate of other regions. Tubal problems and other infection-related diagnoses are also associated with postpartum and post-abortion complications (PATH, 1997).

Other infectious and parasitic diseases and the use of particular medications to treat them contribute to infertility. For example, in India, where 40% of the population is exposed to Tuberculosis (TB), genital TB contributes to female infertility. In Africa, schistosomiasis, malaria, and sickle-cell disease all contribute to infertility. In Tanzania, the success of malaria-control programs may have led to a reduction in infertility rates over the past 20 years (Sperling, et al, 1996 as cited in PATH, 1997).

Infections of reproductive tract are one of the main causes of infertility. Evidence for STIs as a cause of secondary infertility is available mostly West Africa (Abouzahr & Okonofua, 2003 as cited in Sami et al., 2012).

Health care practices and policies also contribute to infertility. Most notable among these are unhygienic obstetric practices, which lead to postpartum infections. Moreover, septic abortions and their complications are another important factor that causes infertility. The results of the WHO study suggest that repeated pregnancies play a greater role in the ethology of infertility in Africa and Latin America, while repeated abortions are more important in Asia and developed countries. Inappropriate gynaecological practices may lead also to infertility. In Egypt, for example, physicians routinely misdiagnose cervical erosion and then treat it inappropriately with cervical electro cautery, potentially causing infertility in the process. In Nigeria, where hernia repairs are routinely left to inexperienced surgeons, there is a pattern of male infertility due to vascular injuries sustained during these procedures (Abouzahr & Okonofua, 2003 as cited in Sami et al., 2012).

Increasingly, men and women in developing countries face exposure to environmental and workplace pollution, which can play a role in infertility. Researchers have documented high levels of arsenic in the semen of infertile men who live in areas of Mexico where drinking water is contaminated (ECS, 1992 as cited in PATH 1997). Similarly, the semen of some infertile Nigerian men contains high levels of aflatoxins, the metabolites of fungi that infest staple foods in many tropical countries. Infertility in Egypt and Singapore has been linked with workplace exposure to heat, pesticides, and other chemicals. In Ghana, the Ghana News Agency has been reporting a high prevalence of infertility among tomato farmers in the Brong-Ahafo region because of the use of agrochemicals including DDT.

Lastly, cultural and social factors can play an important role in causing infertility. Marital and sexual customs such as age at marriage, the number of sexual partners, and female genital mutilation, can influence the risk of genital infection. The use of tobacco, alcohol, and caffeine,

all have been implicated in infertility: Egyptian men who smoke tobacco in traditional water pipes face more than twice the risk of infertility as other men. Cultural traditions may even have genetic ramifications. Generations of close-cousin marriage in Arab cultures have been linked with two causes of infertility: a congenital testicular defect and the immunological problem of anti-sperm antibodies (PATH, 1997).

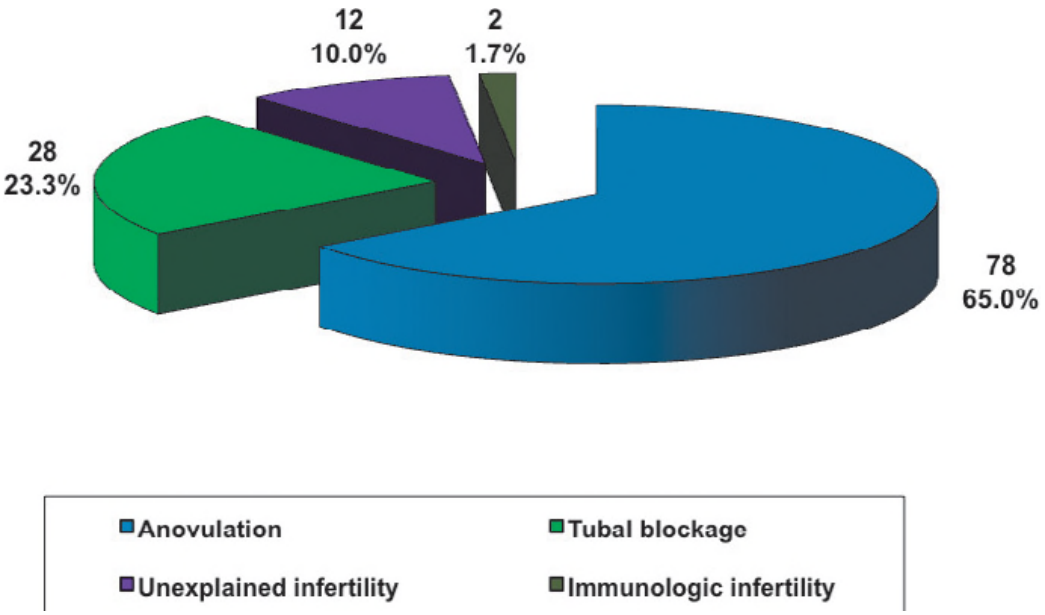


Fig.2.1: Distribution of Clinical factors in female infertility (Jumayev, 2012)

Although infertility is a problem among both men and women, about one-third of infertility cases are caused exclusively by women's problems, whereas one third are due to men, and the rest are attributed to a mixture of both or by problems unknown (Jumayev et al., 2012).

Olooto et al. (2012) further indicated that infertility may be caused by an underlying medical condition that may damage the fallopian tubes, interferes with ovulation, or causes hormonal complications. These medical conditions include pelvic inflammatory disease, endometriosis, polycystic ovarian syndrome, premature ovarian failure, uterine fibroids and environmental

factors. Other causes of infertility in females include ovulation problems, tubal blockage, age-related factors, uterine problems, previous tubal ligation and hormone imbalance while the main cause of male infertility is poor semen quality. Olooto et al. (2012) again identified the following linkages between infertility and other factors.

2.6.7 Environmental factors

Hruska et al. (2000) pointed out that the etiological importance of environmental factors in infertility has been stressed .Toxins such as glues, volatile organic solvents or silicones, physical agents, chemical dusts, and pesticides are implicated in infertility (Mendiola et al., 2008). Individuals having direct contact with or exposure to chemicals have high chances of having primary or secondary infertility.

2.6.8 Weight changes

Ovarian dysfunction could be caused by weight loss and excessive weight gain with body mass index (BMI) greater than 27 kg/m^2 (Imani et al., 1998). Excess weight has also been found to have effect on treatment efficacy and outcomes of assisted reproductive technique (Freundl et al., 2003). Proper nutrition in early life had been linked to be a major factor for later fertility (Sloboda et al., 2010). Weight can have a huge impact on the ability to conceive. Excessive weight gain can contribute to ovulatory dysfunction. With increased weight, insulin resistance can increase as well which leads to elevated production of testosterone from the ovaries, a phenomenon that can further prevent normal ovulation. In men, excessive weight can also negatively affect sperm production by increasing estrogen levels (Chavkin, 2013).

The general health implications of maintaining normal weight have long been understood. People who are overweight experience a higher incidence of hypertension, diabetes, cancer and

heart disease in addition to well-documented complications of pregnancy. More recently, studies have given us a better understanding of the effects of weight on fertility and fertility treatment. We will briefly review some of the considerations that make weight an important factor in the outcome of infertility treatment and pregnancy (Shady Grove Fertility, 2014).

According to American Society of Reproductive Medicine campaign "Protect Your Fertility" (www.protectyourfertility.com) which educates patients of four important factors affecting their fertility: cigarette smoking increased reproductive age, sexually transmitted diseases, and decreased or increased body weight points out that, there are numerous potential complications for obese women trying to get pregnant. Some of these include:

1. Lower response to medication used to regulate or initiate ovulation.
2. Greater need for carefully titrated dosing of medication, especially in patients with polycystic ovaries (PCO).
3. Greater frequency of over-response and the risk of over-stimulation and / or multiple pregnancies in response to medications used to induce ovulation. And if a multiple pregnancy is conceived, there are greater obstetrical complications in patients with excessive BMI than in multiple pregnancies in patients with a normal BMI.
4. More complicated IVF cycles (besides those complications listed above) including :
    - Fewer eggs retrieved
    - Greater technical difficulty retrieving eggs with greater risk of bleeding or injury

- Greater anaesthesia risk at the egg retrieval, including maintaining adequate airway, hypertension and aspiration
- Greater difficulty with embryo transfer in visualizing the uterus and accomplishing the embryo transfer effectively
- Lower embryo implantation rates
- Lower IVF success rates

5. For those who do conceive, greater complications of pregnancy exist including :
   - Higher frequency of early pregnancy loss (miscarriage)
   - Greater anaesthesia and surgical complications if any surgery required (e.g. D&C for miscarriage)
   - Greater frequency of hypertension, gestational diabetes, pre-eclampsia, stillbirth and other complication of pregnancy. (Rates of stillbirth are twice as high in obese patients compared to normal weight patients)
   - Increased risks of requiring caesarean section delivery. The caesarean section rate is almost 50% in obese women and the postoperative complications following C Section - including pulmonary emboli and wound infection are significantly higher.
   - Due to larger babies, there is a greater delivery complication rate for those delivering vaginally.

2.6.9 Life style

It seems that when we were young, we got away with leading these unhealthiest of lifestyles! Unfortunately, as the years pass, we become more prone to the effects of these not so healthy day

to day factors. Lifestyle is one of the biggest hidden reasons for infertility (Fertility-Health.com, 2015)

Fertility of an individual may be influenced by life style choice (Hakim et al., 1999). Tobacco (Cigarette) smoking and alcohol intake contribute to infertility. Some damage is irreversible, but stopping smoking can prevent further damage (American Society for Reproductive Medicine, 2009). Smokers are 60% more likely to be infertile than non-smokers. Alcohol intake, on the other hand, is associated with elevated oestrogen level (Muti et al., 1998) and this reduces Follicle Stimulating Hormone (FSH) secretions. Cigarette smoking in both the male and female can significantly impair the ability to conceive. And, smoking can seriously impact a woman's ability to carry a normal pregnancy (Chavkin, 2013).

There are certain lifestyle issues that can affect fertility health and throw out hormone balance**.** These topics include stress, poor nutrition, lack of exercise, alcohol consumption, smoking, caffeine, plus other circumstances (Fertlity-Health.com, 2015).

2.6.10 Thyroid disease

Thyroid disease had been shown to be associated with increased risk of prematurity or stillbirth (American Thyroid Association, 2010).The prevalence of hypothyroidism in women of reproductive age (20-40 years) varies between 2% to 4% (Bjoro et al., 2000).

2.7 Diagnosing Infertility

Diagnosis of both primary and secondary infertility is defined as one year of attempting to become pregnant without success. In any infertility work-up both male and female partners are considered to be a major contributor and are so investigated especially if the woman is above 35 years of age or if either partner has known risk factors for infertility. Male factors have to be

removed before subjecting the female partner to any expensive but invasive test (Olooto et al., 2012).They further indicated that the first step in any infertility work up is a complete medical history and physical examination of both couple.

Lifestyle issues such as cigarette smoking, canabis, drug and alcohol abuse, and caffeine consumption may reveal the possible cause or causes of the infertility. Menstrual history and any medications being taken, and a profile of the patient's general medical and emotional health can help in deciding on appropriate tests (Olooto et al., 2012).

Andrology Australia (2014) noted that if a couple has been trying for a pregnancy without success, they should go to their local doctor, family planning clinic or women's health clinic, and have some initial tests. Both partners should be tested, even if one has a child from another relationship. Diagnosis can involve a medical history from the man and a physical examination along with a semen analysis to check the number, shape and movement of sperm in the ejaculate. Semen analysis is the laboratory testing of freshly ejaculated semen that usually has been produced by masturbation. Under a microscope, the number, shape and movement of sperm are measured.

A semen analysis is a vital part of diagnosing male infertility. Testing should be done at a specialised laboratory that uses methods approved by the World Health Organization (WHO); special equipment and expertise are needed to do an accurate semen analysis.

Testosterone and the pituitary hormones, FSH (follicle stimulating hormone) and LH (luteinising hormone) circulate in the blood and can be easily measured in a blood test if hormonal problems

are suspected. Hormone test results, combined with results from a semen analysis can suggest possible causes of infertility (Andrology Australia, 2014).

2.8 Effects of infertility

In developing countries, infertility is a public health problem. This is because, the phenomenon is a dreaded condition that is associated with devastating psychosocial consequences rising from the fact that child-bearing is seen as a continuation of one's lineage and economic security and is thus greatly valued in SSA. In many parts of Africa, infertile couples are faced with several problems ranging from overt ostracism or divorce to more subtle forms of social stigma leading to isolation and mental distress (Kadaaga et al., 2014).

Even though infertility in marriage is caused by both the male and female factors and the phenomenon may be devastating to both partners, the case in most developing countries like Ghana is that women often bear the sole blame for barren marriages. In this case, men use infertility as a socially acceptable basis for the divorce of their wives (PATH, 1997). Thus even though both men and women are stigmatized, women bear the brunt especially from the family and friends of their husbands.

Infertile and sub fertile women in polygamous households may be less favoured with access to land and material resources than their more fertile co-wives. They risk divorce because they cannot contribute children to their husbands' patrilineage, and their natal families may become resentful at the need to repay the bride worth of a divorced infertile bride. In addition, an infertile woman has not contributed in children to her mother's matrilineage in the complex dual-descent kinship system (Feldman-Savelsberg, 1995 as cited in Felmans-Savelsberg, 2002).

In Ghana the ability of a married woman to conceive is very important. For instance, a woman who conceives and is unable to have a life birth is sometimes more respected and less stigmatised than a woman who has never or is unable to conceive at all. The use of the conception ability of a couple to define infertility thus implies that affected women bear the brunt of the problem of infertility in marriages.

Many studies have shown that unsuccessfully trying to conceive creates a great psychological burden for people. In one study, over 40 percent of patients who initiated a visit at a fertility clinic were diagnosed with a psychiatric disorder. The most frequent diagnosis is anxiety but depression is almost as common. Only a fraction of such patients receive any sort of psychological treatment concurrent with fertility care (Hinckley, 2016).

As a result of infertility, even married and socially highly placed women are often stigmatised and accused of various crimes all because of their inability to conceive, and may experience abandonment, divorce, polygamy, sorrow, isolation, stress, guilt, and discrimination (Dyer et al., 2002 and Dyer, 2007 as cited in Tabong & Adongo, 2013). In some case, the marriage may be considered null and void if the woman fails to conceive after one or two years in the marriage.

Infertility can have a serious impact on both the psychological well-being and the social status of women in the developing world. As a result of their infertile status, they suffer physical and mental abuse, neglect, abandonment, economic deprivation and social ostracism as well as exclusion from certain social activities and traditional ceremonies (Jumayev et al., 2012). A survey conducted in Southern Ghana revealed that the majority (64%) of women felt stigmatized, and that higher levels of perceived stigma were associated with increased infertility-related stress as well as lower levels of education.

In some developing countries, infertility is often the leading reason for gynaecological consultations. Evaluating and treating infertile couples can be a costly process. At the extreme, offering couples the latest in assisted reproduction technology, such as *in vitro* fertilization, may cost up to US$50,000 per live birth. Given limited health care budgets and a wide range of serious health problems, it is important to ask what kinds of infertility programs are appropriate in low resource settings (Mokhtar et al., 2006; Gerrits, 1997 & Greil, 1997 in Jumayev, 2012).

Where widespread, health centres may be over burdened by couples seeking help for infertility. Moreover, infertility presents stressors in the financial domain. A couple may incur tremendous financial expenses in an attempt to stop at nothing until a pregnancy or a live birth is achieved. In a study by Tabong & Adongo (2013), respondents stated that fertility services available as spiritual and herbal remedies were readily available in the community; however, the cost of treatment was a challenge as items often requested are not within the financial capability of the couples. In addition, the biomedical health facilities resourced for infertility are often at the district level and are limited in terms of assisted reproductive technologies, and many of the procedures are not covered by the national health insurance scheme.

Previous studies have revealed that infertility has some positive effects in marriage such as bringing partners closer together in the search for a solution to their problem (Schmidt, 2009 as cited in Tabong & Adongo, 2014). But searching for remedies as a source of intimacy for couples is rarely the case. Many couples seek either individual treatments or the women are always the ones seeking treatment alone. This emanates from couples blaming one another for their inability to have children and this reinforces the practice of the partners engaging in extramarital affairs to demonstrate their fertility (Tabong & Adongo, 2014).

