

**ATTITUDE AND WILLINGNESS OF INFERTILE PERSONS
TOWARDS THE UPTAKE OF ASSISTED REPRODUCTIVE
TECHNOLOGIES IN IBADAN NORTH LOCAL
GOVERNMENT AREA**

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DEDICATION

This work is dedicated to God Almighty for His unfailing, unending and unequal love, care and mercy bestowed on me before, during and after this academic pursuit.

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ABSTRACT

Infertility is one of the important reproductive health concerns among couples in Nigeria. Many have tried and waited on usual medical routine for infertility treatment with little or no success. One of the strategies to overcome this health challenge is the adoption of Assisted Reproductive Technologies (ART) which seems alien to our culture. This study therefore seeks to investigate attitude and willingness of infertile couples in Ibadan North Local Government Area (IBNLGA) towards uptake of ART.

The study was a descriptive survey. A three-stage sampling technique was used to select 202 married persons attending fertility clinic at the Adeoyo Maternity Teaching Hospital, Ibadan. Data was collected through a pre-tested semi-structured questionnaire. Attitude was measured on a 9-point attitudinal scale; scores of 0-4 and 5-9 were categorised as negative and positive respectively. Data were analysed using descriptive and inferential statistics (Chi-square test) at $p=0.05$.

Respondents' age was 34.3 ± 6.5 years, 88.6% were female and 98.5% were married. More than half (54.5%) had primary infertility. Less than half (46.5%) respondents have heard of ART. Positive attitude of respondents towards the uptake of assisted reproductive technology was relatively high: 48.0%; Negative attitude was found to be 52.0%. Eighty five (42.1%) were willing to make use of ART. Among those who indicated willingness to uptake ART, preference was given to In-Vitro Fertilization, Gamete Intrafallopian Transfer, Intra-Cytoplasmic Sperm Injection and Gestational Surrogacy (80.0%, 50.6%, 45.8% and 10.6% respectively). A few respondents, 10.4%, indicated their interest to accept donated sperm, accept donated reproductive egg (9.9%) and willing to donate reproductive egg/sperm for others (24.2%). High cost (41.6%), lack of interest (37.1%), personal believe (19.8%), perception of babies from ART outcome (19.3%), fear of risks and side effects (15.8%) were identified as factors influencing respondents' willingness to uptake the service. Only a few, 7.4%, were willing to uptake the services without any constriction. Sex and years of experience of secondary infertility were found to be significant with attitude. Attitude was also found to be significant to willingness towards the uptake of ART and was also found to be significant to willingness to donate reproductive egg/sperm and years of experience of secondary infertility. From logistic analysis, female respondents are 3.5 times more likely to have positive attitude than male, while those who have been

waiting within a year are 5 times less likely to have Positive attitude towards the uptake of ART.

Majority had negative attitude towards assisted reproductive technologies and only a few are willing to uptake this service. Health education strategies such as public enlightenment, female child education, mediation, advocacy and enabling environments will be useful in addressing this gap.

Keywords: Infertility, Couples, Assisted reproductive technologies, Attitude, Willingness

Word count: 435

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CERTIFICATION

I certify that this work was carried out by **Oluwayemi Samson AKANDE** in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Nigeria, under my supervision.

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GLOSSARY OF ABBREVIATIONS

ART	Assisted Reproductive Technology
AFP	Australian Family Physician
RTC	Reproductive Technology Council
ASRM	American Society for Reproductive Medicine
WHO	World Health Organization
CDC	Centers for Disease Control and Prevention
OHSS	Ovarian hyperstimulation syndrome
IVF	In-Vitro Fertilization
ICSI	Intracytoplasmic sperm injection
GS	Gestational surrogacy
IMSI	Intra-cytoplasmic morphologically selected sperm injection
ICMART	The International Committee for Monitoring Assisted Reproductive Technology
GIFT	Gamete Intra Fallopian Transfer
SART	The Society for Assisted Reproductive Technology
SLT	Social Learning Theory
NCI	National Cancer Institute

DEFINITION OF TERMS

Assisted Reproductive Technology (ART): All treatments or procedures that include the in-vitro handling of both human oocytes and sperms, or embryos, for the purpose of establishing a pregnancy. These include but not limited to in-vitro fertilization and embryo transfer, gamete intrafallopian transfer, zygote intrafallopian, tubal embryo transfer, gamete and embryo cryopreservation, oocyte and embryo donation and gestational surrogacy (WHO/ICMART, 2008).

In Vitro Fertilization (IVF): an ART procedure that involves extra-corporeal fertilization or a procedure whereby an egg (or more than one egg) is retrieved from the body of a woman and combined with sperm outside the body to achieve fertilisation (Reproductive technology council).

Infertility (Clinical Definition): a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.

Gestational carrier (surrogate): a woman who carries a pregnancy with an agreement that she will give the offerings to the intended parents(s) (ICMART, 2009).

Gamete intrafallopian transfer (GIFT): an ART procedure in which both gametes (oocytes and spermatozoa) are transferred to the fallopian tubes.

Intra-Cytoplasmic Sperm Injection (ICSI); a procedure in which a single spermatozoon is injected into the oocyte cytoplasm.

Zygote intra-Fallopian Transfer (ZIFT): a procedure in which zygote (s) is /are transferred into the Fallopian tube.

Willingness: expressed readiness towards the uptake of assisted reproductive technology.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

It is often presumed that infertility is not a problem in densely populated areas where fertility rates are high (Ombelet, 2009; Hammarberg and Kirkman, 2013), therefore, whenever one mentions the provision of infertility treatment in developing countries, the reaction of the people is almost unanimously negative, because reports from last decades have inculcated in people from Western countries the belief that overpopulation is the major problem of developing countries (Pennings, 2012). Pennings (2012) further added that this conviction was and still is the main barrier to even consider infertility treatment in resource-poor countries and it has led to a bias in Western people's way of looking at the provision of contraception and fertility control in resource-poor countries. As a result of this, it is commonly argued that scarce healthcare resources and family planning activities should be directed towards reducing fertility and restricting population growth (Hammarberg and Kirkman, 2013), rather than devoting resources towards fertility management 'in densely populated areas where fertility rates are high' (Ombelet, 2009). Some have argued that overpopulation, family planning and contraception should rather be the major health concern and focus of resource-poor developing countries rather than spending on management of infertility, which will support the increasing growth of the world (Ekeh, 2011). Others further argued that these countries with poor resources and infrastructure are saturated with high prevalence of many communicable and preventable diseases, as such, attentions should be diverted to the major priority issues.

The WHO (1988) has earlier defined health as 'a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity'. By contrast, it thus shows that infertility is therefore a disease condition, since it is greatly enrobed with the three main indicators of health, as defined above. It could be argued that fewer disease conditions could wreck as much profound and pervasive effects on individuals and families well-being as a whole as infertility. In this regard, infertility has been compared with cancer (Ekeh, 2011).