In addition to the above, Abarikwu (2013) noted that infertility is a problem of public health importance in most developing countries because of its high prevalence and its serious social implications on affected couples and families. The public health implications are even greater when one considers that these conditions represent the consequence of other disease problems, each of which may have additional risks to personal health for both couples and place additional burdens on the health service (Okonofua, 2003).

In addition, infertility leading to depopulation of some areas limits the social and economic development of a region. When efforts to have children by infertile couples are unsuccessful, feelings of helplessness, frustration and despair are common; it can be a major life crisis for many couples. They go through enormous emotional crisis and psychological distress, as their friends and peers begin to have children. It is now generally accepted that male factor infertility is equally as important as the female factor (Abarikwu, 2013).

Furthermore, Gerrits & Shaw (2010) pointed out that since infertility is a condition that can lead to "marital demise, physical violence, emotional abuse, social exclusion, community exile, ineffective and iatrogenic therapies, poverty, old age insecurity, increased risk of HIV/AIDS, and death (Inhorn, 2009) it is suggested that reproductive rights must include the right to assist fertility when fertility is threatened, in addition to the right to control high fertility.

2.9 Management of infertility

Infertility management should be viewed holistically because the medical, psychological, spiritual and socio-cultural components of infertility are inseparable and need to be addressed simultaneously (Allan, 2001).

Infertility treatments are constantly improving: pregnancy rates for infertile couples using Assisted Reproductive Technologies (ART) are currently higher than the average monthly fertility rates. Even if you already have a child, if you suspect secondary infertility, seek help from a fertility specialist as early as possible! Early evaluation is critical since, as time passes, certain treatment options may be more difficult to pursue (Chavkin, 2013).

The medical components of infertility are often emphasized at fertility treatment centers unlike the other components. Some clients have unexplained infertility and will benefit from psychological interventions. Psychological stress is inevitable for the infertile clients and there are different views about how it affects the outcome of treatment (Mahlstedt, 1985).

Infertility specialist doctors have large caseloads, making extensive consultation time with each client difficult to arrange. Some clients, unsatisfied with limited consultation time perceive doctors as only being concerned with treating underlying medical or gynecological problems and not providing emotional support by 'consoling' them or addressing their emotional problems, (Menning, 1980).

Once the eggs are ready, doctor and patient will determine if the best way to proceed is via intercourse, intrauterine insemination or in vitro (in the lab). In vitro fertilization has been useful in circumventing some of the tubal and pelvic disorders that can cause secondary infertility and is also helpful in increasing rates of fertilization--even if a woman's fallopian tubes are already opened, as in the case of severe sperm-related abnormalities (Chavkin, 2013).

In 1994, the UN International Conference on Population and Development placed infertility on the international health agenda by openly identifying the prevention and treatment of infertility is a reproductive right (Geelhoed et al., 2002). According to Tabong & Adongo (2013), the

treatment of infertility can either be traditional or biomedical. Traditional infertility services are common in Ghana's rural areas as an important alternative source of understanding, coping, and managing health problems, including infertility in Ghana. Traditional treatment of infertility often involves cultural and religious remedies administered via herbs, plant concoctions and spiritual sacrifices by herbalists or spiritualists. Because traditional remedies are more accessible and affordable especially for the poor, these are often the first to be used in cases of infertility (Kadaaga et al., 2014).

The medical remedies of infertility on the other hand are used to correct ovulation dysfunction (irregular or infrequent periods). If there are no underlying causes of ovulation problems (such as a thyroid disease), the first line of medical treatment of infertility is oral medication to induce regular menstrual cycles. For ovulatory dysfunction, representing almost 20% of female infertility (Cookes et al., 2008 as cited in Tabong & Adongo, 2013), Clomiphene Citrate (CC) is used to initiate ovulation. In some cases, surgery may be required to treat conditions associated with infertility, which is often performed on an outpatient basis using a laparoscope (a type of endoscope) inserted through the navel and assisted reproduction technologies (Cookes et al., 2008 as cited in Tabong & Adongo, 2013). For males, low sperm counts, deformed spermatozoa and inability to sustain an erection (impotence) are managed using medication.

There are many barriers to effective and affordable biomedical infertility care in developing countries like Ghana that have poor reproductive health indicators. Infertility treatment and resources are lacking in the formal health sector due to more urgent, life-threatening public health issues like maternal mortality and the unmet need for infertility treatment remains large (Kadaaga, 2014).

Where infection is the leading cause of infertility, prevention will help far more couples, at less expense, than treatment (Sciarra, 1994) as cited in PATH, (1997). In this case, reducing the prevalence of STIs and associated cases of PID calls for complementary prevention and management interventions, preferably integrated with existing reproductive health services. In many settings, informing men and women that STIs may cause infertility at the same time as encouraging them to take preventative measures and seek treatment when symptomatic has proved useful (PATH, 1997).

Fertility medications such as clomid or injectable gonadotropins are used to increase the number of eggs available for fertilisation, either naturally or with intrauterine insemination, or in vitro fertilisation (IVF). The use of IVF allows us to bypass pelvic/tubal problems, and also increases fertilisation in cases of severe sperm related abnormalities. When the issue is diminished, ovarian function, egg donation is an option for those with secondary infertility (Goldstein, 2011).

Reducing the incidence of postpartum infections can be achieved through ensuring safer birth practices, including training traditional birth attendant show to ensure hygiene during deliveries, and by developing mechanisms to help women with potentially complicated deliveries to deliver in clinics.

The most effective ways to reduce post-abortion infections are (1) to promote family planning, because effective contraception eliminates the need for abortion; (2) to provide treatment for post-abortion complications at a variety of health facilities; and, (3) where the law allows, increasing access to safe pregnancy termination services. Where other diseases are a common cause of infertility, aggressive campaigns to control their spread may have an impact. For example, reducing the incidence of tuberculosis or treating affected women before TB spreads to the genital tract would prevent many cases of female infertility in India.

Likewise, testicular biopsies of Nigerian and Ghanaian men who have a high incidence of inflammatory lesions, suggest that efforts to control and treat schistosomiasis would reduce levels of male infertility in addition to female infertility in these countries.

Infertile individuals adopted both healthy and unhealthy coping mechanisms. Acceptance of the situation and remaining faithful whilst praying to God for mercy was widely reported among Christians and some Moslems. Another healthy coping strategy that was also reported in both individual interviews and FGDs was redirecting their energy into economic ventures. This was another way to earn respect in society. However, many reported unhealthy coping strategies. Social isolation, abuse of alcoholic beverages, and engaging in sex with multiple partners were widely reported among men (Tabong & Adongo, 2014).

Counselling, both in terms of the provision of pertinent information and in terms of giving psychosocial support, constitutes an essential element of infertility care. It has been stated that information and counselling should be accessible for people with infertility problems, even in the absence of treatment options (WHO, 1993; Dyer et al., 2004; Sundby & Larsen, 2006 as cited in Gerrits & Shaw, 2010).

2.10 Prevention of infertility

Olooto et al. (2012) came out with the following preventive measures against infertility.

1) Maintaining a healthy lifestyle: Excessive exercise, consumption of caffeine and alcohol, and smoking (tobacco and marijuana) are all associated with decreased fertility, hence should be avoided. Eating a balanced and nutritious diet, fruits and vegetables and maintenance of normal body weight are associated with better fertility.

2) Preventing or treating existing diseases: Identifying and controlling chronic diseases such as diabetes, hyperthyroidism and hypothyroidism increases fertility. Regular physical examinations help to detect early signs of infections or abnormalities.
3) Sexually transmitted diseases can be prevented by abstinence from sex or the practice of "safer sex" strategies for people having multiple sex partners, and the correct and consistent use of barrier contraceptive methods.
4) Prompt treatment of STIs.
5) Not delaying parenthood: Fertility starts to decline after age 27 and drops at a somewhat greater rate after age 35 (Carl, 2007).

2.11 Barriers to Treating Infertility

Existing barriers and problems in the treatment procedure causes infertility to be considered as a kind of life crisis, a chronic disease, harm and a cause of distress in these people (Diamond et al., 1999; as cited in Leila et al., 2014).

There are many barriers to effective and affordable biomedical infertility care in developing countries like Ghana that have poor reproductive health indicators. Infertility treatment and resources are lacking in the formal health sector due to more urgent, life-threatening public health issues like maternal mortality and the unmet need for infertility treatment remains large (Kadaaga, 2014).

There are various barriers to accessing infertility treatment. These barriers include cultural barriers, socio-economic barriers and inappropriate or inadequate professionals to treatment of infertility. Economic barriers include the high costs associated with more advanced techniques such as hormone assays, sperm analysis, hysterosalpingography or laparoscopic procedures. Wu

et al., (2012) pointed out that infertility treatment cost imposes great economic burden on families and health systems. The study further indicated that most social insurance systems usually reject infertility treatments due to the high costs associated with them.

While the general public may think that infertility treatment is cost prohibitive for most couples, it turns out that emotional reasons are the biggest barriers keeping infertile patients from undergoing fertility treatment and over 50 percent of infertile couples never talk to their doctors about their fertility challenges. The ones who are willing to talk to their primary care doctor or their general OB/GYN do so hesitantly. And 20 percent wait two years before they are willing to make an appointment with a fertility specialist (Hinckley, 2016).

Existing problems in the treatment procedure especially cause the appearance of impulsive behaviours, scattered wrath, depression, feeling of helplessness, worthlessness, incompetence, anxiety and negative beliefs towards themselves within and after long-term and sometimes unsuccessful treatments Burns, (2007) as cited in Leili et al., (2014). Sometimes these stresses, helplessness and mental problems can underlie the discontinuation of treatment (Leili et al., 2014).

Furthermore, even if diagnosis is made, modern reproductive technology is generally not available. For the majority of women, the cost of such treatment is out of reach and this inability to receive appropriate infertility treatment has far reaching consequences (Culley, Hudson & Van Rooij, 2009).

While economic barriers are likely to be significant for many minority couples, there is also the possibility of cultural religious beliefs effectively restricting demand for treatment, either because fertility treatment is regarded as unacceptable or because culturally appropriate

alternatives (e.g. informal adoption, remarriage, acceptance etc.) are promoted (Culley, Hudson & Van Rooij, 2009).

The American Society for Reproductive Medicine (2015) indicated that economic barriers are not the only impediments to accessing infertility care. Chief among the noneconomic barriers are cultural and societal factors. The research noted that communication differences, cultural stigmas (including male and female aversion to being labelled ‘‘infertile’’), cultural emphasis on privacy, and unfamiliarity or prior bad experiences with the medical system of a country can discourage members of certain racial, ethnic, or religious groups from seeking care for infertility (Armstrong and Plowden, 2012; Bell, 2010; Cordasco, 2011; McCarthy-Keith et al, 2010 and White et al., 2006). Language differences may also discourage some patients from seeking infertility health care. Physicians may consciously or unconsciously make assumptions or possess biases about who deserves to be a parent and who wants or deserves treatment (White et al., 2006).

In a systematic review of 22 studies carried out on the reasons of treatment discontinuation included: Treatment delay (39.18%), unknown cause (19.17%), physical and mental burden (19.07%), mental burden (14%), physical burden (6.32%), personal problems (16.67%), personal reasons (9.27%), communication problems (8.83%), refusal of treatment (13.23%), organizational (11.68%) and clinic (7.71%) (Gameiro et al. (2012) as cited in Leili et al., 2014).

Another obstacle is the burden of pursuing infertility treatment, particularly cycle-based treatments. In addition to being able to afford treatment, the patient must be able to take substantial time off from work for office visits and be able to travel to medical facilities that may be far (Wu et al, 2013 and Missmer et al., 2011). Many treatments require repeated visits and the ability to follow complex medical instructions (Nachtigall et al., 2009). There is growing public

health awareness that the distributions of health care centres are inaccessible to many communities (American Congress of Obstetricians and Gynaecologists, 2013; RESOLVE, 2015). Therefore, geographic unavailability can hinder several from seeking or obtaining treatment.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

According to Kumekpor (2002) research methods are the processes applied in an attempt to ascertain what we want to know. Research methods are, therefore, concerned with how we go about discovering what we want to know. Therefore, in order to attain a reliable inferences concerning what the researcher wants to know, the chapter discussed the following issues: profile of the study area, the research design, the study design, study population, sources of data, sampling techniques, sample size determination, tools for data collection, ethical considerations and data analysis.

3.2 The Study Area

The study was conducted in Tamale Metropolis in the Northern Region of Ghana. The twenty (20) largest communities in the metropolis were purposively sampled for the survey. These are located in and around the metropolis and thus are cosmopolitan in terms of the populations, as well as urban and periurban in terms of setting. Purely urban and purely peri- urban community were purposively selected for the study. However, due to limited logistical reasons, the survey was completely conducted only in eighteen (18) of these communities.

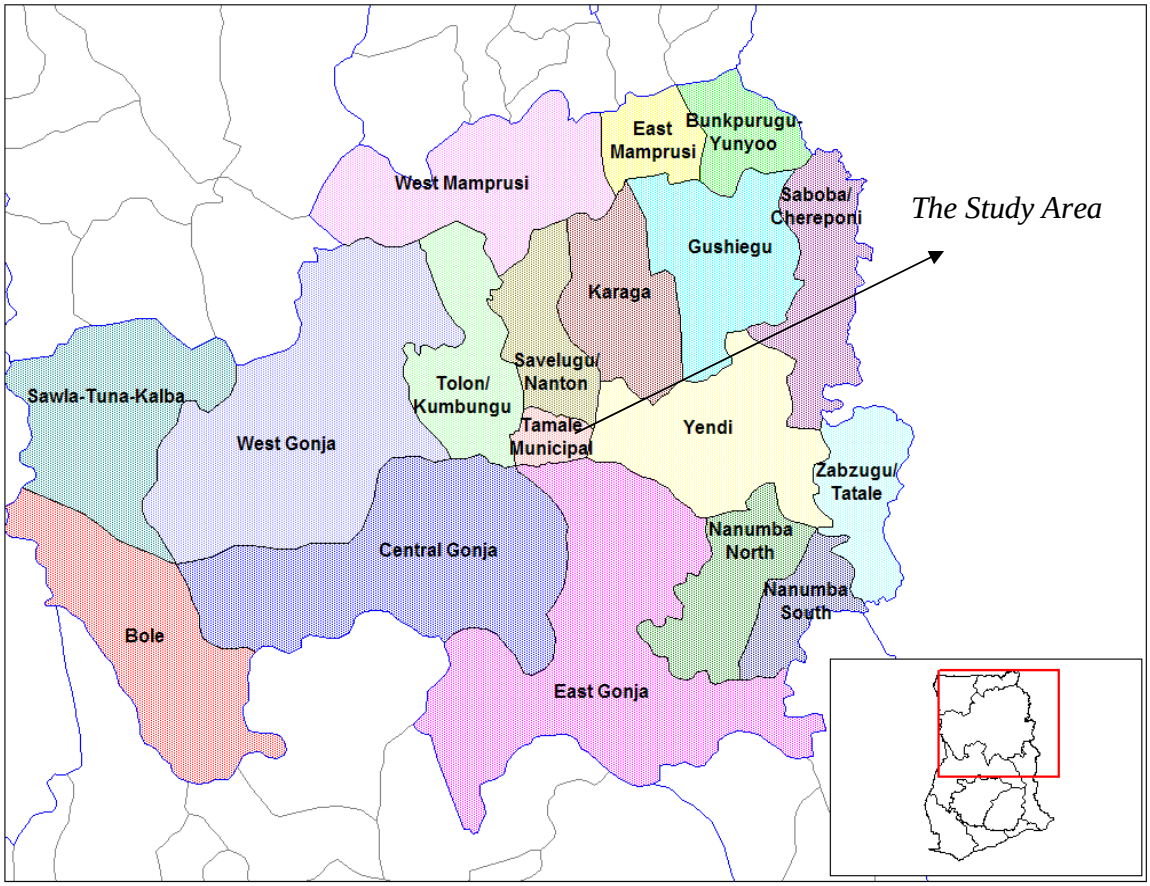
3.2.1 The Geography of the Study Area.