Despite the difference in infertility issue and the increasing rate of other communicable and preventable diseases, the wish and expectation to have children is shared by most people in the world (Holton et al., 2011). In response to this, the USA Supreme Court in 1998, in affirming lower court decisions of infertility being a disability, defined the 'ability to conceive as a basic life activity' (Gleicher, 1998; Ekeh, 2011), but this disability and personal tragedy being experienced all over the world are further compounded for the infertile women in the resource-poor developing countries like Nigeria, where these women have been documented with a far reaching continuum of consequences ranging from blame, guilt, fear, social isolation/alienation, increased violence, divorce, polygamy to even murder being perpetrated on them (Ekeh, 2011); also there is increased exposure to multiple sexual partners and Sexually transmitted diseases as well as helplessness, economic destitution and suicide on their own (Araoye,2003; Boerma and Urassa, 2001; Ekeh, 2011).

Having children is an essential part of life for most people and in many cultures, and not having children on the other hand, is frequently considered a personal tragedy and a curse, impacting on the entire family and even the local community (Adewunmi, Etti, Tayo, Rabi, Akindele, Ottun Akinlusi, 2012). As a result, infertility has been described and defined in many ways by different professionals. It is commonly described as a woman's inability to conceive as well as being unable to carry a pregnancy to full term. Historically, Dickens in 2002, sees infertility to include 'infecundity, meaning inability to conceive or impregnate, and pregnancy wastage, meaning failure to carry a pregnancy to term through spontaneous abortion and stillbirth; Infertility includes primary infertility, where a couple has never achieved conception, and secondary infertility, where at least one conception has occurred but the couple is currently unable to achieve pregnancy'. As such, infertility is defined as the 'failure to achieve pregnancy after 12 months of unprotected and frequent intercourse in the context of regular ovulation, in a woman aged less than 37 years' (AFP, 2012). It can also be defined as not being able to get pregnant (conceive) after one year of unprotected sex (CDC, 2015).

It is commonly accepted that infertility affects more than 80 million people worldwide and, one in ten couples experiences primary or secondary infertility, and the rates vary

amongst countries from less than 5% to more than 30% (WHO, 2002), while it affects one in every four couples in developing countries (WHO, 2012).

Globally, 48.5 million people of reproductive age are affected by infertility (WHO, 2010) and due to population growth, it is expected that these estimates have increased during the last three years (Davidová Pechová, 2014). But according to the recent publications of the WHO, study (published at the end of 2012) has shown that the overall burden of infertility in women from 190 countries has remained similar in estimated levels and trends from 1990 to 2010. The estimate as at 1990 shows that one in every four couples in developing countries had been found to be affected by infertility, whereas the prevalence of men's cases are yet unknown (WHO, 2015).

The type and prevalence of infertility varies widely from one country to the other (Alhassan, Ziblim and Muntaka, 2014). About 6% of married women 15–44 years of age in the United States are unable to get pregnant after one year of unprotected sex, whereas, almost 12% of women of same age group in the United States have difficulty getting pregnant or carrying a pregnancy to term, regardless of marital status or impaired fecundity (CDC, 2015). In Sub-Saharan Africa, the prevalence of infertility is as high as 30% and the male contribution in most countries, including Nigeria, had been variously estimated to be between 30 and 50% (Ugboaja, Monago and Obiechina, 2010) and about one-third of couples are reported to be infertile in sub-Saharan Africa (Adesiyun, Ameh, Avidime, Muazu, 2011). In fact, prevalence has been reported to be higher in resource-poor developing countries compared to the developed countries (Lunenfield and Steireghem, 2004). Therefore, infertility is a problem of global proportions (Mustapha, Adesiyun, Yusuf, Abdullahi and Lawal, 2015).

Infertility is a complex biological, psychological, and social phenomenon (Davidová Pechová, 2014) and it has been described as the most important reproductive health concern of Nigerian women and, it accounts for between 60 and 70% of gynaecological consultations in tertiary health institutions in Nigeria (Okonofua, 2003). At the study conducted in the University of Ilorin Teaching Hospital, more than 50% of gynaecological consultations are for infertility (Jimoh et al., 2011), in which approximately, 1 in 5 couples seek fertility advice from a doctor and over half of these couples require specialist assistance (AFP, 2012).

Infertility is not always a woman's problem. It is a complex medical disorder with significant psychological and economical dimensions. It is also a unique medical condition in that it involves the couple rather than the individual male or female (Ekeh, 2011). However, the causes can be traced to either of the gender in most cases, or both partners. Causes of infertility vary with gender, same with mode of treatment. In 2002, Makar and Toth found out that there are many biological and other causes of infertility, including some that medical intervention can treat, and the causes of infertility may be known to relate to either the woman or her male partner, or both, or may be unexplained (Fong, Tang, Yeung, 2015). Although male factors contribute to about half of all cases of infertility, this is rarely acknowledged and women are often held responsible for couples' inability to conceive (Dhont, Luchters, Ombelet, Vyankandondera, Gasarabwe, Wiggert and Temmerman, 2010). Women in Ghana also described how the blame for infertility is disproportionately attributed to women (Fledderjohann, 2012). In a third of cases, fertility problems affect only the female. In approximately 25% of cases, the cause of infertility involves both the male and female. In the remaining 10%, no objective cause can be identified (Boivin, Griffiths, and Venetis, 2011; WHO, 2013). As such, both men and women contribute to infertility.

Many couples struggle with infertility and seek help to become pregnant. CDC in 2014 reports that 'infertility in men can be caused by different factors and is typically evaluated by a semen analysis: a slightly abnormal semen analysis does not mean that a man is necessarily infertile. Instead, a semen analysis helps determine if and how male factors are contributing to infertility'. The same 2014 CDC study analysed data from the 2002 National Survey of Family Growth and found that 7.5% of all sexually experienced men younger than age 45 reported seeing a fertility doctor during their lifetime—this equals 3.3–4.7 million men. Out of the men who sought help during the 2002 National Survey of Family Growth, 18% were diagnosed with a male-related infertility problem, including sperm or semen problems (14%) and varicocele (6%). Many medical conditions or exposures have been attributed to infertility; among these include 'diabetes, cystic fibrosis, trauma, infection, testicular failure, or treatment with chemotherapy or radiation, heavy alcohol use, testosterone supplementation, smoking,

anabolic steroid use, and illicit drug use, environmental toxins including exposure to pesticides and lead'(CDC, 2015). Dublin Bishops' Committee for Bioethics in 2003 attributed infertility to non-ovulation and ovulatory dysfunction, inadequacy of sperm or low sperm count, tubal malfunction, cervical hostility, anti-sperm antibodies use and psychosexual factors.

Conditions affecting any reproductive organ of women can contribute to female infertility. Some of these conditions include "irregular periods, polycystic ovary syndrome (PCOS), functional hypothalamic amenorrhea (FHA), diminished ovarian reserve (DOR, this naturally decline with age), premature ovarian insufficiency (POI), menopause, tubal patency (whether fallopian tubes are open, blocked, or swollen (tubal occlusion), history of pelvic infection, history of ruptured appendicitis, history of gonorrhoea or chlamydia, known endometriosis, or a history of abdominal surgery" (CDC, 2015).