The Tamale Metropolis, which is located at the centre of the northern region of Ghana (see Fig.1.3), has a population of approximately 371,400 inhabitants according to projections from the 2010 Population and Housing Census (GSS, 2012). This represents about 9.4 percent of the region's population, and comprises about 49.7 percent males and 50.3 percent females. This implies that, women constitute about 186,814 of the population as against men who constitute

184,586. About 81 percent of the metropolis population lives in urban localities as against 19 percent living in rural localities (GSS, 2012). Dagombas form the major ethnic group in the metropolis. In addition, there are Mamprusis, Gonjas, Dagaabas, Akans, Ewes, and people from the Upper East Region. The estimated total fertility rate of the metropolis is 2.8. This is slightly lower than the regional fertility rate of 3.5. The general fertility rate is 79.9 births per 1000 women aged 15 to 49 years (GDHS, 2008).

About 48.6 percent of people who are 12 years and older are married (Ghana Statistical Service (GSS), 2014) in the Tamale metropolis. The bearing of children in the area is seen as a means of both continuing genealogy and economic security at old age. There are a few private clinics within the metropolis that deal with gynaecological problems including the provision of fertility services.

Fig. 3.1: A map of the northern region of Ghana showing the Tamale metropolis



The population 11 years and older, 60.1% had literates and 39.9% are non-literates. The proportion of literate males 69.2 percent of men is higher than that of females (51.1%). Of the population 15 years and older, the higher proportion (33.0%) are engaged as service and sales workers, 21.5 percent are employed in craft and related trade work, 17.6 percent are in agricultural related work and 8.1 percent are professionals. A higher proportion of females are self-employed without employees (70.5%) than males, 51.3% (GSS, 2014). This implies that a majority of women are daily, busily seeking their source of livelihood and this may affect their fertility status because of the work related stress.

3.3 Research design

The mixed methods research design was used for this study. The mixed research design is a design which involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone (Creswell and Plano Clark, 2007). One of the main reasons for the usage of this design was based on the fact that the study objectives required the collection of both quantitative and qualitative data. The results from the methods may validate each other and provide stronger evidence for a conclusion.

The study design was the descriptive and crosses sectional approach with the purpose of examining the factors influencing secondary infertility among women in the Tamale metropolis. A descriptive research begins with a well-defined subject; conducts a study to describe accurately the outcome in detailed the vivid picture of the subject (Neuman, 2007).

Descriptive research aims at describing social systems, relations or social events and providing background information about the issue in question and also to stimulate explanations (Sarantakos, 1988). The researcher main purpose was to collect data to answer questions pertaining to the phenomenon. The merits of the design was that it gives clearer view of the situation and therefore gives accurate descriptions thus enhances decision making concerning the problem under study. Manipulation of variables is curtailed in using this design (Neuman, 2007).

The study was also exploratory because, it was a small-scale study of a short duration where little is known about the situation on the ground. According to Babbie (2007), exploratory

research is the study that is conducted to explore a topic to enable the researcher to better understand the topic.

3.4 Study Population

Best and Kahn (1995) describe study population as any group of persons that have one or more features in common that are of concern to the investigator. As far as this study was concerned, the study units included women who are within the reproductive age group (15 – 49) and had secondary infertility problems. Key informants such as medical doctors, midwives and traditional birth attendants (TBAs) were also considered for the study.

3.5 Sampling Procedures and sample size

Communities were selected based on quota sampling technique because quotas of respondents were taken from each of the communities in the Tamale metropolis. After a discussion with key community stakeholders including the Assemblymen and Community Health Volunteers (CHVs) during the community entry process, revealed an estimated number of 186,814 women in the Tamale metropolis (study area). To obtain accurate estimates of the major parameters; the socio-economic characteristics of respondents, their conception background, sexuality, use of contraceptives, infertility factors including, the causes and challenges, effects, the remedies or treatment options as well as the perception of the problem in the society, the sample size (n) was computed based on the sample size formula proposed by Scott M. Smith. This formula is specified as follows:

$$n = \frac{t^2(1-p)p}{m^2}$$

Where:

n = required sample size

t = confidence level at 95% (standard normal value of 1.96)

p = estimated prevalence of secondary infertility in the area. We assume a perceived prevalence of secondary infertility of 30% (standard value of 0.03)

m = margin of error at 5% (standard value of 0.05)

The computation is based on a sample frame of estimated 186814 women in the metropolis. Based on the above, the computed required sample size is:

$$n = \frac{(1.96)^2(1-0.3)0.3}{(0.05)^2} = \frac{3.8416(0.7)0.3}{0.0025} = 322.6944 \approx 323$$

$$n = 323$$

Therefore, the computed sample size based on the above is 323 but I increased the sample size to 400 that is 20 participants by 20 communities in order to have an equal number of observations per community and thus improves the statistical significance and accuracy of the result. The simple random sampling was used to units needed for data collection. However, only 358 questionnaires were completed.

3.6 Source of data

To secure reliable and accurate information of the research, both primary and secondary data was used. The primary data comprised of responses to self-administered questionnaires to women who had secondary infertility problems and interview guides to medical doctors, midwives and TBAs. The secondary data was sourced from the Tamale teaching hospital registry and any other necessary documents available.

3.7 Data collection instrument

The main instruments that were used for the collection of the primary data were a questionnaire for the women who had secondary infertility problems. Also, interview guide was employed to collect data from the medical doctors, midwives and TBAs. The items in the questionnaire were both open-ended and close-ended items and were divided into section. The first section of the instruments covered demographic characteristics of the women. The other sections were based on the specific objectives of the study.

3.8 Ethical consideration

Prior to the administration of the questionnaire and interviews a letter of introduction from the registrar of the university and the Allied Health Sciences Department of the University for Development Studies, and the Ethics Committee of the Faculty and the Ghana Health Service Ethics Committee. The consent of respondents in both the personal interviews and the key informant interviews were also obtained. Respondents were also assured of confidentiality with regard to their responses.

3.9 Data Analysis

After collection of the data, it was sorted, cleaned and coded. Descriptive statistics generated by the Statistical Package for the Social Sciences (SPSS Version 18) and excel using percentages and tables for the data analysis. A framework for the analysis was developed out of issues, which came out of the literature review and conceptual framework with the objectives of the study in mind. The parameters of the framework for the suggested standard of analyses consisted of the objectives of the study. Data analysis was presented by means of descriptive statistics through the use of tables, frequencies and percentages of the variables.

CHAPTER FOUR

RESULTS OF THE STUDY

4.0 Introduction

This chapter presents the results and the findings of the study. The findings are presented in four sections in accordance with the specific objectives of the study. The first section deals with the demographic characteristics of the respondents. The second section ascertains the sexual behaviour associated with women with secondary infertility in the Tamale metropolis. The third section investigates the causes of secondary infertility among women in the Tamale metropolis. The fourth section examines the challenges women with secondary infertility face in the Tamale metropolis and the last section assesses the common treatment options employed by women facing secondary infertility in their attempt to conceive.

4.1 Socio-Demographic Characteristics of respondents

In this section the general profile of the women covered by the survey is presented in Table 4.1. These results provide a suitable context within which the main findings of the study are discussed in chapter five and the associated implications drawn. The analysis is based on only sexually active women (15 -49 years) and where possible, we ensure that the women in the sample are exposed to having regular sexual intercourse due to their marital relationships or permanent cohabiting unions.

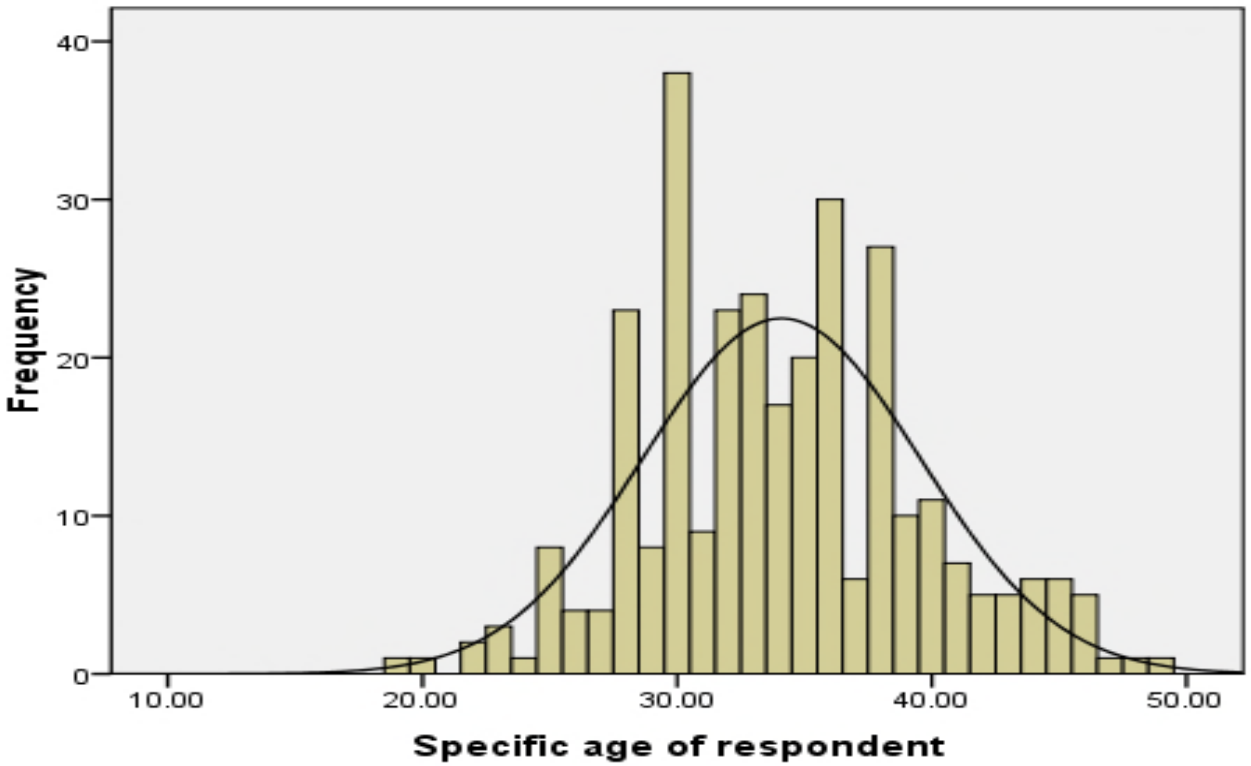
Table 4.1: Socio-Demographic Characteristics of Women with Secondary Infertility (respondents) in the Tamale Metropolis

Variable						
Age (years)	Up to 20	21 – 30	31-40	41-50	Don't Know	
N (%)	2 (0.6)	91 (25.6)	178 (50.0)	39 (11.0)	45 (12.6)	
Marital Status	Married	Single	Co-habitation	Widowed	Separated	
N (%)	348 (97.8)	2 (0.6)	3 (0.8)	1 (0.3)	2 (0.6)	
Educ. Level	No School	Primary	Secondary	Tertiary	Other	
N (%)	213 (60.5)	82 (23.3)	48 (13.6)	9 (2.6)	1 (0.3)	
Major Occupation	Salary worker	Farming	Trading	Casual labourer	Artisan	Other
N (%)	25 (7.0)	3 (0.8)	251 (70.3)	4 (1.1)	45 (12.6)	29 (8.1)
Yrs in marriage	1-5	6-10	11-15	16-20	Over 20	
	44 (12.5)	98 (27.8)	98 (27.8)	63 (17.8)	50 (14.2)	

Source: From Survey Data, 2015

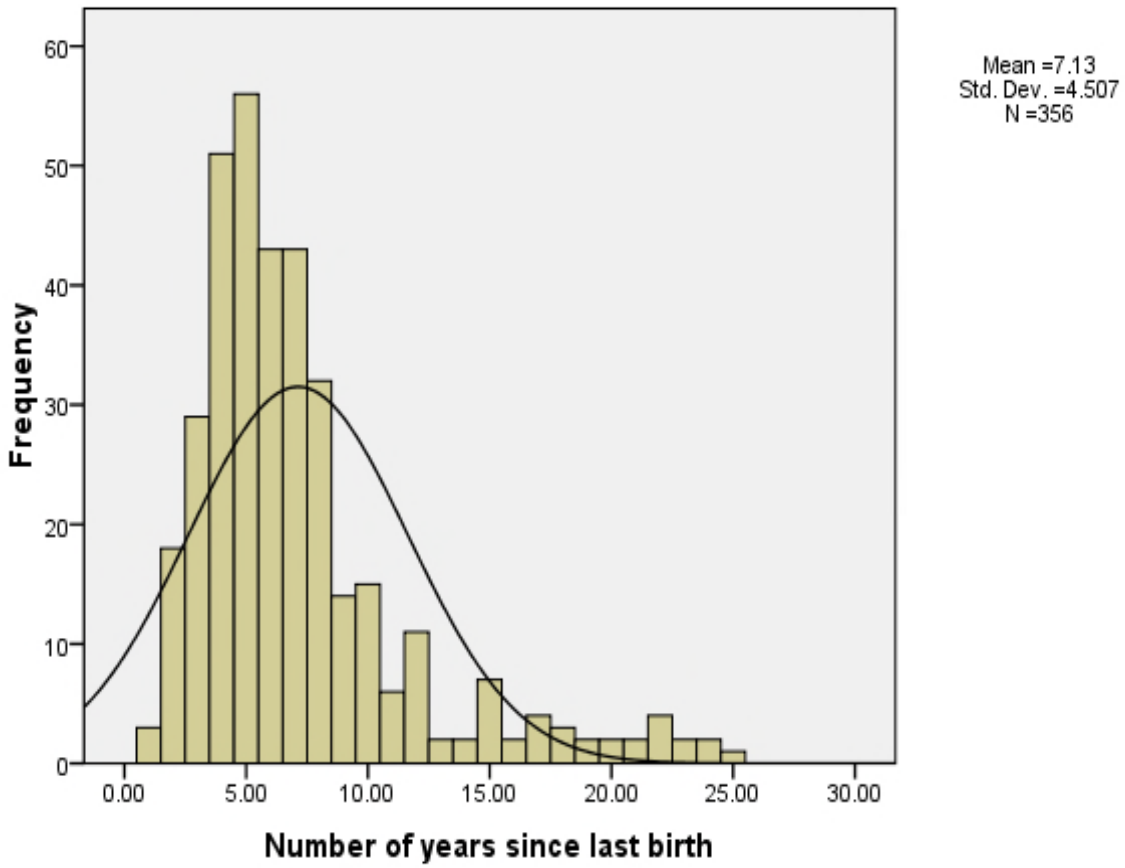
The ages of the women who constituted the sample for the study ranged from a minimum of 19 years to a maximum of 49 years, averaging 34 years. Whereas there are women in their teenage age brackets facing the problem of secondary infertility, a majority (61%) of women with secondary infertility are those who are above 30 years of age as shown in Fig. 4.1. As reported in earlier sections, a woman's age is one of the most determinants of her fertility, especially of secondary infertility. As observed practically, couples who after a first child postpone the efforts to achieve another conception because of the expectation that a second conception will occur automatically often get disappointed if this does not turn out to be so. In this study, more than 50% of the respondents are aged between 30 and 40 years.

Fig. 4.1: Age distribution of women with secondary infertility



Averagely, the length of time within which the respondents faced the problem of secondary infertility ranged from 1 – 25 years, averaging 7 years. The majority of the women (about 71.6%) faced the problem of secondary infertility for 5 years or more as illustrated in Fig. 4.2.

Fig. 4.2: A distribution of years of secondary infertility among women in the Tamale metropolis



Source: field survey, 2015.

As noted by Goldstein (2011), the natural decline in ovarian function is the single most important factor in fertility, and it is thus important to realize that women are born with all of the eggs they will ever have. And as a woman ages, the egg quality decreases, and the chances of miscarriage increases.

4.2 The sexual behaviour of women with secondary infertility (respondents) in the Tamale metropolis of the northern Region of Ghana

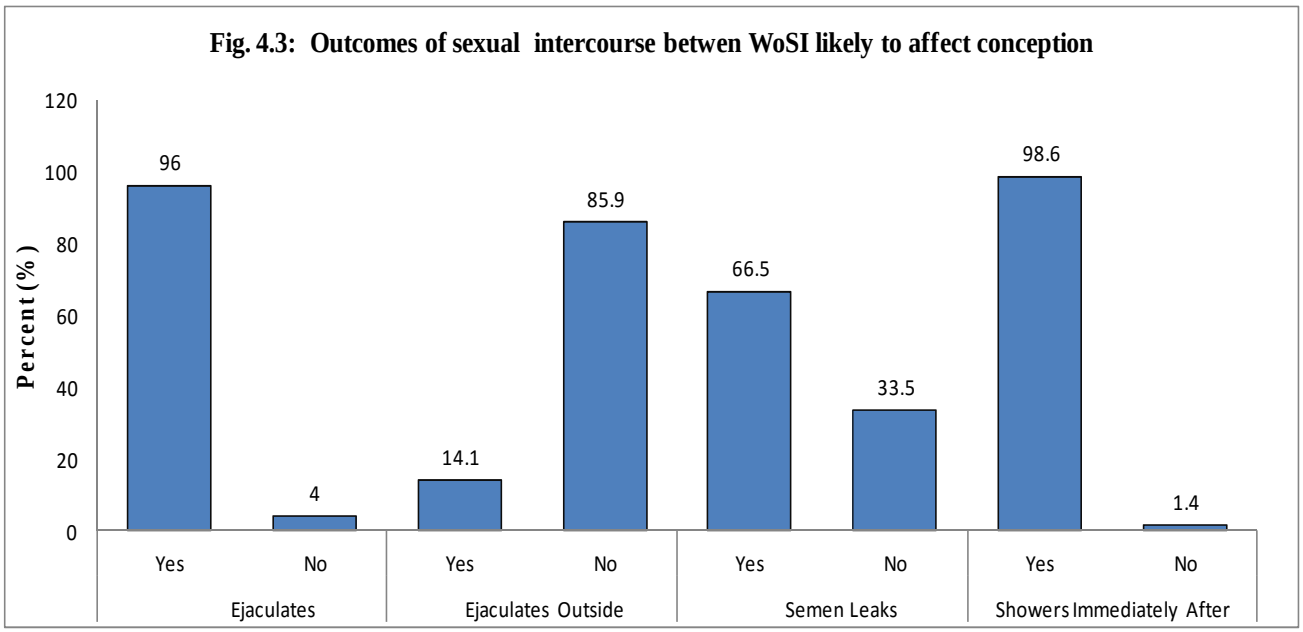
This section presents the result of the first objective. Generally, the higher the frequency of sexual encounters a woman has and the better she feels about the quality of her sexual life, the higher the likelihood for her to conceive. The reverse holds true. Based on this fact, the study obtained data on the frequency of self-reported sexual intimacy by respondents with their spouse per given periods of time and the self-rating of the respondents of the quality of these sexual intimacies. The results are presented in Table 4.2 below.

Table 4.2: Self-reported frequency of sexual intimacy by respondents in the Tamale metropolis

Rate (Number/Week) (N = 354)	Frequency	Percent (%)
Once	72	20.3
Twice	116	32.8
Thrice	96	27.2
Four Times	27	7.6
Other (Once a month/two months)	43	12.1
Subjective Self-rating of Quality Intimacy (N=351)		
Less Adequate	60	17.1
Adequate	255	72.6
More than Adequate	33	9.4
Other	3	0.9

Source: field work 2015.

In addition to the self-reported sexual activity by the women with secondary infertility in the study area, the outcomes of their sexual intercourse with their husbands or partners was also obtained and analysed by the study. The results of this analysis are presented in Fig. 4.3 below.



Source: field work 2015.

4.3 Causes of secondary infertility among women in the Tamale metropolis

This section discusses issues regarding the second objective which investigate the various causes of secondary infertility among women in their reproductive age groups in the Tamale metropolis. The analysis is meant to respond to the objective two of this study which aims at investigating the causes of secondary infertility among reproductive women in the study area.

The major causes of female secondary infertility are problems related to physical and psychological stress (36.7%), disorders in the menstrual cycle (19.2%), complications arising from the use or misuse of contraceptives (16.1%), problems associated with specific food substances (5%), infrequent/widely-spaced sexual intercourse (5%), male factors such as low sperm count and semen volume (4.4%), sexually transmitted infections (4.4%), old age (3.1%), fibroid or problems with the uterus (2.5%), deficient diet or malnutrition (1.9%) and complications arising from unsafe abortion (1.7%). The results on these causes are presented in Table 4.3.

Table 4.3: Perceived causes of secondary infertility among women in the Tamale metropolis

Causes	Frequency	Percent (%)	Rank
Stress/Illness	132	36.7	1
Irregular Menses	69	19.2	2
Contraceptives	58	16.1	3
Food Chemicals	18	5.0	4
Inadequate Intimacy	18	5.0	4
Low Sperm Count	16	4.4	5
STIs	16	4.4	5
Age	11	3.1	6
Fibroid	9	2.5	7
Deficient Diet	7	1.9	8
Abortion	6	1.7	9

Source: field work, 2015

It can be seen that over a third of the respondents attribute the problem of secondary infertility to psychological stress or related physiological illnesses. Whereas having this problem in society like the Tamale metropolis where childbearing is very important, is a potential source of stress and physiological imbalances, the physical and emotional energies spent in finding solutions to these problems result in huge psychological and physiological effects on the fertility status of affected women (and men).

The above result agrees with the findings of the University of Harvard (2009) that about one-third of the time a physiological problem is identified in the woman facing the problem of infertility, with affected persons reporting that infertility was the most upsetting experience of

their lives. Moreover, it was revealed that women with infertility felt as anxious or depressed as those diagnosed with cancer, hypertension, or recovering from a heart attack.

The second most important cause of infertility as reported by about 19% of the respondents is menstrual disorders such as irregular ovulatory and the menstrual cycle. Irregular menstrual cycles are an indicator that ovulation is not occurring in the regular, natural way. This then affects both the chance of conception and planning to conceive.

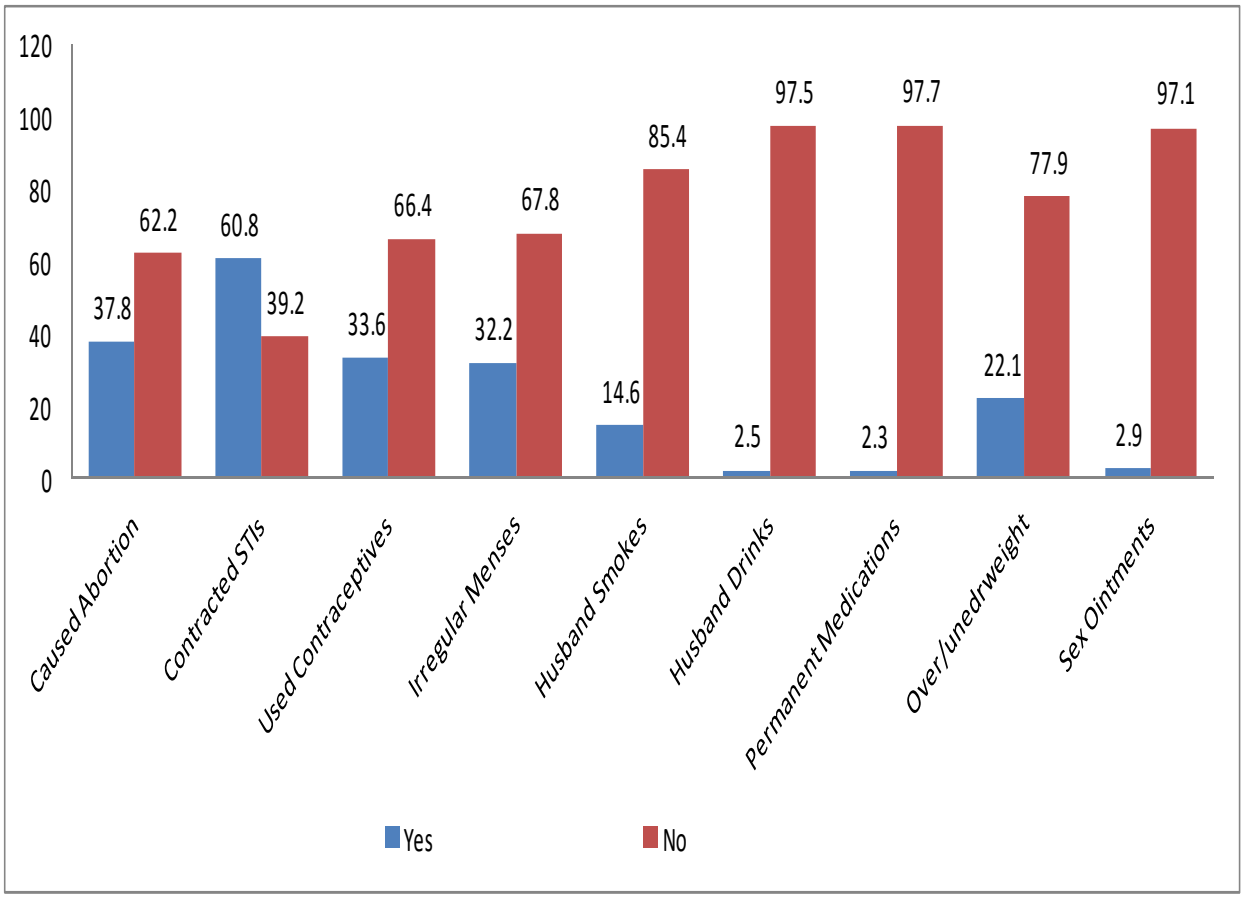
Another important self-reported cause of secondary infertility by the respondents is the use of contraceptives. This was reported by about 16% of the respondents. A significant proportion of women in Northern Ghana and in the Tamale metropolis are of the wrong perception that infertility in both women and men is caused by the use of contraceptives. Whereas female infertility is believed to be directly caused by use of contraceptives, male infertility on the other hand is understood as arising from female use of contraceptives. Thus the use of contraceptives as a birth control measure is often shunned by some couples in the metropolis.

The male factor, fundamentally reported as low sperm count was reported by just 4% of the respondents. This small proportion of respondents reporting this cause may be those who are educated or have already sought medical treatment alternatives to the problem and who are thus better educated on the causes of infertility. These factors are more elaborately discussed in the following sections.

4.3.1 Challenges women with secondary infertility face in the Tamale Metropolis

This section presents the underlying risk factors likely to influence secondary infertility. These are either factors directly associated with the respondents or their spouses, and include the use of contraceptives, STDs, previous abortions, nature of the menstrual cycle, lifestyles of the respondents' husband such as drinking and smoking, as well as the use of sex relieving substances or mentholated creams and ointments such as like Robb and Vaseline. The results are presented in Fig. 4.4.

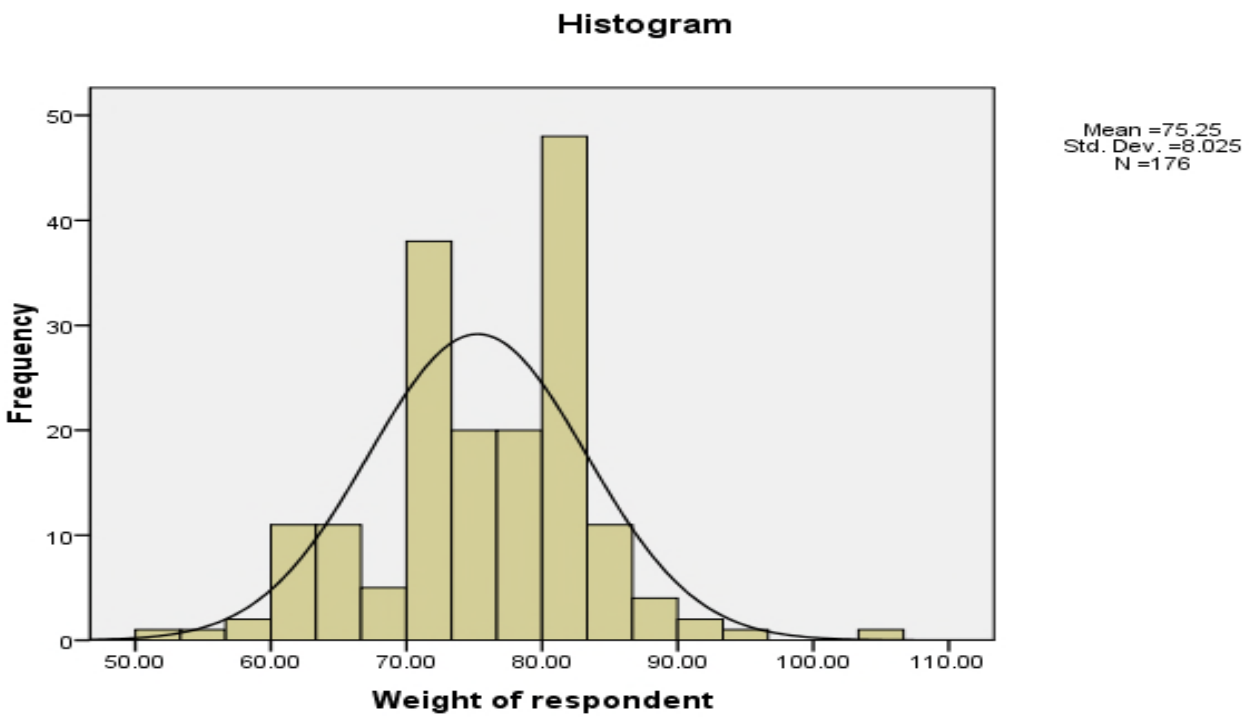
Fig. 4.4: Potentially modifiable risk factors of secondary infertility (%) among respondents in the Tamale metropolis



Source: field work, 2015.

As can be seen in the Fig. 4.4, the above risk factors have the potential of affecting the sexual and reproductive life of the spouses facing this problem either directly or indirectly. For instance, about 37.8% of the respondents ever caused abortion; about 60.8% of them ever contracted STIs; about 33.6% ever used contraceptives; approximately 32.2% experience irregular menses; around 14.6% of the husbands of respondents smoke; while over or underweight is found among 22.1% of the respondents partners. The role of these factors as determinants of fertility will be elaborated in the next sections.

Fig. 4.5: Weight distribution of respondents in the Tamale Metropolis (in Kg)



Source: field work, 2015.

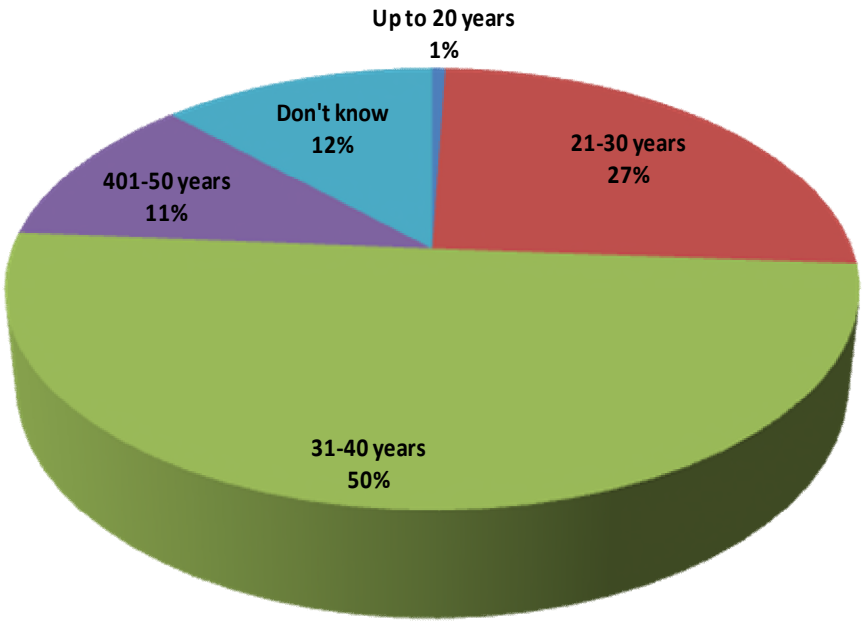
Even though obesity and overweight are not common conditions among the majority of women in the Tamale metropolis, over-weight or underweight among reproductively active women implies many infertility consequences. The study revealed that among the population of women

with secondary infertility problems, the proportion of obese women is higher than is the case among the general population.

Several empirical studies have been able to link over-weight and underweight to disorders of menstruation, infertility, and diabetes mellitus in pregnancy and other problems (Sharpe and Franks, 2002 s cited by Normn et al., 2004). Moreover, polycystic ovary syndrome (PCOS) is a condition characterized by hyperandrogenism and menstrual disturbances, further complicates the issue (Norman et al., 2002 in Norman et al., 2004).