The WHO in 2002 outlined communicable diseases like malaria, tuberculosis and infection with the human immunodeficiency virus (HIV) among other diseases as contributing factors to infertility. These also have significant morbidity and mortality and adversely affect developing countries. Bushnik (2012) reports that genital tract infection which includes sexually transmitted infections (STIs), postpartum or post-abort infection and pelvic tuberculosis or schistosomiasis and the advanced age of the female partner (when older than 35 years) also contribute to this public health problem. In a study conducted in Hong Kong, Fong, Tang and Yeung in 2015 reported that nearly half of the women did not know that fertility was affected by age.

1.2 Statement of the Problem

Infertility is a major public health problem in Nigeria. It has been described as the most important reproductive health concern of Nigerian women (Okonofua, 2003) and accounts for between 60 and 70% of gynaecological consultations in tertiary health institutions in Nigeria (Alvarez, 2006; Ojeme, 2011).

Nigeria's with a population estimated to be over 158 million in 2010 (Population Reference Bureau, 2010) has a high population growth rate and also a fertility rate 5.6

births per woman in 2013 (NDHS, 2013). Despite this fertility figure, an institutional-based incidence of infertility in some parts of Nigeria showed that the prevalence of infertility in Ilorin was 4.0 % (Abiodun, 2007). Study by Obuna, Ndukwe, Ugboma, Ejikeme and Ugboma in 2012 also gave an indication of infertility in an outpatient clinic of a resource poor setting in South East Nigeria to be 15.4%. A recent urban profile of infertility conducted in a teaching Hospital in North West Nigeria by Panti Sununu in 2014 showed that up to 15.7% of couples visiting the hospital gynaecological clinic in some parts of Nigeria may have difficulties in achieving a desired conception after two years of marriage without the use of contraceptives. Primary infertility and secondary infertility constituted 32.8% and 67.2% respectively in the hospital based study (Panti and Sununu, 2014).

The availability of Assisted Reproductive Technology (ART) has ensured that infertile couples can address the problem using available technologies. Since its evolution over the last three decades, ARTs have resulted in the birth of more than 5 million children worldwide (ICMART, 2012). The advances in reproductive technologies have opened up new frontiers in medically assisted human reproduction as they have been used to assist many couples to achieve conception and parenthood (Adekile, 2012). The most recent national estimates indicate that 3.8% of all women who gave birth in Australia in 2011 received some form of ART (Macaldowie, Wang, Chughtai and Chambers, 2012). There were success recorded from IVF in the whole of West, East and Central Africa which shows that ARTs are feasible and successful in a low resource settings where staff are trained and equipment are available (Ola, 2013; Kibwana, 2003).

Although ART is available in Nigeria, cost of services is a limiting factor to widespread use. Despite breakthroughs recorded from ART, several barriers limit accessibility to this technology, including availability and affordability of the technologies (Olugbenga-Bello, Wasiu, Sunday, Olarewaju, Olaniyan and Oke, 2014). Research also indicates that a greater percentage of those who experience infertility are poor and ART is still not readily covered by the premium health insurance schemes in Nigeria (Olugbenga-Bello, et al, 2014; Okonufua and Obi, 2009). Current studies available in Nigeria focused on the knowledge, attitude and acceptability of

assisted reproductive technologies by infertile couples (Olugbenga-Bello et al., 2010; Okwelogu, Azuike, Ikechukwu and Nnebue, 2012), but few studies exist to determine the attitude and willingness of infertile persons to use ART. Hence, the need to conduct this study.

Therefore, this study sought to determine attitude and the willingness of infertile persons towards the uptake of assisted reproductive technologies in Adeoyo Maternity Teaching Hospital fertility clinic in Ibadan North Local government area of Oyo State in South-Western Nigeria.

1.3 Justification

In Nigeria, there are limited treatment options currently available for infertile couples (Olugbenga-Bello, et al 2014). As a result, the desire to have children and end the problems of infertility has led many couples to choosing and patronising various treatment centres with different treatments. Because of this challenge, this study aims at exploring attitude and the willingness of infertile persons towards the uptake of assisted reproductive technologies for infertility management in urban and in a hospital settings, since people's perspective is influenced by their health seeking behaviour for treatment.

This study will be useful in sensitizing and planning public enlightenment programmes for the uptake of this modern infertility treatment in public health institutions. The study will also help choose the most appropriate strategies in addressing their inadequacies. It will also help identify the types of ART that these individuals will be willing to adopt and utilise if made available in this health institution and provide evidence for policy formulation and implementation for management of infertility problem through a new, effective and efficient technology.

More so, the study will help in the adoption of measures that will help in revising existing health policies, increase funding of health system and enactment of healthy public policies that will be favourable to both the health system and reproductive health issues. Data that will be provided from this study will help in ascertaining valid and valuable information that will help in carrying-out meaningful trainings and curriculum review for health care providers who work and will be working with infertility clinics in order to provide solutions and reduce the increasing prevalent rate of this health issue.

1.4 Broad Objectives

The broad objective of the study were to determine attitude of infertile persons and their willingness towards the uptake of assisted reproductive technologies for the management of infertility in Ibadan North Local Government, Oyo State.

1.5 Specific Objectives

The specific objectives for the study are to:

1. Determine the attitudes of infertile persons towards the uptake of assisted reproductive technologies (ART) for infertility management in Ibadan North local government
2. Describe the willingness of these individuals towards the uptake of ART for management of infertility in Ibadan North local government.
3. Identify the numbers of couples with infertility issues that are presently utilizing the available forms of ART among those visiting the gynaecological clinic in Ibadan North local government.
4. Identify barriers to the uptake of ART for the management of infertility by the respondents in Ibadan North local government.

1.6 Research Hypothesis

1. There is no significant association between the demographic characteristics of the respondents and their willingness towards the uptake of assisted reproductive technology.
2. There is no significant association between respondents' attitude and the willingness towards the uptake of assisted reproductive technology.
3. There is no significant association between demographic characteristics of the respondents and their attitude towards the uptake of assisted reproductive technology.

4. There is no significant association between types of infertility and the respondents' attitude towards the uptake of assisted reproductive technology.
5. There is no significant association between respondents' willingness to donate reproductive egg/sperm and their attitude towards the uptake of assisted reproductive technology.

1.7 Research Questions

1. What are the attitudes of infertile individuals towards the uptake of assisted reproductive technologies for infertility management?
2. Which types of assisted reproductive technologies are they willing to utilise if made available and affordable in the health system?
3. How many infertile couples are currently utilising various form of ART among those visiting the gynaecological clinic?
4. What are the barriers to the willingness towards the uptake of ART among these individuals?

1.8 Variables

The dependent variables include the attitude and willingness of infertile couples. The independent variables include the socio demographic variables: gender, religion, age as at last birthday, number of children, numbers of years in marriage, occupation, average monthly income etc.