As the age of giving birth is increased, the reproductive capacity is decreased, the ovary becomes less efficient, the frequency of sexual intercourse is decreased and the possibility of chromosomal abnormalities and miscarriage is increased (Roupa et al, 2009). In Fig. 4.6, the desire to conceive is lowest among women less than 20 years of age and highest among respondents in their 31 - 40 years age bracket. Thus the problem of secondary infertility most likely becomes more critical with the increase in the age of the affected woman. Whereas early childbirth is associated with the woman likely to have many children, delayed childbirth on the other hand may lead to secondary or even primary infertility. In most cases, overweight and age may be correlated.

Fig. 4.6: Age-specific proportion of the desire to conceive among WoSI in the Tamale metropolis



Source: filed work, 2015

The other lifestyle factors such as eating habits, drinking, smoking and psychosocial stressors are equally important in terms of the implications they have for secondary infertility.

4.4 Social Correlates of women with secondary infertility (Respondents) in the Tamale metropolis of the northern Region of Ghana

This section presents the findings on the social consequences of infertility, namely the self-rated relationship of the affected woman with the community, the extended family, parent in-laws, her direct biological relations (parents and siblings), and her peers in the community or in any *Asungtaba* associations (women groups). The findings on the above attributes are presented in Table 4.4.

Table 4.4: Self–rated social correlates of secondary infertility among respondents in the Tamale metropolis

Self-Rating	Bad or stressful		Good or Respectful		Cordial		Very Cordial	
N (%)	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Community	10	2.9	35	10.1	275	79.7	25	7.2
Extended Family	15	4.4	39	11.3	249	72.4	40	11.6
Husband/Partner	11	3.2	41	12.0	157	45.8	134	39.1
Parents In-laws	20	6.2	32	10.0	219	68.2	48	15.0
Brothers & Sisters In-laws	15	4.6	28	8.6	252	77.5	30	9.2
Own Parents & Siblings	0.0	0.0	4	1.2	163	48.2	171	50.6
Women groups or other Associations	3	1.0	3	1.0	222	76.8	59	20.4

Source: field work, 2015.

It has been established that, the attitude of a woman towards family income, the quality of her family and social relations, lifestyle, economic quality of life, nutrition, and intimacy determine her fertility status and thus her ability to conceive to a large extent. The purpose of a woman's quality of life in this regard thus has a role in helping us understand the problem of secondary infertility in its wider dimension.

The results from the data obtained through the in-depth interviews show the highest proportion of the affected women reporting of a cordial relationship between them and members of their communities (79.7%,), their extended families (72.4%), their husband or partners (45.8%), their

parent in-laws (68.2%), brothers and sisters in-laws (77.5%) and women groups or other associations members (76.8%). In terms of their relationship with their own parents, the highest proportion of the women reported that they have very cordial relationship representing 50.6%, while about 39.1% reported having very cordial relationships with their husbands and partners.

Because childbirth in the Ghanaian culture is very important, most of the respondents reported that they feel highly insecure and lonely in their marriages because of the problem of secondary infertility. This is especially the case where the first child did not survive. The affected women reported that they may be divorced as has happened to other women in similar conditions or be forced to live in polygamous marriages as a result of their partners marrying a second wife because of their situation.

In addition whereas affected women often enjoy supportive relationships with their own family members and close friends, most of them reported their relationships with their parents' in-laws and other friends also often strained. Most family members of the husband often tend to blame the affected women for the problem even if the infertility is not caused by the female factor in that particular situation. Among other friends, affected women may become subjects of scorn, ridicule and gossips.

4.5 Some statements of some respondents in some communities quoted in verbatim

The following statements were qualitative information gathered on the field with some women in the selected communities for the study. During a personal interview with them they reported their frustration and the challenging they are going through as a result of their in ability to give birth to a child. They reported as follows:

"The extended family of my husband makes remarks that are unhealthy about my situation and my parents in-laws especially are putting pressure on me to give birth quickly. But for the encouragement of my parents and siblings, the negative comments and attitude of the extended family of my husband would have been too difficult for me" – A respondent from Gulkpegu.

"Within the extended family of my husband, I cannot even dare touch or more so send a child on an errand without getting rebuked. I am seen as an odd fellow in the extended family of my husband"- A respondent from Dohinayilli.

Another woman in the same suburb reported that her relationship with her husband is full of quarrels, while her brothers and sisters in-laws make funny remarks about her.

"*My parents-, brothers and sisters in-laws think that the failure to conceive and give birth is a weakness on my part; and are thus not AT ALL happy with my situation. My own family members however know that I am able to give birth but the problem of infertility is from my husband*"- Another respondent from Dohinayilli.

In the Mossi Zongo community, a woman reported that her parents' in-laws sometimes abuse the husband and her for their situation, while the siblings of her husband suggest options to him to her detriment.

Another respondent also reported as

"My relationship with my husband, who has children with my co- wifel, is very bad because of my inability to give birth. His reason is to force me to leave the marriage so that he will be with my co-wife and her children only" – A respondent from Tishegu.

Also in Mossi Zongo community, the relationship of an affected woman with her husband is good and her husband collaborates with her in seeking solutions. In another case, the relationship of a woman with her husband is so bad that he sees sexual intercourse with her as a "waste of time".

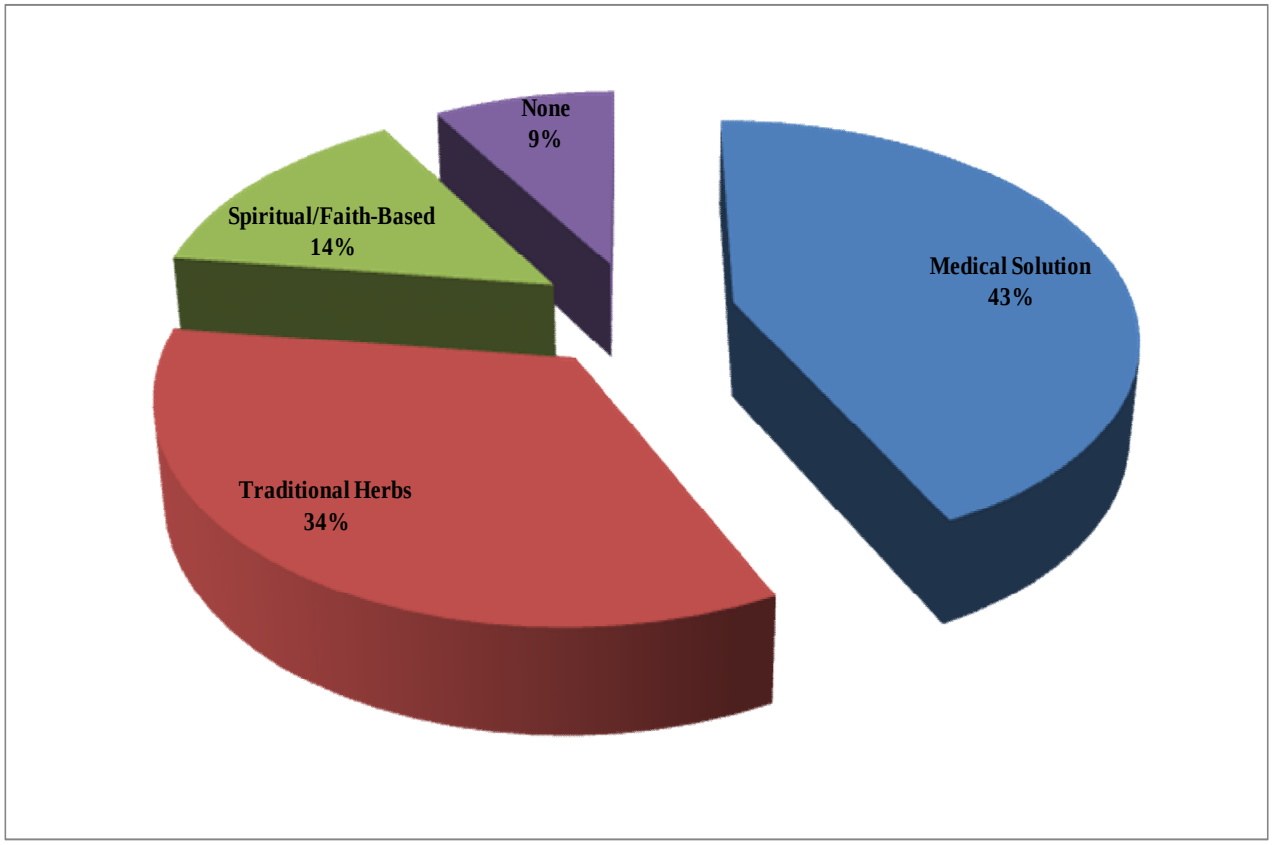
Some other examples of verbal and psychological abuses that respondents face include being asked insulting and mockery questions such as *"man daa mi la a daa mari la pua, kawula a dogi mi yoo?* , which translated from Dagbani means "*I thought you were pregnant, have you given birth now?*".

4.6 Common treatment options employed by women facing secondary infertility in their attempt to conceive

Largely four major treatment options were identified among women with secondary infertility in the Tamale metropolis. About 43% of the affected women attend medical facilities or infertility clinics to seek solutions for their infertility; while about 34% of the women seek to treat infertility using traditional methods that largely employ the use of herbs. In addition, about 14% of the respondents seek spiritual or faith-based solutions to the problem of infertility, while about 9% do not make any attempt to treat their condition.

These results are presented in Figure 4.7.

Fig. 4.7: Major treatment options employed by women facing secondary infertility in the Tamale metropolis



Source: Plotted from Survey Data, 2015

Because of their desire to have more children, women facing the problem of secondary infertility seek solutions to the problem in various ways. As shown above, the majority of the women use biomedical treatment for the problem of infertility. The specific methods they employ in this regard vary with the specific cause. When the infertility problem is due to simple infections, the treatment may involve the use antibiotics to get cure. If it is linked to a lifestyle effect like

smoking, diet, or drinking, it may require a lifestyle change to treat it. In the case where the problem lacks identifiable causes, biomedical solutions based on the advice of experts may involve a change in sexual lifestyles or increased frequency of sexual intercourse with the woman's menstrual cycle.

4.7 Experts' views on the problem of secondary infertility among women in the Tamale metropolis

One of the medical experts defined secondary infertility as the inability of a couple to achieve a clinically recognizable conception or pregnancy after having stayed together and engaged in regular sex for a minimum period of one (1) year. This couple should have conceived before but which might have ended in a baby, a miscarriage or an abortion. According to another medical expert, secondary infertility is the inability for a couple to achieve pregnancy after unprotected sex by the couple of about 12 months after the first conception. Another expert views secondary infertility as the case where a woman who in her reproductive age delivers before but is subsequently unable to conceive again despite the desire to do so.

Infertility was reported to be prevalent in the Tamale metropolis and to affect both younger (i.e. under 30) and older (i.e. over 30) women in their reproductive age. The incidence of secondary infertility is reported to be "alarming", with consultations being daily and constituting about 35% of the patients weekly', one medical expert reported.

The Fig. 4.8 below presents the views of the key informants, who are medical experts working in infertility clinics or with reproductive health units or in the major hospitals within the metropolis.

Fig. 4.8: Expert views of the underlying and primary causes, effects and treatment options of secondary infertility

Underlying causes

Overweight
Polygamous marriages
Drinking
Distance Marriage
Chronic illnesses
Hormonal dysfunctions
Sexual enhancing herbal products/bitters
Hostile cervical mucus
Irregular/infrequent sex
Smoking
Exposure to extreme heat
STIs
Age
psychological problems/stress
Abortion, illegal abortion
Spiritual

Primary causes

Male Factors - low sperm count, abnormal sperms, erectile dysfunctions, impotency
Female Factors - ovulatory dysfunctions, tubal blockage, spermacidal antibodies, STIs, Irregular menses, fibroid
Psycho-physiological factors - stress, anxiety, illnesses,

Effects

Within marriage: Divorce, rivalry, marital insecurity for self and child(ren), loss of spousal love,
In Extended Family: Verbal abuse, disregard, shunning, Hatred and lack of respect
In Community: Insults and verbal abusimnes

Treatment

Clomid (clomiphene citrate) and serophene
Advise on timing of sexual intercourse
Treatment depends on cause
Assisted reproduction (costly)

The results presented below encompass the underlying causes, primary causes, effects and treatment procedures of infertility. The medical experts reported that treated couples often get remedies to the problem after a period of one year depending on whether the problem is a minor or more serious case.

CHAPTER FIVE

5.0 DICUSSIONS

5.1 Introduction

This chapter presents the discussion of the results on secondary infertility among women, in the Tamale metropolis. This includes the general profile of the affected women, modifiable lifestyle, risk factors of secondary infertility, and social correlates of infertility, causes, treatment options and expert views of secondary infertility in the study area.

5.2 The Socio-Demographic Characteristics of Women with Secondary Infertility (respondents) in the Tamale Metropolis

In this section, the general profile of the women considered under the survey is discussed. The discussion provides a suitable context within which the main findings of the study were discussed and the associated implications drawn. It is based on only women at reproductive age (15 -49 years). Where possible it ensured that the women in the sample comprise only those who have regular sexual intercourse in marital relationships or in other forms of permanent unions or still the same have regular unprotected sexual intercourse for the purpose conceiving and having live birth.

The actual ages of the women who constituted the sample for the study ranged from a minimum of 19 years to a maximum of 49 years, averaging 34 years. As illustrated in Table 4.1, more of the slightly older women (above 30 years) reported secondary infertility than younger women (below 30 years). Thus, whereas there were women in their teenage age brackets facing the problem of secondary infertility perhaps due to abortion- or STIs-related consequences, a majority (61%) of women with secondary infertility are those above 30 years of age.

Consequently as expected, the problem of secondary infertility is most likely to occur in older women of over 30 years of age, i.e. those at the upper bound of the distribution (see Fig. 4.1) than in their younger counterparts below 30 years; i.e. those in the lower bound of the distribution in Fig. 4.1.

In the same light, the younger women probably in their first experience in their marriages might have issues with their partners at that initial stage of their marriage and so the incidence of secondary infertility would be reduced compared to their counterparts in the older age (above 30 years).

The above results support the views of Jumayev et al. (2012) that the chances of women in their reproductive age to conceive is reduced almost twofold after the age of 35 years. As the age of giving birth is increased, the reproductive capacity is decreased, the ovary becomes less efficient and the frequency of sexual intercourse is decreased. Ultimately, the possibility of chromosomal abnormalities and miscarriage is increased (Roupa et al., 2009).

From Table 4.1, it may be seen that almost all, about 97.8% of the women in the sample were married, with the remaining 2.2% being either single (0.6%), cohabitating (0.8%), widowed (0.3%) or separated (0.6%). This means that a majority of the women facing this problem in the Tamale metropolis are in stable marital relationships, and are thus most likely to have more frequent, unprotected sexual intercourse. In this way, these women have a higher likelihood to conceive all things being equal. These women are also more likely to be actively seeking solutions to this problem in order to secure their marriages.

In terms of marital status, the study found that about 75 (representing 21.2%) of the women were previously married before their present marriage; whereas 278 (78.8%) never married before and

are therefore in their first marriage. Of those women who had previously married, 66 (25.1%) had children from the previous marriage while 263 (74.9(%) had no children from the previous marriage. In fact over all, about 97.8% of the women under this study are married since having children within marriage is a most highly acceptable norm in the Tamale metropolis, in the Northern Region and in Ghana as a whole.

In addition, as reported in Table 4.1, about 87.5% of the respondents thus women faced the problem of secondary infertility following a long period of exposure to unprotected sexual intercourse i.e. after the 6th year of their marriage. Averagely, the length of time within which the respondents faced the problem of secondary infertility ranged from 1 – 25 years, averaging 7 years. The majority of the women (about 71.6%) faced the problem of secondary infertility for 5 years and more as illustrated in Fig. 4.2.

Even though the problem became perceptible after the birth of the last child, the higher percentage of respondents reporting this problem from averagely 5 years after the birth of the last child (averagely the 6th year of marriage upwards) shows that the problem of secondary infertility is prevalent and critical in the Tamale metropolis.