CHAPTER TWO

LITERATURE REVIEW

2.1 Nature of infertility

Inability to have pregnancy, maintain a pregnancy, carry a pregnancy to a live birth by a woman (WHO, 2012) or conceive as expected affects men and woman alike, as both genders report associated psychological distress, depression, and low self-esteem (Hollos, 2003; Chachamovich, Chachamovich, Ezer, Fleck, Knauth and Passo, 2010; Cui, 2010) and it is a major public health problem with devastating consequences and, has been described as an important reproductive health concern of women and a common reason for gynaecological clinic consultations in Nigeria (Olugbenga-Bello, et al 2014). It extends beyond the loss of human potential and unrealized self. As such, it is a cause of physical, social and verbal abuse of couples affected (Ola, 2013).

‘Individuals and couples are increasingly seeking the assistance of reproductive services to assist with fertility in circumstances where they are unable to bring their reproductive desires to fruition, such as when a viable other-sex partner is not available or when thwarted by infertility’ (Dooley, 2014). Difficulty with conception, called infertility, is a common reason for young couples to present to their primary care physician. Most experts define infertility as the inability to conceive after at least one year of unprotected intercourse. As such, women who are able to get pregnant but then have recurrent miscarriages are also said to be infertile (Davidová and Pechová, 2014). This term ‘infertility’ is used synonymously with sterility, infecundity, childlessness and sub-fertility and are used both interchangeably and inconsistently (Mascarenhas, Cheung, Mathers and Stevens, 2012).

Black’s medical dictionary defines infertility as when a couple has not achieved a pregnancy after one year of regular unprotected sexual intercourse. Similar definition was provided by Practice Committee of the American Society for Reproductive Medicine (ASRM) in 2013 as the ‘failure to achieve a successful pregnancy after 12 months or more of appropriate, timed unprotected intercourse or therapeutic donor insemination’. Prasanna (2010) stated that 24 months of trying to get pregnant by woman are recommended as the definition for infertility. In the opinion of Gurunath, Pandian, Anderson and Bhattacharya (2011), ‘definitions of

infertility differ, with demographers tending to define infertility as childlessness in a population of women of reproductive age, while the epidemiological definition is based on “trying for” or “time to” a pregnancy, generally in a population of women exposed to a probability of conception’.

To provide further understanding of the concept of infertility, U.S. Department of Health and Human Services sees infertility to mean ‘not being able to get pregnant after one year of trying. Or, six months, if a woman is 35 or older. Women who can get pregnant but are unable to stay pregnant may also be infertile.’ This is also in line with what CDC in 2015 defines infertility to be: “not being able to get pregnant (conceive) after one year of unprotected sex”, therefore, it advised that “women who do not have regular menstrual cycles, or are older than 35 years and have not conceived during a 6-month period of trying, should consider making an appointment with a reproductive endocrinologist—an infertility specialist.”

To further provide a clear view of the problem at hand, The World Health Organization in 2013 defines infertility as follows:

“a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (and there is no other reason, such as breastfeeding or postpartum amenorrhoea). Primary infertility is infertility in a couple who have never had a child. Secondary infertility is failure to conceive following a previous pregnancy. Infertility may be caused by infection in the man or woman, but often there is no obvious underlying cause.”

The emotional, physical and financial costs borne by couples experiencing infertility can be substantial (Macaluso, Wright-Schnapp, Chandra, Johnson, Satterwhite, Pulver, Berman, Wang, Farr and Pollack, 2010) and it has been found out that it has extended beyond just pregnancy or its absence, it has significant public health consequences, including psychological distress (Bak, Seok, Song, Kim, Her and Yoon, 2012), social stigmatization, economic constraints (Wu, Elliott, Katz and Smith, 2013) and later, the onset of adult diseases in both men and women (Merritt, Der Pari, Vitonis, Titus, Cramer and Terry, 2013). In a bid to find a lasting solution to this problem, challenges associated with infertile couples seeking different health care providers and adopting

different health seeking behaviours varies, this , ranges from traditional/alternative health care to orthodox medical types such as Assisted Reproductive Technology (ART) and spiritual including syncretic types, where she may be asked to sleep in holy place(s) and bathe in the open space beside the river bank (Aluko-Arowolo, 2014), yet, many are still battling with the problem up till date with little or no success story.

Primary and secondary infertility

Primary infertility is where a couple have never had children, or have been unable to achieve pregnancy after one year of having unprotected sexual intercourse (Davidová and Pechová, 2014). Mascarenhas, Cheung, Mathers and Stevens in 2012 sees primary infertility as ‘the absence of a live birth for women who desire a child and have been in a union for at least five years, during which they have not used any contraceptives’.

Secondary infertility is defined as the inability of a sexually active and non-contraceptive woman who has previously had a live birth to have a child despite cohabitation and the wish to become pregnant for at least 12 months (Alhassan et al., 2014). In a comprehensive sentence, secondary infertility can be a situation where a couple have had children or achieved pregnancy previously, but are unable to conceive at this time, even after one year of having unprotected sexual intercourse.

The reasons for infertility may involve one or both partners. These abnormalities or inability to conceive as at when due are dependent on different factors, which extends from natural, environmental, chemical to behavioural and health status of an individual. In approximately 25% of cases, the cause of infertility involves both the male and female. In the remaining 10%, no objective cause can be identified (Boivin, Griffiths and Venetis, 2011; WHO, 2013).

2.2 Nature and extent of infertility as a Public health Problem

According to the WHO, globally, 48.5 million people of reproductive age are affected by infertility (Mascarenhas et al., 2012; WHO, 2010). However, due to population growth, it is expected that these estimates have increased during the last three years

(Davidová and Pechová, 2014). Global estimates suggest that nearly 72.4 million couples experience fertility problems and approximately 15%, of all couples are confronted with infertility (Gurunath, et al, 2011), and it is estimated to be affecting 10–15% of couples in industrialized countries (Evers, 2002).

Although the fertility rate has declined in recent years to the lowest rates ever recorded in the United States (Hamilton, Martin and Ventura, 2012), but nearly 20% of women 40 to 44 years of age in the United States are still childless (U.S. Census Bureau, 2010). Despite this figure, the desire for children has remained high and unchanged for decades (Newport and Wilke, 2013). In the Czech Republic, infertility affects 15% of couples of reproductive age among those seeking ART in the country (ČTK, 2013).

This infertility health condition is very common in Africa according to 2011 report from the World Health Organization WHO. Infertility has recently been construed to be a serious problem in sub-Saharan Africa. 'This problem seems to be viewed as of low priority with reference to the effective and efficient allocation of available health resources by national governments as well as by international donors sponsoring either research or service delivery in the public health sector' (Akinloye, 2011). In Sub-Saharan Africa, the prevalence varies widely from 9% in the Gambia and 11.8% in Ghana to 21.2% in north-western Ethiopia and 20%–45% in Nigeria (Adewunmi et al., 2012). Africa thus shares a large burden of infertility due to its double burden of disease, and the inability to manage and treat sexually transmitted infections effectively and efficiently has been established scientifically to be a major contributing factor to infertility.