About 60.5% of women with secondary infertility in the Tamale metropolis have no formal education as against 23.0% with primary education; 13.6% of the respondents have secondary education and only 9.2% of them have post-secondary or tertiary level education. Since a demographic factor such as the educational level of a woman in her reproductive age is positively related with her knowledge of and ability to seek assisted reproduction treatment from accredited health institutions (Roupa et al., 2009), the fact that over 60% of women in the sample have no formal education implies a low likelihood of the respondents seeking medical solutions

from the right institutions. Moreover, most of the women affected by this problem would be less likely to seek solutions timely enough before their problem becomes untreatable. If this is true, then it explains the relatively high level of secondary infertility observed in the study area.

Petty trading or hawking forms the highest share of about 70% of the distribution of the occupational status of women with secondary infertility in the Tamale metropolis. This is followed by women working as artisans (seamstresses, hairdressers and batik tie and dye makers etc) representing 12.6%; those having other menial jobs representing 8.1% and women working in regular salary jobs constituting about 7%. The art of trading or hawking under the tropical heat is often associated with a lot of stress. As may be seen under the causes to be presented later, stress and stress-related factors have been identified in the literature as a major factor that affects the sexual behaviour, ovulation cycle and hence the conception ability of reproductive women.

5.3 The sexual behaviour of women with secondary infertility in the Tamale metropolis of the northern Region of Ghana

Choices imposed by the general and sexual lifestyles of women with secondary infertility (respondents) may affect their sex behaviour and reduce their level of fertility. For instance, the frequency of sexual intercourse of a woman (facing secondary infertility) and the disposition of her mind towards sexual intercourse may affect the probability of her conception. Generally, the higher the frequency of sex a woman has and the better she feels about the quality of such sex, the higher the likelihood for her to conceive. The reverse holds true. Based on this fact, the study obtained data on self-reported sexual intimacy by respondents with their spouse per week and the

self-rating of the respondents of the quality of these intimacies. The results are presented in Table 4.2.

Based on the results presented in Table 4.2, a majority, 239 (67.6%) of the women with secondary infertility indicated problems engage in sexual intercourse at least twice every week. However, a considerable percentage of 12.1% of the women engage in sexual intercourse less frequently i.e. once a month, twice a month or even once a year. Even though these sexually active women like their counterparts were in marital relationships where regular and frequent sex is expected, some of them reported that because of their inability to bear more children, their husbands consider sex with them to be a luxury and not a need or an obligation for them as husbands and also, "waste of time and energy". In this case, sexual intercourse between the couple becomes an emotionless routine. Moreover, in polygamous relationships, the husbands of affected women were also more likely to have a higher level of affinity to their wife (wives) more capable of giving him more children than the one who cannot. Consequently, secondary infertility may result in marital infidelity, separation or even divorce.

About a fifth (20.3%) of the women engages in sexual intercourse just once every week. For this group and the respondents with less frequent sexual intercourse, conception may be difficult as the women are more likely to miss having sex within their most fertile periods due to the relatively gaps between their sexual activities and the most likely successful ovulation window.

Unlike the findings on the frequency of the sexual intercourse by respondents, about 255 respondents constituting 72.6% regard the number of sexual intercourse they have per week as adequate whereas 17.1% reported that the number of their sexual intercourse per week is less

than adequate. About 9.4% of the respondents think the number of their sexual intercourse per week is more than adequate.

For the about 72.6% of respondents who feel good about the number of their sexual intercourse, conception should not be a major problem if they had no pathological hindrances to successful conception. It should be noted as reported above however that for an infertile couple with a longer period of exposure, sexual intercourse becomes a routine and there is a high likelihood of women in this situation to describe their sex life as good even if it is practically not so.

In addition to the self-reported sexual activity by women with secondary infertility in the study area, the outcomes of their sexual intercourse with their husbands or partners was also obtained and analysed by the study. The results of this analysis are presented in Fig. 4.2 below.

The above findings reveal that a high percentage (about 96%) of respondents' husbands ejaculate during sexual intercourse as against 4% of husbands who do not ejaculate during sex. Also, as to whether ejaculation is premature or not, 85.9% of the respondent's husbands or partners are reported not ejaculate prematurely as against 14.1% of them who ejaculate prematurely. Moreover, approximately 66.5% of the women noted that the semen of their husbands leaks out after sexual intercourse, and around 98.6% of the respondents take a shower immediately after intercourse. The outcomes reported above are likely to affect the ability of respondents to conceive. For instance, the 66.5% of the cases in which women reported leakage of semen after sex represents a case of low sperm volumes. This is reported to have a potential to reduce the potential of conception since the quantity of semen required to facilitate fertilisation following intercourse is insufficient.

The cases of premature ejaculation, semen leakage and women rushing to take a shower immediately after sexual intercourse represent risk factors likely to reduce conception by the affected women. To reduce this risk, sex therapy and education for affected women and their spouses may be required.

Douching and wash down immediately after sex performed by about 98.6% of the respondents also has the potential to negatively affect conception. This is done based on the perception of the women of sex as "dirty". Even though, the leakage of sperms from the vagina of most (66.5%) of the women may explain their rush to wash off immediately after intercourse, it shows that affected women seem not to know that the consequent effect of this behaviour is a reduction in their chances to conceive.

In the above situations, education is needed to inform affected women how to hold in their man or the semen to facilitate a possible fertilisation of the ovum. This education could be given in the form of tips as part of the medical-based fertility treatment given to affected couples.

5.4 Causes of secondary infertility among respondents

This section presents the various self-reported causes of secondary infertility among reproductively active women in the Tamale metropolis. The objective 2 of this study was to investigate the causes of secondary infertility among women of child bearing age in the study area.

The major, self-reported causes of female secondary infertility are problems related to physical and/or psychological stress (36.7%), disorders in the menstrual cycle (19.2%), complications arising from the use of contraceptives (16.1%), problems associated with specific food substances (5%), infrequent/widely-spaced sexual intercourse (5%), low sperm count and semen

volume (4.4%), sexually transmitted infections (4.4%), old age (3.1%), fibroid or problems with the uterus (2.5%), deficient diet or malnutrition (1.9%) and complications from unsafe abortion (1.7%). These causes are presented in Table 4.3.

Since the causes presented in Table 4.3 are self-reported rather than medical, they merely reflect the views of the respondents about the causes of infertility. Nevertheless some of the reported causes emanate from diagnosed medical causes by fertility experts.

Thus as noted above, it can be observed that the most commonly reported causes of secondary infertility in the study area, including the most highly ranked causes reported by the respondents are health-related. These together, namely stress or illness constituting more than a third (36.7%);, irregular menses representing 19.2%, sexually transmitted diseases (4.4%), low sperm count (4.4%), fibroid (2.5%) and complications arising from abortion (1.7%) constitute a total of 68.9% of the reported causes. The findings emphasises the need for the implementation of improved maternal care systems especially for low income families in the Tamale metropolis and in Ghana as a whole.

The evidence in Table 4.3 supports the findings of Roupa et al., 2009 and Gerritis and Shaw (2010) that STIs cause a large percentage of infertility in Africa. In this study, we suspect that the reported causes biased STDs which might have been wrongly reported as illness and which may be common in polygamous marriages as is the case in the predominantly Muslim population of the metropolis. Since a large percent (60.5%) of the women had no formal education, they probably could not differentiate between ordinary STIs and other fertility-related diseases in reporting the cause of the problem.

The problem of irregular menses or menstrual dysfunctions which is the second most highly ranked cause and representing about 19.2% of the respondents is expected to be common among the slightly older women of over 31 years. About 61% of the respondents make up this age group. A high level of unsafe abortion may also be expected from the high proportion of the women without formal education since these may not know the consequences of unsafe abortions on their reproductive health and where to get safe abortion, or may even not be able to afford safe abortion.

A relatively high percentage (16.1%) of the women also attribute the problem of infertility to the use of contraceptives including the pill, intra uterine devices, injection and condoms; food with spices such Maggi cubes is suspected to affect fertility negatively (5%); inadequate sexual intercourse with their husbands (5%); sex-related physiological deficiencies such as low sperm count (4.4%) and old age of the women (3.1%) are other self-reported causes revealed by the study.

It is surprising that a spiritual cause of the problem such as witchcraft which is commonly blamed for most misfortunes in Ghanaian society was reported by only a few of the respondents. It is not clear why the respondents downplayed the spiritual dimension of this problem when it is practically a major problem even in the urban section of the Tamale metropolis, where the possession by spirits and witchcraft are held as causes of infertility.

5.4.1 Underlying challenges and risk factors of secondary infertility among women in the Tamale metropolis

This section presents the underlying risk factors likely to influence secondary infertility. These are either factors that are directly associated with the respondents or their spouses, and include the use of contraceptives, STIs, previous abortions, nature of the menstrual cycle, lifestyles of the

respondents' husband such as drinking and smoking, as well as the use of sex relieve substances like creams and ointment. The results are presented in Fig. 4.4.

As can be seen in the Fig. 4.4, the above risk factors, like the reported causes are related to the health and/or lifestyles of the respondents and their spouses. These factors thus have the potential of affecting the sexual and reproductive life of the spouses facing this problem. For instance, about 37.8% of the respondents ever caused abortion; about 60.8% of them ever contracted STIs; about 33.6% ever used contraceptives; approximately 32.2% experience irregular menses; around 14.6% of the husbands of respondents smoke; while over or underweight is found among 22.1% of the respondents partners. The role of these factors as determinants of fertility will be elaborate in the next sections.

Not surprisingly, the potential risk related to drinking is found to be very negligible among respondents' husbands. This is because a large proportion of the population in the Tamale metropolis are Muslims. In addition permanent medications and the use of substances (ointments and creams) to facilitate sexual intercourse on secondary infertility appears to pose little potential risk to fertility in the study area.

Research shows that weight of the woman or her husband has a significant impact on her ability to conceive. This is because excessive under-weight or overweight leads to ovulatory dysfunctions or hormonal disorders. The weight distribution of women with secondary infertility as presented in Fig. 4.5 ranges 52 to 105Kg. As may be seen, even though the distribution is largely normal with a large section of the sample weighing between 60kg and 80kg, a considerable section of the distribution comprises the lower bound with women below 50Kg while the upper bound of the distribution includes women over 80Kg.

These lower and upper bound components are likely to have ovulatory dysfunction and thus conception difficulties due to their extreme low or high weights. In addition to the risk posed by the weight of women, severe obesity in men has been shown to alter fertility often due to imbalances in hormone regulation tied to sperm production.

Under the discussion below, we examine in detail the biomedical implications for the above causes and risk factors of secondary infertility and how they may likely affect women trying to conceive. We do this by referring to the literature where possible. The view is to support the reported knowledge of the affected women with medical reasons. By the additional knowledge that this section provides, affected women and their partners will be able to trace their problems beyond the diagnosis stage to the real major or underlying causes of the problem.

This is because infertility in general and secondary infertility in particular is a multidimensional health issue which occurs not only due to health problems related to the fallopian tubes, the ovaries, sperms, and the endometrium, but it may also be a result of the choices imposed by the modern lifestyle, like women marrying at an older age (after 30 years), engaging in busy and stressful careers, the non-existent of conducive legal framework for assisted reproduction, etc. (Roupa *et al*., 2009). In addition, Jumayev et al. (2012) observed that insufficient family income; poor quality of life, life stress, and discontent with daily routines as well as 'bad' relationships with family members (husband, mother- and father-in-law, husband's siblings etc) were significant correlates of female infertility in Uzbekistan.

i. **Stress and Illness:** The most reported cause of secondary infertility in the Tamale metropolis was stress and illness (36.7%). The daily demanding way of life of "modern woman" often leads to psychological stress, fatigue and associated stress-

related illnesses. These are believed to have considerable adverse effects on the reproductive ability of the woman. For instance, stress leads to changes in the menstrual cycle, and may affect sexual and marital life of spouses. Despite the implication of stress for the reproductive life of women and/or their spouses, the medical staffs of infertility centres often fails to consider this when dealing with their clients.

A quantitative study on the psychological impact of infertility on men, conducted in South Africa, showed significant elevated mean levels of distress in infertile men compared to fertile men (Dyer *et al*., 2009).

ii. **Irregular menses or menstrual dysfunction:** Disorders in the menstrual cycle including irregular menses and an increased/decreased menstrual flow was the second most highly reported cause of secondary infertility among women in the Tamale metropolis (19.2%). According to the literature, menstrual disorders or dysfunctions occur as a result of metabolic diseases and an increase function of the thyroid. In this regard, counselling on the menstrual cycle and the proper timing of intercourse may be required to boost the chances of the affected woman conceiving (Sundby, 1997, 2002).

iii. **Use of contraceptives:** As already defined, infertility occurs when there is an inability of non-contraceptive couple to conceive despite attempts to attain conception over a period of one year or more. Thus contraceptives use is strongly believed to be a determinant of a woman's fertility status. In this study, the third most commonly self-reported cause of secondary infertility was the use of contraceptives (the pill, intra-uterine device, injection, condom and others), represented by 16.1% of the

respondents. Even though the data shows that only about 33.6% of the women in the sample ever used contraceptives, a majority of the infertile women are often accused of using contraceptives to prevent pregnancy and to promote a perceived immoral sexual lifestyle.

Literature based on a study in Northern Ghana reports that the previous use of contraceptives has been blamed as the highest cause of infertility (Tabong and Adongo, 2013). It is also known that the use of contraception methods like IUDs causes the inflammation and even destruction of the fallopian tubes (Larsen, 2013), and this may cause barrenness.

iv. **Food Substances:** Around 5% of the respondents reported that they believe chemicals from particular food substances are the cause of infertility by altering the ovulatory and menstrual cycles. This is the fourth most important perceived cause of infertility. Quite commonly the consumption of coffee, kola nuts, herbal products, cigarettes and alcohol affects the menstrual cycle and thus fertility of women. In addition respondents believe that food spices may also induce or inhibit the frequency of sexual intercourse.

.The results showed that only 2.5% and 14.6% respectively of the respondents spouses smoke and drink. In the literature, Chavarro et al., 2007 identified that dietary factors, such as intake of specific fatty acids, protein, carbohydrates, dairy foods, iron and multivitamins are related to infertility and ovulation disorders. Other studies suggest that an overall dietary and lifestyle pattern aimed at increasing the intake of certain micronutrients and improving insulin sensitivity through the

modification of diet composition, weight control, and increased physical activity may help prevent ovulatory disorder and infertility.

v. **Inadequate/infrequent intimacy:** Like the consumption of food substances, approximately 5% of the respondents believe that inadequate intimacy (i.e. infrequent or non-satisfactory sexual intercourse) with their husbands or partners is the cause of infertility. About 12.1% of the respondents reported that they had just one sexual encounter with their partners per week, while 17.1% described their intimacy as adequate – less frequent and/or emotionally unsatisfying.

Obviously the frequency of intimacy between a woman and her partner determines her potential ability to conceive. This is because of the increased likelihood of the sperm meeting and fertilising the ovum of the woman. Studies showed that at lower frequencies of intercourse, the rate of conception drops more rapidly (Wilcox, Weinberg and Baird, 1995). And according to Dunson, Baird and Colombo, 2004), a high frequency of coitus between couples results in closely spaced ejaculations and this reduces the sperm count, the concentration of sperm, and the percentage of sperm that are motile. On the contrary, a low frequency of coitus could lead to the act occurring outside the 5 most fertile days per month in the ovulatory cycle of the reproductive woman.

vi. **Low sperm count or quality:** About 4.4% of the respondents attribute the problem of infertility to low sperm count of their husbands. It has been identified that closely-spaced sexual intercourse might decrease the potency of semen by depleting the number or quality of sperm. In addition, closely-spaced ejaculations reduce the sperm

count, the concentration of sperm, and the percentage of sperm that are motile. Thus, frequent ejaculation could theoretically reduce the potency of subsequent batches of sperm. Moreover, schistosomiasis, do cause inflammations of the male genital tract, and these may impair sperm production or block sperm release (Wilcox, Weinberg and Baird, 1995).

vii. **Sexually Transmitted Diseases/Infections (STDs/STIs):** Around 4.4% of women facing the problem of secondary are of the perception that STDs/STIs cause infertility. A major part of the infertility problems in sub-Saharan Africa are tubal factor related, mainly due to STDs, postpartum infections and unsafe abortions. There is evidence to show that Chlamydia is the STD that causes a large part of infertility problems (Gerrits and Shaw, 2010). Educating the affected women through maternal health programmes on how to prevent STDs

viii. **Age (i.e. age at marriage or at which women seek to conceive):** Approximately 3.1% of the respondents attributed infertility to age. Even though in Africa, the common risk of infertility is STIs rather than age, the age at which the woman marries or decides to have a child is a major infertility risk in many developed countries especially Europe (Roupa et al., 2009).

As the age of giving birth is increased, the reproductive capacity is decreased, the ovary becomes less efficient, the frequency of sexual intercourse is decreased and the possibility of chromosomal abnormalities and miscarriage is increased (ibid.).

As may be seen in Fig. 4.5, the desire to conceive is lowest among women less than 20 years of age and highest among respondents in the 31- 40 years are bracket. Thus the problem of secondary infertility is becoming more critical with the increase in age of the woman.

ix. **Deficient Diet**: Deficient diet was reported by 1.9% of respondents to be a cause of secondary infertility. Available evidence suggests that social factors, such as stress, anxiety or sudden weight loss after a crash diet inhibit normal gonadotropin-releasing hormone secretion, leading to ovulation failure. The literature has clearly indentified a series of modifiable lifestyle factors, such as psychological stress, smoking, alcohol and caffeine consumption, poor diet, obesity, and insufficient exercise that could potentially impact fertility in the general population.

x. **Abortion:** This was reported to be responsible for about 1.7% of the cases of secondary infertility in the Tamale metropolis. A major part of the infertility problems in sub-Saharan Africa are tubal factor related, mainly due to STDs, postpartum infections and unsafe abortions. Among the 5 million women who are estimated to suffer temporary or permanent disability each year because of unsafe abortio**n**, more than three million are likely to suffer from the effects of reproductive tract infections and 1.7 million are estimated to develop secondary infert**i**lity. Overall, some 24 million women are estimated to be currently suffering from secondary infertility worldwide due to an unsafe abortion (Shah and Ahman, 2009).

xi. Lifestyle factors: These include weight gain, smoking, drinking, permanent medication, and use of sex ointments and creams.

Shady Grove Fertility, (2014) points out that, both underweight and overweight women and men suffer from a higher incidence of infertility. Severe obesity in men has been shown to alter fertility often due to imbalances in hormone regulation tied to sperm production. In many cases, overweight or underweight women also may have hormonal disorders, which may cause them to ovulate infrequently or not at all.

Generally, underweight patients (BMI less than 19) can be encouraged to gain more weight, and this alone often increases their fertility significantly or makes hormonal therapy more successful. Obesity also increases the risk of spontaneous abortion among women (Wang, Davies and Norman (2002).

From the findings, it is realised that, even though obesity and overweight are not common conditions among the majority of women in the Tamale metropolis, over-weight or underweight among reproductively active women implies many infertility consequences. The study revealed that among the population of women with secondary infertility problems, the proportion of obese women is higher than is the case among the general population.

On the other side of the spectrum, many studies have demonstrated a clear and consistent decrease in infertility with increasing female weight. Overweight patients who undergo significant weight loss may ovulate without the need for fertility medications (Shady Grove Fertility, 2014).

Alcohol affects the health status of both the woman and her partner by reducing fertility by about 50%. Drinking alcohol causes a decrease in sperm count, an increase in abnormal sperm and a lower proportion of mobile sperm. Alcohol also inhibits the body's absorption of nutrients such as zinc, which is one of the most important minerals for male fertility (Glenville, 2012).

Cigarettes contain nicotine, which has received much attention for its interference with normal endocrine function. It has been shown to cause testicular atrophy, gonadal dysfunction, and male factor infertility by triggering testicular cytotoxicity (Gocze and Freeman, 2000; Tabong and Adongo, 2013)

5.5 Social Correlates of women with secondary infertility in the Tamale metropolis of the northern Region of Ghana (subjective self-rating of respondents)

This section presents findings on the social consequences of infertility, namely the self-rated life quality of the affected woman's with the community, the extended family, parent in-laws, her direct biological relations (parents and siblings), and *Asungtaba* associations (women groups). It has been established that, the attitude of a woman towards family income, the quality of her family and social relations, lifestyle, economic quality of life, nutrition, and intimacy determine her fertility and ability to conceive to a large extent. The purpose of this section is thus to help us understand the problem of secondary infertility in a wider scale. The findings on the above attributes are presented in Table 4.4.

It should be known that women in the Tamale metropolis, as a result of their infertile status suffer physical and mental abuse, neglect, stigmatisation, abandonment, economic deprivation and social ostracism as well as exclusion from certain social activities and traditional ceremonies (Gerrits, 1997 and Okonofuaa, 1997 in Jumayev et al., 2012).

Even though a major difference between primary and secondary infertility in terms of the implications of these consequences for the affected women exists, respondents in the study area equally face higher levels of perceived stigma and experience increased infertility-related stress (Hollos and Larsen, 2008). These social correlates unlike the modifiable lifestyle factors discussed above are even more important as they may further complicate the infertility status of the respondents.

The results from the data obtained through the in-depth interviews show the highest proportion of the affected women reporting of a cordial relationship between them and members of their communities (79.7%,), their extended families (72.4%), their husband or partners (45.8%), their parent in-laws (68.2%), brothers and sisters in-laws (77.5%) and *Asungtaba* women group members (76.8%). In terms of their relationship with their own parents, the highest proportion of the women reported that they have very cordial relationship representing 50.6%, while about 39.1% reported having very cordial relationships with their husbands and partners.

Usually, the stigma and abuse that affected women face is more serious in the case where the first pregnancy results in miscarriage or still birth, or the first child of the woman dies. Even though having a life birth and a surviving child reduces this stigma, affected women with surviving girl parents are often less value by their spouses and spouse's family members than

those with surviving boy children. This is because of the general belief in the area that girls will marriage and thus cannot guarantee the family lineage of the husband like the boys can do.

Except the rating of the quality of the relationships of respondents with their husbands and partners, and their own parents, we suspect that the respondents "falsely" self-rated the quality of these relationships with other social groups in their communities. This is because their explanation of the same relationships is contradictory to the above analysis. Thus we suspect some degree of deviation between the responses and the real perspectives of respondents' social relationships.

Below are some of the views of the women in explaining the quality of their relationship with the community, parents in laws, brothers and sisters in laws, women groups, own siblings and own parents.

In contrast to the 72.4% of the women who reported to have cordial relationships with the extended families of their husband, our probes for the affected women to explain how cordial their relationships really were yielded some of these statements quoted verbatim below.

In the Mossi Zongo community, a woman reported that her parents' in-laws sometimes abuse the husband and her for their situation, while the siblings of her husband suggest options to him to her detriment. Therefore, as noted in section 4.3, in some of the cases where the man is to blame for the problem of infertility, the woman still bears the consequences. This follows the general view in the area that women are the sole cause of the problem of infertility among couples.

In Table 4.4, whereas about 76.8% of the respondents regard their relationship with women groups (*asungtaba)* as cordial, the general practical experience of this cordiality was explained otherwise. For instance, an affected woman reported that she belongs to an Asungtaba women's group and even though her relationship with group members is somewhat cordial, members often have little gossips about her.

The further results reveal that respondents reported their relationship with their husbands to be cordial (45.8%) and very cordial (39.1%). These high ratings notwithstanding, a majority of the views from the women were to the contrary. As indicated in the qualitative analysis.

Also in Mossi Zongo community, the relationship of an affected woman with her husband is good and her husband collaborates with her in seeking solutions. In another case, the relationship of a woman with her husband is so bad that he sees sexual intercourse with her as a "waste of time".

Some other examples of verbal and psychological abuses that respondents face include being asked insulting and mockery questions such as "*man daa mi la a daa mari la pua, kawula a dogi mi yoo?* , which translated from Dagbani means "*I thought you were pregnant, have you given birth now?*".

From the above analysis, the following conclusions may be drawn. In a majority of the cases as reported and practically too, the affected woman's own direct relatives namely, her parents and siblings have a higher tendency to sympathise with her and be supportive than people outside this inner circle of relatives. Medical professionals can therefore employ this support system

from woman's own family to boost the general wellbeing of affected women and to even facilitate conception where possible.

In contrast to the attitude of the woman's own nuclear family members, relatives from her husband's family are often problematic and have a higher tendency to abuse, stigmatise and put pressure on the affected woman, deepened her stress level and thus indirectly worsen her problem. . Usually, where the husband's relatives realise that the fault is from the woman, they psychologically or physically abuse these women with the intention of causing them to leave the marriage for the man to remarry. In this case, affected women are not regarded in high esteem and are not consulted by extended family members of the husband and the husband himself even in matters of great importance to her.

But even when the fault is from the man, the woman in shielding her husband from shame bears the consequence of the problem. One of the medical experts under the key informant interviews confirmed this view. Strangely, the husbands in this situation may even join their own family members to perpetuate the abuse of their wives. Helping women under this condition requires educating the husband and his relatives about the situation. This should include disclosing the cause of the problem. In a few cases, men who know the fault is from them may tend to relate well with their wives in order to prevent the shame that may be brought on them if their wives make it known to their relatives that the fault is the husband.

In the extended family, the community and among women groups, it is common for the affected women to be accused of using family planning methods to prevent conception and to cover up a sexually immoral life with men outside the marriage. In some cases, little gossips especially

within women groups that affected women are using family planning to prevent giving birth and aging fast is common.

5.6 Common treatment options employed by women facing secondary infertility in their attempt to conceive

It is heart-warming to note that despite their usually expensive and inaccessible nature especially to poor and uneducated couples, the choice of medical means for treating secondary infertility in the Tamale metropolis is predominant. These included use of infertility drugs, surgery, donor insemination and in vitro fertilisation (IVF). This means that despite the fact that modern, infertility treatment and resources are lacking in the formal health sector because of the high and urgent demand for infertility experts and facilities in the area by other health-related conditions such child and maternal mortality, among the valid sample of 357 women experiencing secondary infertility in the Tamale metropolis, a majority of them (43%) them had sought solutions and treatment of the problem from medical sources. There is no major referral fertility clinic in the Tamale metropolis.

Since women with a considerable level of education and income are those most likely to have both physical and financial access to medical treatment options which are less comprehensive in the mainstream public health sector in Northern Ghana, it may be assumed that this section of the sample are educated women in the middle income bracket. The use of medical treatment options for dealing with infertility was observed to decrease with the duration of the problem. This

means that the longer the problem exist after the women or couple had sought medical treatment, the higher the likelihood for the affected woman or couple to abandon medical solutions for complementary or alternative treatment methods.

Among the 357 women covered by the survey, about 34% of them had used tradition treatment dominated by herbal medicines for the treatment of infertility. Herbs are used for the treatment of infertility when the affected woman or her husband swallows or applies herbal medicines to part of the body. This section of the sample is more likely to be less educated women with low incomes. For instance a respondent stated that when she told her husband to accompany her to the fertility clinic, he replied that he does not have the money and that the woman should use *Dagban tiim,* meaning traditional medicine. This section of the respondents may also try herbal medicine first and defer medical solutions.

Even though to the above category of women, herbal medicines may be cheap and more accessible, it is known that this method of treatment reduces the chances of conception as evidence shows that phytoestrogens present in herbal medications exert negative estrogenic effects on implantation, adversely affecting pregnancy outcomes of biomedical treatment (Kaadaaga et al, 2014). This therefore supports the view that those using this method may not be well educated. In this case, collaboration of health professionals with herbal medicine practitioners would help identify the common herbal medicines used for infertility treatment, their potential benefits and harm. This is because there is a definite place of herbal medicine in infertility treatment.

As seen in Fig. 4.7, about 14% of the respondents had use spiritual or faith-based methods in their attempt to conceive. Spiritual healing in the Tamale metropolis is administered by means of

prayer and related methods. This class of women seek to get solutions for their problem of infertility through the prayers of "mallams", pastors or traditional priests. This methods are however highly unorthodox, lack clear procedures and may even be unreported. This solution option especially with Christian couples often comes with guidance and counselling. Nevertheless, there abounds anecdotal evidence to show that this method also results in success. About 9% of the respondents did not disclose the treatment options they employ. This portion of the respondents may represent self-disillusioned women who having tried unsuccessfully.

5.7 Experts' views on the problem of secondary infertility among women in the Tamale metropolis

An expert on the case of secondary infertility is referred to health workers like, gynaecologists, midwives, and nurses who deal direct with women or men concerning their fertility and childbirth.

According to one of the medical experts; 'infertility was reported to be prevalent in the Tamale metropolis and to affect both younger (i.e. under 30 years of age) and older (i.e. over 30 years of age) women in their reproductive age'. One of the experts estimates this prevalence to be around 30-40% among women and about 25-30% among men. Practically, more women than men were reported to visit gynaecological and infertility clinics, often without being accompanied by their husbands. This means the female factor is predominant. Whereas the male factor is less predominant, it is more difficult to deal with.

The incidence of secondary infertility was reported to be "alarming", with consultations being daily and constituting about 35% of the patients weekly. According to one of the key informants, out of the patients consulting him, more than 35% of them do so with cases of infertility, and out of those with infertility problems, approximately 90% have secondary

infertility problems. In the TTH, the medical experts estimate that around a 1/3 (33%) of the patients who consult the gynaecological expert report problems of secondary infertility.

In Fig. 4.6, the medical experts reported a wide range of underlying causes of secondary infertility among women in the Tamale metropolis. These include age, overweight, Irregular/infrequent sex which often results from the polygamous marriages in most households, irregular ovulation, long distance marriages, STIs, tubal blockage, hormonal dysfunctions, psychological problems/stress, chronic illnesses, abuse of sexual enhancing herbal products (bitters), complications from illegal abortion, and spiritual forces.

Even though these factors do not directly lead to infertility, they act as risk factors of infertility. The medical experts reported age, irregular ovulation, tubal blockage, and complications resulting from illegal abortion as female factor infertility. On the other hand, overweight, infrequent sex, long distance marriages, stress and psychological problems, chronic illnesses, and abuse of herbal medicines are factors related to both male and female.

It is surprising that spiritual forces were mentioned even by medical experts as an underlying cause of secondary infertility. It shows how well established views about the existence and influence of spiritual powers among societies in Ghana, and for that matter the Tamale metropolis is, and confirms our view that the low reporting of spirituality as a cause of secondary infertility by the respondents really represents a case of under reporting.

The reported primary causes of secondary infertility include female factors, male factors and combined factors associated with the psycho-physical wellbeing of spouses, especially the woman. The female factors include ovulatory problems, tubal blockage, hostile cervical mucus (antibodies), STIs, irregular ovulation and fibroid. The male factors include low sperm counts,

absence of sperms, abnormal sperms, erectile dysfunction and impotency, while the psycho-physical factors are stress, anxiety and illnesses.

The above means that couples especially younger women (under 30 years) who have regular sex have a higher chance of getting pregnant. In addition, maintaining a moderate weight, staying with a spouse, having regular sex (at least 3 times per week), avoiding illnesses or stress as well as maintaining a generally healthy life lifestyle by avoiding smoking, drinking or extreme exposure to heat reduces the risk of secondary infertility and increases a woman's chances of conceiving. Finally, preventing sexually transmitted infections (STIs), such as gonorrhoea and Chlamydia may reduce a couple's risk of secondary infertility.

The effects of secondary infertility can be classified as effects within the marriage, effects in the extended family and effects in the community. As observed earlier, the burden of infertility is mostly borne by the women even when the male factor is the predominant cause of infertility in the marriage. The effects of infertility include divorce or separation, increased likelihood of the man marrying another wife, conflict resulting from lack of love between the spouses, and a general insecurity for the woman and her children. Within the extended family women with secondary infertility problems face verbal abuse, disrespect, shunning and hatred. The extended family of the man also pressurise him to remarry. In the larger community, respondents in addition to the verbal abuse, may be publicly ridiculed, falsely accused, gossiped about and cannot send children on errands without the likelihood of conflicts arising with the child's parents.

As reported by the medical experts, the treatment depends on the diagnosed cause of infertility in the affected couple. Thus there are various treatment options for managing secondary infertility

as reported by the medical experts. For infertility related to ovulatory dysfunction, the drugs Clomid (*Clomiphene citrate*) and Serophene are used. In most other cases guidance and counselling is given to the couple without the administering of any medical procedure. It was reported that female factor infertility is easier to treat than infertility associated with the male factor.

The medical experts reported that treated couples often get remedies to the problem after a period of one year. Where the problem is minor such as ovulatory problems and irregular sex, there is about 50 - 70% chances of the woman conceiving within a period of 2 - 3 months. Success rates are however more difficult to obtain with more serious cases such as tubal blockage and the male factor infertility.