Infertility seems to be on the increase in Nigeria. It has been described as an important reproductive health concern of women and a common reason for gynaecological clinic consultations (Olugbenga-Bello et al., 2014). As such, the prevalence of infertility in Nigeria has been studied in demographic surveys, epidemiological surveys and through clinical observations. The management of the Nordica Fertility Clinic, an assisted reproduction service centre in Lagos, Nigeria, reported in 2010 that over 40-50% of all consultations in gynaecological clinics in the country are done for

infertility and that infertility affects 20- 25% of married couples in Nigeria. This was in agreement with what Okonofua found out in 2005 that infertility is a major burden on clinical service delivery in the country, being more than 50% of gynaecological caseloads and constituting over 80% of laparoscopic investigations.

2.3 Contributing factors to infertility

Different factors are contributing to infertility across the globe. Major risk factors for infertility include increasing age, obesity, and sexually transmitted infections (Dooley, 2014). Established and possible causes of infertility, according to CDC in 2014, may include genetic abnormalities, aging, and certain acute and chronic diseases, behavioural risk factors (e.g., body weight, smoking) and exposure to certain environmental, occupational, and infectious agents. A woman is most fertile in her early 20s. After age 35, the chance a woman can get pregnant drops greatly after age 35 (and especially after age 40). The age when fertility starts to decline varies from woman to woman (MedlinePlus.com). In terms of ovarian reserve, a typical woman has 12% of her reserve by age thirty and only about 3% at the age forty with 81% of variations reserve being due to age alone (Wallace and Kelsey, 2010). As cited in Ekeh, 2011, analysis of the relationship between female age and fertility found that: by age thirty, 7% of couples were infertile; by age thirty-five, 11% of couples were infertile; by age forty, 33% were infertile and by age forty-five, 87% of couples were already infertile, thus, making age as one of the single and most important factor in female fertility.

An online medical encyclopaedia of MedlinePlus and CDC (2014) outlined several factors to the cause of infertility, among these include inability of a fertilized egg or embryo to survive once it attaches to the lining of the womb (uterus), failure of the fertilized egg not to attach to the lining of the uterus, inability of eggs to move from the ovaries to the womb, problems resulting from the failure of ovaries to produce eggs, autoimmune disorders, birth defects that affect the reproductive tract, cancer or tumour, clotting disorders. Other contributing factors include diabetes, drinking too much alcohol, smoking, obesity, too much of exercise, eating disorders or poor nutrition, growths (such as fibroids or polyps) in the uterus and cervix, medicines

such as chemotherapy drugs, hormone imbalances, older age, ovarian cysts and polycystic ovary syndrome (PCOS), pelvic infection or pelvic inflammatory disease (PID), damages done to womb from sexually transmitted infection, abdominal surgery, surgery done to prevent pregnancy (tubal ligation) or failure of tubal ligation reversal (reanastomiasis), thyroid disease, physical and emotional factors (MedlinePlus, 2014; CDC, 2014).

Factors contributing to infertility in men include decrease in numbers of sperm, blockage that prevents the sperm from being released, defects in the sperm, birth defects, the use of chemotherapy and radiation for cancer treatment, exposure to high heat for prolonged periods, heavy use of alcohol, smoking of marijuana or cocaine, hormone imbalance, impotence, infection, the use of medicines such as cimetidine, spironolactone and nitrofurantoin, obesity, older age, retrograde ejaculation, scarring from sexually transmitted infections, injury, surgery, smoking, accumulation of toxins into the blood system from the environment, vasectomy or failure of vasectomy reversal, physical and emotional factors (Medline Plus. com).

Environmental and occupational hazards account for an unknown proportion of male infertility but are suspected causes of declining human sperm quality in industrialized countries (Rolland, Le Moal, Wagner, Royère and De Mouzon, 2013).

One example of a recognized, preventable risk factor for infertility in women and men is untreated sexually transmitted infection (STI). In particular, infection with *Chlamydia trachomatis* increases the risk of pelvic inflammatory disease (PID) in women (Oakeshott, Kerry, Aghaizu, Atherton, Hay, Taylor-Robinson, Simms and Hay, 2010) and if left untreated, according to Oakeshott et al (2010), PID can cause structural or functional fallopian tube damage known as tubal factor infertility.

2.4 Assisted Reproductive Technology (ART)

According to Fathalla in 2002, “our human species is not exactly known for its willingness to comply with divine instruction. But when God said unto them ‘Be fruitful and multiply’, they were more than eager to comply.” In achieving the mandate of the divine creation, majority of couples had no problem in conceiving and reproducing as at when due and expected. A minority, however, were distressed because of delay or inability to conceive and bring forth children (WHO, 2002). As

such, medicine tried to help them to conceive naturally. There remained, however, a group who could not reproduce naturally without assistance.

Over the last two decades, Assisted Reproductive Technologies (ART) had assisted reproduction, increased the chances of conception, diagnosis and embryo selection (Ola, 2013). Further into the future, ART allowed a much better understanding of the early stages of human development and differentiation, and opened up a new field of stem cell research, bringing a new hope for the treatment of certain serious diseases, for which no effective treatment is currently available (Fathalla, 2002) and has rapidly increased and the number of countries now practicing ART has multiplied many times and it is now widely available in Asia, the Middle East, South America, and parts of Africa (Ola, 2013).

The first recorded experiment with artificial insemination in humans occurred in the late 1700s, when Scottish-born surgeon John Hunter impregnated a woman with her husband's sperm, resulting in a successful pregnancy, and in 1884 American Physician William Pancoast performed a modified artificial insemination procedure when he injected sperm from a donor into a woman who was under anaesthesia (Encyclopaedia Britannica, 2013). The woman, who was married, gave birth to a baby nine months later and did not know that she had been impregnated with donor sperm. Her husband, whom Pancoast determined was infertile, later found out about the procedure from Pancoast. Later on, the birth of Louise Brown in 1978, through the technique of in-vitro fertilization by Robert G. Edwards and Patrick Steptoe, was a path-breaking step in control of infertility; it is, in retrospect, considered as one of the most ARTs that have evolved over the last three decades into a suite of mainstream medical interventions that have resulted in the birth of more than 5 million children worldwide (ICMART 2012) and there has been a significant increase in the use of assisted reproductive technologies in many developed countries, like Canada, making it an important medical advances of the last century.

Today artificial insemination in humans is considered a form of assisted reproductive technology. Women impregnated in this way are physically capable of conceiving and

bearing children, though they are unable to conceive through sexual intercourse, usually because their husband is sterile or impotent. Fresh semen is obtained from the husband (if he is impotent) or from some other male donor (if the husband is sterile) and is introduced by a syringe into the woman's vagina or cervix during the middle of her menstrual cycle. The semen can also have been previously frozen and stored in a sperm bank. The technique is reasonably successful in achieving conception and pregnancy.