What do medical experts do after the treatment options fail to yield the desired solution for the affected couple within a given period of time? The following strategies were reported: assisted reproduction, referral of patients to specialists and guidance and counselling of the affected couple.

Aside the medical solutions, affected couples may seek traditional or herbal treatment prepared in the form of concoction for drinking and bathing, or powder for smearing or insertion into the private part of the woman. Lastly others seek spiritual treatment through *malams* or prayer camps. These options may either be use sequentially or even concurrently.

CHAPTER SIX

6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter is devoted to the conclusion drawn from the study and finally come out with some recommendation that when taken into consideration would help addressing the problem associated with people with secondary infertility.

6.1 Summary

The study set out to examine the factors that influence secondary infertility among women between the reproductive ages of 15 to 49 years in the Tamale metropolis. It was guided by four specific objectives: to ascertain the sexual behaviour associated with women with secondary infertility in the Tamale metropolis, to investigate the causes of secondary infertility among women in the Tamale metropolis, to examine the challenges women with secondary infertility face in the Tamale metropolis and to assess the common treatment options employed by women facing secondary infertility in their attempt to conceive.

To achieve the objectives of the study, both quantitative and qualitative approaches were used in the study, while the cross-sectional and descriptive study designs were employed to guide the study. A total of 400 respondents (women who had secondary infertility issues) and seven key informants' (five medical experts and two TBAs. The 400 respondents were chosen via quota

and simple random sampling. Data collection was by the use of questionnaire, in-depth interview guide. The analysis of data encompassed the application of descriptive statistics.

Key findings of the study

Based on the analysis, results and discussion of the study the key findings according to the objectives are presented in this section.

1. The majority of the respondents had sex two times in a week which is unlikely to make a woman pregnant.
2. The major causes of female secondary infertility are problems related to physical and psychological stress (36.7%), disorders in the menstrual cycle (19.2%), complications arising from the use or misuse of contraceptives (16.1%), problems associated with specific food substances (5%), infrequent/widely-spaced sexual intercourse (5%), male factors such as low sperm count and semen volume (4.4%), sexually transmitted infections (4.4%), old age (3.1%), fibroid or problems with the uterus (2.5%), deficient diet or malnutrition (1.9%) and complications arising from unsafe abortion (1.7%).
3. Majority of the respondents (43%) them had sought solutions and treatment of the problem from medical sources. There is no major referral fertility clinic in the Tamale metropolis. About 34% of them had used tradition treatment dominated by herbal medicines for the treatment of infertility.

6.2 Conclusions

The study concludes that the major causes of female secondary infertility are problems related to physical and psychological stress, disorders in the menstrual cycle, complications arising from the use or misuse of contraceptives, problems associated with specific food substances,

infrequent/widely-spaced sexual intercourse, and male factors such as low sperm count and semen volume.

The study also conclude that the common challenges women with secondary infertility faced include bad human relationship with mother in laws with the community, the extended family, her direct biological relations (parents and siblings), and her peers in the community or in any *Asungtaba* associations (women groups).

It can also be concluded the common treatment options for affected women were attending medical facilities or infertility clinics to seek solutions for their infertility, use of herbs and seeking spiritual or faith-based solutions to the problem of infertility.

From the medical experts perspective it can be concluded that the underlying causes of secondary infertility among women in the Tamale metropolis include; age, overweight, Irregular/infrequent sex which often results from the polygamous marriages in most households, irregular ovulation, long distance marriages, STIs, tubal blockage, hormonal dysfunctions, psychological problems/stress, chronic illnesses, abuse of sexual enhancing herbal products (bitters), complications from illegal abortion, and spiritual forces.

It was also concluded the primary causes of secondary infertility are underlying risk factors likely to influence secondary infertility include the use of contraceptives, STIs, previous abortions, nature of the menstrual cycle, lifestyles of the respondents' husband such as drinking and smoking, as well as the use of sex relieve substances like creams and ointment.

Except the rating of the quality of the relationships of respondents with their husbands and partners, and their own parents however, we suspect that the respondents "falsely" self-rated the quality of these relationships with other social groups in their communities. This is because their

explanation of the same relationships is contradictory to the reports they gave when asked to explain their responses. There is therefore some degree of deviation between the responses and the real perspectives of respondents' social relationships.

Even where the cause of secondary infertility is the male factor, affected women attempts to shield the husband from the shame of his inability to produce children, thereby bearing the consequence of social stigma, abuse and esteem themselves. Strangely, the husbands in this situation may even join their own family members to perpetuate the abuse against their wife.

Despite their usually expensive and inaccessible nature especially to poor and uneducated couples, the choice of medical means for treating secondary infertility in the Tamale metropolis is predominant. These include the use of assisted reproduction methods like fertility-enhancing drugs, surgery, artificial insemination and Invitro fertilisation.

The study also conclude that women with a considerable level of education and income are more likely to have both physical and financial access to medical treatment options which are less comprehensive in the mainstream public health sector in Northern Ghana, it may be concluded that the section of the sample who seek medical solutions are educated women in the middle income bracket, or have high access to relevant maternal and child health information.

Overall, the problem of secondary infertility in the Tamale metropolis is a critical one. This is more so because of the important social, cultural, religious and economic implications of childlessness in the area. Thus many affected couples have a high level of awareness of the causes, risk factors and treatment options of secondary infertility. This awareness may be attributed to the high access of the affected couple to the relevant information on the problem via radio, television or social media channels. Consequently, the majority of the affected couples

seek medical solutions for the treatment of secondary infertility despite the limited availability and relatively high cost of these medical facilities capable of dealing with infertility problems.

6.3 Recommendations

Based on the findings of the study, the study came out with the following recommendations:

1. The Ghana Health Service (GHS) in collaboration with the opinion leaders in the areas should educate the affected couples on the courses of secondary infertility to ensure that affected couples are fully informed about the ways to eliminate the courses of secondary infertility.

2. It is recommended that medical experts helping women under this condition should educate the husband (and his relatives) about the situation. This should include disclosing the cause of the problem. Since the woman's own direct relatives namely, her parents and siblings have a higher tendency to sympathise with and be more supportive than people outside this inner circle, medical professionals should employ this support system from woman's own family to boost the general wellbeing of affected women and facilitate conception where possible.

3. The various health facilities should have counselling units to enable the council couple with the problem of secondary infertility
4. The Ghana health service in collaboration health NGOs should as a matter of agency educate affected women on available medical treatment for them and discourage them from consulting spiritualist and the need to reduce physical stress as a way avoiding very

stressful activities which could limit the chances of affected women from getting remedy or treatment in that regard.

5. The government should as a matter of concern provide the people with their needs on reproductive health care to become one of the nation's priorities in providing affordable reproductive care to affected women and men alike. This way will support especially those who cannot afford for medical care.

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APPENDIX I

Research questionnaire

QUESTIONNAIRE FOR IN-DEPTH INTERVIEWS

THE DETERMINANTS OF SECONDARY INFERTILITY AMONG WOMEN IN THE TAMALE METROPOLITAN AREA OF THE NORTHERN REGION OF GHANA

My name is ----------. I am part of a team from the UDS conducting a survey aimed at analyzing the determinants of secondary infertility among women in the Tamale Metropolitan Area of the Northern Region of Ghana. The survey forms part of an MPhil study being undertaken by a student in the Community Health and Development Programme of the University. In this regard, I would like to ask you some questions about your farming activities and this will take about 1 hour.

Your name will not be recorded and the information you provide will be used strictly for research and not for any other purpose. Your participation is voluntary and you can choose not to answer any or all of the questions if you wish; however, we hope you will participate since your views are important.

May I begin the interview now? Yes ☐ No ☐

.

A. DEMOGRAPHIC PROFILE OF RESPONDENTS

Date of Interview: |___|___||___|___||___|___ Time: |___|___||___|___|

1. Respondent ID_____ 2. Name and House no._____

3. Name of Community_____ 4. Name of Interviewee_____

6. Age of Respondent: 1 = Under 20|___|___| 2 = 21 - 30|___|___| 3 = 31 – 40 |___|___| 4 = 41 – 50 |___|___|

5 = Over 50 |___|___| 6 = Don't know

Age of respondents husband/partner: 1 = Under 20|___|___| 2 = 21 - 30|___|___| 3 = 31 – 40 |___|___| 4 = 41 – 50 |___|___| 5 = Over 50 |___|___| 6 = Don't know

7. Highest education level completed by Respondent:
None/Informal School = 1 Primary = 2 Secondary (e.g. Middle School, Junior High/Secondary, Senior High/Secondary) = 3 Tertiary (e.g. University, College, Polytechnic or colleges of education, equivalent) = 4 Other :(specify) = 5_____

8. Highest education level completed by Respondent's husband/partner:
None/Informal School = 1 Primary = 2 Secondary (e.g. Middle School, Junior High/Secondary, Senior High/Secondary) = 3 Tertiary (e.g. University, College, Polytechnic or colleges of education, equivalent) = 4 Other :(specify) = 5_____

9. Marital status: 1. Married ☐ 2. Never married before ☐ 3. Cohabitation
4. Widowed ☐ 5. Separated ☐ 6. Other_____

10. Major occupation of respondent: 1. Salary worker ☐ 2. Farming ☐ 3. Trading 4. Casual labourer ☐ 5. Artisan ☐ Other_____

11. Major occupation of respondent's husband/partner: 1. Salary worker ☐ 2. Farming ☐ 3. Trading 4. Casual labourer ☐ 5. Artisan ☐ Other_____

12. Media exposure (NB: ask about media sources and frequency of access then select): 1. Not exposed □ 2. Slightly exposed □ 3. Exposed □ 4. Highly exposed
13. □

B. REPRODUCTIVE BEHAVIOUR AND CHARACTERISTICS

14. Duration of respondent's current marriage: |___|___|

15. Respondent previously married: Yes □ No □

16. Children from previous marriage: Yes □ No □

17. Respondent's husband/partner previously married: Yes □ No □

18. Children from husband/partner's previous marriage: Yes □ No □

19. Planned or unplanned abortion before? Yes □ No □

20. Number of years since last birth: |___|___|

21. Child of last birth survived : Yes □ No □

22. Last birth normal end of pregnancy period delivery: Yes □ No □

23. Respondent's fertility preference: 1. Wants (a/another) child □ 2. Wants no more child □

24. Respondent uses contraception: Yes □ No □

25. Specific type of contraception commonly used: 1. Condom □ 2. The pill □ 3. IUD □ 4. Withdrawal □ 5. Foam □ 6. Rhythm □ 7. Other_____

26. Source of contraception methods: 1. Local pharmacy 2. Friends/relatives □ 3. Ghana health personnel □ 4. Open market □ 5. Other_____□

27. Sources of family planning information:

i. Ghana health service Yes □ No □
ii. Friends/relatives Yes □ No □
iii. Social media Yes □ No □

iv. Radio /TV Yes ☐ No ☐
v. Movies/Films Yes ☐ No ☐
vi. Other_____

28. Respondent's autonomy in household: 1. wholly dependent on husband/household head ☐ 2. Gainfully employed ☐ 3. Teams up with husband in housekeeping ☐ 4. Breadwinner of household ☐ 5. Other_____

29. Respondent's decision making in household: 1. Husband/ household head decides ☐ 2. Respondent and husband/household head decide ☐ 3. Respondent alone decides ☐ 4. Extended family decides ☐ 5. Other_____

C. CAUSES OF SECONDARY INFERTILITY

30. Respondent knows any cause of secondary infertility: Yes ☐ No ☐

31. Respondent experienced failure to conceive despite desire to do so for a period of at least 1 year of exposure? Yes ☐ No ☐

32. Duration of respondent's desire to conceive |___|___|

33. Respondent's menses regular? Yes ☐ No ☐

34. If respondent is married, average frequency of intimacy (sexual intercourse): 1. Once/week ☐ 2. Twice/week ☐ 3. Thrice/week ☐ 4. Four times/week ☐ 5. Other_____

35. Rating of intimacy with husband/partner per week: 1. less adequate ☐ 2. Adequate ☐ 3. More than adequate ☐ 4. Other_____

36. Lubricants used during intercourse? Yes ☐ No ☐
Specify_____

37. Husband/partner ejaculates during intercourse? Yes ☐ No ☐

38. Does ejaculation occur outside vagina? Yes ☐ No ☐

39. Does semen leak out when respondent stands? Yes ☐ No ☐

40. Respondent partner ever contracted syphilis or gonorrhoea? Yes ☐ No ☐

41. Respondent ever contracted other vaginal infections before? Yes ☐ No ☐

42. Respondent or husband/partner:
    i. Drinks Yes ☐ No ☐ Specify No./day_____
    ii. Smokes Yes ☐ No ☐ Specify No./day_____
    iii. Permanently on medication Yes ☐ No☐ Specify duration_____
    iv. Excessively under/overweight Yes ☐ No ☐ Specify weigth_____
    v. Other_____

43. Respondent's view on the possible causes of infertility?
    i. _____
    ii. _____
    iii. _____
    iv. _____
    v. _____
    vi. _____

D. Effects of Infertility

44. Respondent's self-rating of status in community: Bad/stressful ☐ 2. Good/respectful (Undercurrent tension) ☐ 3. Cordial ☐ 4. Very cordial ☐ *5. Other*_____

    *Explain*_____

45. Respondent's self-rating of status in extended household: Bad/stressful ☐ 2. Good/respectful (Undercurrent tension) ☐ 3. Cordial ☐ 4. Very cordial ☐ *5. Other*_____
    *Explain*_____

46. Respondent's relationship with husband/partner: Bad/stressful ☐ 2. Good/respectful (Undercurrent tension) ☐ 3. Cordial ☐ 4. Very cordial ☐ *5. Other*_____
    *Explain*_____

47. Respondent's relationship with parents in-laws: : Bad/stressful ☐ 2. Good/respectful (Undercurrent tension) ☐ 3. Cordial ☐ 4. Very cordial ☐ *5. Other*_____

*Explain*_____

48. Respondent's relationship with parents brother and sister in-laws: : Bad/stressful □ 2. Good/respectful (Undercurrent tension) □ 3. Cordial □ 4. Very cordial □ *5. Other*_____
*Explain*_____

49. Respondent's relationship with own parents and siblings: : Bad/stressful □ 2. Good/respectful (Undercurrent tension) □ 3. Cordial □ 4. Very cordial □ *5. Other*_____
*Explain*_____
50. Respondent's relationship with women groups or other associations in community, workplace or place of worship: Bad/stressful □ 2. Good/respectful (Undercurrent tension) □ 3. Cordial □ 4. Very cordial □ *5. Other*_____
*Explain*_____

E. TREATMENT OPTIONS

51. Which type of treatment options you employed in trying to treat secondary infertility
1. Medical Solution 2. Traditional/ Herbs 3. Spiritual/ Faith-Based 4. None

Appendix II

Key informants interview Guide

INTERVIEW GUIDE

THE FACTORS THAT AFFECT SECONDARY INFERTILITY AMONG WOMEN IN THE TAMALE METROPOLITAN AREA OF THE NORTHERN REGION OF GHANA

My name is ----------. I am part of a team from the UDS conducting a survey aimed at analyzing the factors that affects secondary infertility among women in the Tamale Metropolitan Area of the Northern Region of Ghana. The survey forms part of an MPhil study being undertaken by a student in the Community Health and Development Programme of the University. In this regard, I would like to ask you some questions about your dealings with infertility issues or experiences with couples with secondary infertility issues and this will take about 30 minutes.

Your name will not be recorded and the information you provide will be used strictly for research and not for any other purpose. Your participation is voluntary and you can choose not to answer any or all of the questions if you wish; however, we hope you will participate since your views are important.

May I begin the interview now? Yes ☐ No ☐

1. How is your perception of secondary infertility

   ……

   ……

   ……....

2. Are there known cases of secondary infertility known to you in this community

   ……

   ……....

   ……....

3. What do you think are the causes of secondary infertility

……

……

……

……

……

4. What experiences do women in this category often have?

……

……

……

5. How often do couples with secondary infertility consult you (frequency)?

……

6. Couples who consult you in this regard, do they get remedies in the long run?

……

……

7. What treatment or advice is usually prescribed or given to this effect?

……

……

……

THANK YOU FOR COOPERATION