Stanford in 2013 reported that the number of ART cycles (which is primarily in-vitro fertilization [IVF] cycles) performed in the United States has increased from 99,629 in 2000 to 163,039 in 2011, and ART procedures were used for more than 1% of total births in the United States in 2011. The most recent national estimates indicate that 3.8% of all women who gave birth in Australia in 2011 received some form of ART (Macaldowie et al., 2012). This has led to the birth of over 3.5 million babies worldwide with the aid of ARTs treatment (Sullivan, 2010). This is evidence in its use in Australia, where about 3.3% of all babies born in 2008 (56 923 births) were a result of IVF (Sullivan, 2010) and many more were associated with ovulation assistance or artificial insemination.

Infertility is increasingly being overcome through advancements in fertility treatment, in particular assisted reproductive technologies (ARTs), and through these assistance, whether minimal or high level, aims to optimise the chances of having a singleton pregnancy and the birth of a healthy baby (AFP, 2012).

Medicinenet (2013) defines Assisted Reproductive Technology (ART) as a group of different methods used to help infertile couples. Assisted reproductive technology (ART), according to WHO and ICMART (2008), is defined as 'all treatments or procedures that include the in-vitro handling of both human oocytes and sperm, or embryos, for the purpose of establishing a pregnancy'. ART works by removing eggs from a woman's body. The eggs are then mixed with sperm to make embryos. The embryos are then put back in the woman's body.

Medicinenet reports that success rates vary and depend on many factors. Some things that affect the success rate of ART include: age of the partners, reason for infertility,

clinic, type of ART, if the egg is fresh or frozen and if the embryo is fresh or frozen. According to the 2011 CDC report on ART, the average percentage of ART cycles that led to a live birth were: 39% in women under the age of 35, 30% in women aged 35-37, 21% in women aged 37-40, 11% in women aged 41-42. The latest report based on CDC's 2013 Fertility Clinic Success Rates Report shows that, there were 190,773 ART cycles performed at 467 reporting clinics in the United States during 2013, resulting in 54,323 live births (deliveries of one or more living infants) and 67,996 live born infants. According to CDC, of the 190,773 ART cycles performed in 2013, 27,564 were banking cycles in which the intent of the ART cycle was to freeze all resulting eggs or embryos for future use and for which none expectation of pregnancy or birth was approximately 1.5% of all infants born in the United States using ART.

Developing countries are no exemption to this development. Ola in 2013 reported that various forms of ART are now available in Nigeria and other sub regions since the Lagos University Teaching Hospital team of Giwa-Osagie, Ashiru and Abisogun produced pregnancies through IVF in 1984, 1986, and a live birth in 1989 (Giwa-Osagie, Ogedengbe and Emuveyan, 1987). As such artificial insemination by husband (AIH), donor insemination(DI), in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), zygote intrafallopian transfer (ZIFT), intracytoplasmic sperm injection (ICSI), embryo freezing and embryo donation, surrogate motherhood are now widely available in Nigeria , but in the hands of over 15 private hospital managers (Orhue, 2010).

Individuals and couples are increasingly seeking the assistance of reproductive services to assist with fertility in circumstances where they are unable to bring their reproductive desires to fruition, such as when a viable other-sex partner is not available or when thwarted by infertility (Obuna, Ndukwe, Ugboma, Ejikeme and Ugboma, 2012).

2.5 Types of Assisted Reproductive Technologies (ART)

The term ART encompasses a range of strategies to help people conceive. WHO in 2002 identified different types of ART to include the following:

1. in vitro fertilization and embryo transfer
2. gamete intrafallopian transfer
3. zygote intrafallopian transfer
4. tubal embryo transfer
5. gamete and embryo cryopreservation
6. oocyte and embryo donation and
7. gestational surrogacy.

ART does not include assisted insemination (artificial insemination) using sperm from either a woman's partner or a sperm donor (WHO, 2012).

But according to Ekeh (2011), the various types of ART can be grouped into two: low-tech fertility (Low-Tech ART) and high-tech fertility treatments. As classified, the low-tech treatment include: timed intercourse, artificial inseminations (intrauterine, intravaginal, intracervical, intra-tubal, intrauterine tuboperitoneal, donor sperm or egg/ embryo and gamete intrafallopian transfer inseminations), while the high-tech ART treatment include in vitro fertilization-embryo transfer (IVF-ET), zygote intrafallopian transfer (ZIFT) and gestational surrogacy.

2.6 Low-Tech Fertility Treatments (Low-Tech ART)

A. Timed intercourse

If production of sperm is low, couples are typically encouraged to limit their frequency of intercourse and to time their intercourse to coincide with periods of ovulation in the female. Timed intercourse is the most basic and simplest of all infertility treatment procedures which is applied in the cases of unexplained infertility. Education, information, and counselling are provided to couples in order to help identify ovulation period, optimal timing for intercourse in relation to ovulation and reasonable time frames for couples to achieve pregnancy.

B. Artificial inseminations

An artificial insemination is an alternative method of treating infertility. If the male is normally fertile but for some reason is not transmitting sufficient sperm, he may donate semen whose sperm cells can be concentrated and then introduced into the

woman's uterus artificially. This involves a series of procedures in which medical expert helps in the placement of sperms into the woman's genital tract, instead of achieving the process through the usual sexual intercourse that exist between the two partners.

The artificial inseminations comprise of different types, and they are applied or recommended according to the outcomes of medical test and analysis carried out prior the commencement of the insemination.

i. Intrauterine insemination (IUI)

The Intrauterine insemination (IUI) is the placement of a well washed and prepared man's sperm into a woman's uterus using a long, narrow tube (ASRM, 2012). Medicinenet (2015) sees IUI as an infertility treatment that is often called artificial insemination and used for couples with unexplained infertility. This involves the transfer of potentiated sperm using special insemination catheters through the cervical into the uterine cavity using aseptic technique at the peri-ovulatory period which commonly nowadays is preceded by a super ovulation treatment (with gonadotrophin and human chorionic gonadotrophins to trigger ovulation) to facilitate release of several Oocytes to enhance the prospect of conception. This is currently the most widely practiced form of artificial insemination involving the placing of a carefully prepared or washed sperms (of about 0.1 to 1.0 ml) in the uterine cavity with the aid of a small cather through the cervix (Ekeh, 2011; Okonufua, 2010) in order to allow a relatively higher concentration of spermatozoa to reach the oocyte so as to initiate fertilization. It does not involve sexual intercourse but the artificial fertilization occurs within the human body (in vivo).

IUI was first applied in clinical practices as far back as in the 1980's (Lalich, 1986; Ekeh, 2011) as treatment for poor post coital test and immunologic infertility. This type of inseminations is mostly used in situations where there is hypospadias, retrograde ejaculation, impotence, vaginismus and routine first-line treatment for unexplained infertility in both male and female. According to ASRM, IUI is most effective for treating:

- women who have scarring or defects of the cervix or Women who have problems with their cervical mucus (Medicinenet, 2015)
- men who have low sperm counts

- men who have sperm with low mobility
- men who cannot get erections
- men who have retrograde ejaculation, a condition in which sperm are ejaculated into the bladder instead of out of the penis
- IUI can be used in combination with medications that stimulate ovulation; this combination can increase the chance of pregnancy in some cases.

A combination of IUI procedure with combination of ovarian hyperstimulation has been found to be effective in the study carried in USA (Guzick, Carson and Coutifaris, 1999; Ekeh, 2011) and has also been found to be the first-line choice of treatment of unexplained infertility in low-tech settings in resource-poor countries (Abdelkader and Yeh, 2009).

The success of IUI depends on the cause of the couple's infertility. According to Macaldowie, Wang, Chughtai and Chambers (2012), 'of 2,283 DI cycles reported in Australia, 15.0% resulted in a clinical pregnancy and 12.2% resulted in a live delivery and the clinical pregnancy rate and live delivery rate was highest in women aged under 35 and decreased with advancing women's age'. If inseminations are performed monthly with fresh or frozen sperm, success rates can be as high as 20% per cycle depending on whether fertility medications are used, the age of the female partner, and the infertility diagnosis, as well as on other factors that could affect the success of the cycle.

ii. Intravaginal insemination (IVI)

This is simplest form of artificial insemination although rarely performed as it is only indicated in those rare instances where the woman's partner is unable to ejaculate within the vagina but can ejaculate by other means such as masturbation or with the aid of a penile vibrator. In recent times, especially in developed countries, lesbians are now using these but with donor sperms. The cost is that of a sterile pot and syringe.

iii. Intracervical insemination (ICI)

In this kind of artificial insemination, the sperm sample is injected directly unto the woman's cervix. Indications are essentially the same as for intravaginal insemination,

but usually performed by the physician or fertility specialist and it is relatively cheaper than IUI but more expensive than IVI.

iv. Intratubal insemination (ITI) is the most rare and invasive form of artificial insemination and also the most costly. Sperms are deposited directly inside the fallopian tubes in order to aid quick fertilization without involving much energy for motility of the sperms to the fallopian tube where fertilization will take place.

v. Donor sperm (DS) or Donor eggs/embryos covers a range of techniques of placing sperm into the female genital tract using donated sperm from a man who is not the woman's partner (Macaldowie et al., 2012). It is an IUI procedure which is usually carried out in situation where azoospermia or severe oligozoospermia that pregnancy is unlikely, resulting from either conditions of testicular trauma, genetic defects or cancer therapies with radiation. In the case of DSI, donor can be known or remained anonymous, often regarded as commercial donors. Rigorous screening for medical and genetic disease is mandatory for all donors such that frozen donor sperm could be the norm. Designated or a known donor appears to be more utilised in resource-poor developing countries while commercial or anonymous donor sperm services is more pronounced in developed countries (Ekeh, 2011).

In the case of woman, egg is retrieved from the body of a donor. Egg retrieval is the process used to remove the eggs from the ovaries so they can be fertilized. A mild sedative and painkiller are often used during the procedure, and it normally takes about 30 minutes. The steps for egg retrieval are:

- an ultrasound probe is inserted into the vagina to visualize the ovaries and the follicles, which contain the eggs.
- a needle is inserted through the wall of the vagina to the ovaries.
- suction is used to pull the eggs from the ovaries into the needle.

Egg donation is the donation of an unfertilised egg not belonging to the female member of the couple attempting to conceive. The donor may or may not be known to the couple (Assisted Conception Australia and New Zealand 1999 and 2000). It is used when a woman does not produce healthy eggs that can be fertilized. An egg donor undergoes ovary stimulation and egg retrieval steps of IVF. The donated egg can then be fertilized by sperm from the woman's partner, and the resulting embryo is

placed into the woman's uterus. Egg donation may be particularly helpful for women who:

- Have primary ovary insufficiency (POI)
- Have had chemotherapy or radiation therapy
- Have had surgical removal of the ovaries
- Were born without ovaries
- Are carriers of known genetic diseases
- Are infertile because of poor egg quality

DS is appropriate in certain circumstances when other ART procedures had been used and failed or when hormonal tests indicate very poor reproductive potential or when the woman has no eggs or absent of ovaries at birth or damaged via surgical removal or radiation or chemotherapy etc. Choosing the appropriate egg and laboratory screening and tests are the major challenges facing this procedure.

vi. Gamete intra-fallopian tube Transfer (GIFT)

A procedure where an egg (or more than one egg) retrieved from the body of a woman and sperm obtained from a male are both inserted back into the fallopian tube of a woman, with the aim to achieve fertilisation (and then pregnancy) within the body of the woman (RTC, 2012). Thus, fertilization and early embryo are hoped to occur in the natural environment of the fallopian tube and womb rather than the more high –tech laboratory of dishes and culture media. It is of note that this is one of the fertility treatment procedures officially recognised by the Roman Catholic Church (Ekeh, 2011). Gamete intrafallopian transfer (GIFT) is an ART treatment where mature oocytes and sperm are placed directly into a woman's fallopian tubes. This involves the transfer of Oocyte and potentiated sperm to the fallopian tube with the laparoscope for in vivo fertilization and subsequent implantation and pregnancy. Although this does not also involve sexual intercourse, the artificial fertilization occurs in vivo within the human body.

2.7 High –Tech Fertility Treatments (High-Tech ART)

i. In Vitro Fertilization-Embryo Transfer (IVF or IVF-ET) (also called test-tube conception)

Treatment of the infertile was based on the traditional concept of identifying and treating causes, but this was largely unsuccessful with respect to infertility treatments until the introduction of IVF in 1978 and its success thereof (Ekeh, 2011). In Vitro Fertilization (IVF) is a medical procedure in which mature egg cells are removed from a woman, fertilized with male sperm outside the body, and inserted into the uterus of the same or another woman for normal gestation (Encyclopaedia Britannica, 2013). Instead of meeting in the fallopian tube for fertilization to occur, the eggs and sperms are brought together in a dish in the laboratory. After fertilization has occurred, the zygote are transferred into the womb to continue growth. A health care provider places the embryo into the woman's uterus, where it may implant and result in a successful pregnancy (ASRM, 2012). Although IVF with re-implantation of fertilized eggs (ova) has long been widely used in animal breeding, the first successful birth of a human child from IVF, carried out by British gynaecologist Patrick Steptoe and British medical researcher Robert Edwards, did not take place until 1978.

In Vitro Fertilization (IVF), one of the methods of medically assisted reproductive technology (ART), has become the procedure of choice for the infertile or those who are involuntarily childless who can afford it in Nigeria, as in other parts of the world (Yusuff, 2013).

Reproductive Technology Council (RTC) in 2012 defines it as ‘a procedure whereby an egg (or more than one egg) is retrieved from the body of a woman and combined with sperm outside the body to achieve fertilisation. In vitro fertilization is generally undertaken only after an exhaustive evaluation of infertility has been made. A number of the candidates for IVF are women who suffer from blocked or absent fallopian tubes; others are couples in which the male partner has a low sperm count or couples whose infertility is unexplained. The IVF procedure includes the recovery (by needle aspiration) of mature eggs and the incubation of the eggs in a culture medium, as well as the collection and preparation of sperm and its addition to the medium. In certain cases (e.g., low sperm count) intracytoplasmic sperm injection (ICSI) may be

necessary. In this technique deoxyribonucleic acid (DNA) from sperm is injected via a needle into an egg. Fertilization generally occurs within 12 to 48 hours. The potential embryo is then placed in a growth medium, where it is observed periodically for division into two-cell, four-cell, and eight-cell stages. During this period the mother receives progesterone to prepare her uterine lining for implantation of the embryo. The embryo, which at this point is known as a blastocyst, is introduced through the cervix into the uterus, in which the blastocyst seems to float free for about three-and-a-half days. If the procedure is successful, the embryo implants itself in the uterine wall, and pregnancy begins (Encyclopaedia Britannica, 2013; Orhue, 2010). If many embryos develop some of the surplus embryos may be frozen and used later (RTC, 2012). One or more fertilized eggs (embryos) may be transferred into the woman's uterus, where they may implant in the uterine lining and develop. It thus involves artificial fertilization outside the human body and without sexual intercourse (Orhue, 2010). The steps of IVF are:

- Stimulation of Egg Maturation
- Egg Retrieval
- Fertilization
- Embryo Transfer
- Stimulation of Egg Maturation

In this process, also known as ovarian stimulation or ovulation induction, a woman takes medication to stimulate the ovaries to make many mature eggs at one time.

These medications are given by injection for 8 to 14 days. A health care provider closely monitors the development of the eggs using trans-vaginal ultrasound. Blood is drawn frequently to assess oestrogen production by the ovaries. When the eggs are mature—as determined by the size of the ovarian follicles and the level of Oestrogen—an Hcg injection initiates the ovulation process. A health care provider takes out (egg retrieval) the eggs 34 to 36 hours after the injection. The IVF process takes between 4-6 weeks from ovarian stimulation to embryo transfer. Failure of IVF is typically the result of unsuccessful implantation or miscarriage.

Possible explanations for failed implantation are immune rejection by the woman; an embryo with an abnormally thick outer membrane (zona pellucida) that prevents

embryo hatching once inside the uterine cavity; lack of synchronization between embryonic stage and endometrial development at the time of embryo introduction into the uterus; and embryonic aneuploidy (abnormal chromosome number). Changes in chromosome structure are a central cause of miscarriage in IVF (Encyclopaedia Britannica, 2013).

Every necessary medical procedure is carefully carried out to ensure fertilization. If the sperm are healthy, they are placed in a dish with the egg and left overnight in an incubator. Fertilization usually occurs on its own. However, sometimes sperm are not able to fertilize the egg on their own. When this is the case, a single sperm is injected into an egg using a needle. This process is called intra-cytoplasmic sperm injection (ICSI). About 60% of IVF in the United States is performed with ICSI. The number of pregnancies from IVF using natural fertilization is about the same as the number resulting from ICSI.

Couples should consider genetic testing if the sperm cannot fertilize the egg on their own. The testing can determine whether the sperm have chromosome problems that might cause development problems in the resulting embryos. Embryos that develop from IVF are placed into the uterus from 1 to 6 days after retrieval.

ii. Zygote intra fallopian tube transfer (ZIFT) or Embryo Transfer

This involves the transfer of zygote (from fertilization of oocytes obtained through IVF and potentiated sperm) to the fallopian tube with the laparoscope. The fertilization is done in vitro before the transfer and without sexual intercourse. It is a high tech ART different from GIFT in that the eggs are inseminated in a laboratory dish to achieve fertilization before being transfer to the fallopian tube as per the GIFT procedure.

The procedure is normally painless, but some women may experience cramping. A health care provider inserts a long, thin tube through the vagina and into the uterus and injects the embryo into the uterus. The embryo should implant into the lining of the uterus 6 to 10 days after retrieval.

iii. Intra-cytoplasmic sperm injection (ICSI)

With the introduction of intracytoplasmic sperm injection (ICSI) (Fathalla, 2002), ART can now help infertile couples with a male factor, a condition for which results of traditional treatment have not been satisfactory. In certain cases (e.g., low sperm count) intracytoplasmic sperm injection (ICSI) may be necessary. In this technique deoxyribonucleic acid (DNA) from sperm is injected via a needle into an egg through a microsurgical technique or by using a needle in a procedure known as microsurgical epididymal sperm aspiration (MESA) (RTC, 2012). Fertilization generally occurs within 12 to 48 hours. The potential embryo is then placed in a growth medium, where it is observed periodically for division into two-cell, four-cell, and eight-cell stages (Encyclopaedia Britannica, 2013). The potential of ART is now not limited. This is a complimentary procedure to IVF when there are abnormalities of either low or deformed sperms or a severe male infertility. In extreme and appropriate cases, spermatid or yet immature spermatozoon obtained from the epididymis may be used. It involves directly injecting a single spermatozoon, unto an oocyte using special equipment (The ICSI machine).

Intracytoplasmic sperm injection (ICSI) is a treatment for men with very low sperm counts or with sperm that for some other reason are unable to fertilize an egg. The first child conceived by this method was born in 1992 (Encyclopaedia Britannica, 2013). ICSI involves the direct injection of a single sperm into the cytoplasm (cell material surrounding the nucleus) of an egg that has been retrieved for IVF. RTC (2012) sees it as 'an IVF technique where to achieve fertilization a single sperm is injected directly into an egg'. If a man has an obstruction in the genital tract that prevents sperm from moving through the genital ducts, sperm can be taken directly from the epididymis, the coiled channels that provide nourishment to the sperm. Eggs that are successfully fertilized are placed in the woman's uterus. It can help fertile couple as well to conceive healthy children through the application of new technologies of pre-implantation genetic diagnosis and embryo selection (Jimoh, Saka, Saidu, Salaudeen, Raji, Yahaya and Dare, 2011) . This is a major break-through in the treatment of male infertility.

Intra-cytoplasmic sperm injection (ICSI) and Intra-cytoplasmic morphologically selected sperm injection (IMSI)

Intra-cytoplasmic morphologically selected sperm injection (IMSI) is different from ICSI in that in selecting, the sperms are magnified 6500 times as opposed to 200 times using a regular ICSI microscope. This way, the most subtle sperms can be ignored in the continued search for more normal sperms. This radically improved the outlook for couples with severe male factor infertility. IMSI is also beneficial in couples with recurrent failure of IVF/ICSI, recurrent implantation failure, recurrent biochemical pregnancies, recurrent pregnancy loss, severely reduced sperm motility (Abayomi, 2015).

A review done on the first 1000 IMSI cases at Nordica Fertility Centre, Nigeria, shows a fertilization rates of 87.5% (9 out of 10 of the eggs fertilised), pregnancy rate of 42% and live birth of 39% (almost half of all couples treated achieved pregnancy), and about 98% of these couples being are patients with poor prognostic diagnosed severe male factor infertility and recurrent failed ICSI (Abayomi, 2015).

According to Abayomi (2015), "there is evidence to suggest that rising incidence in male factor infertility all over the world with a recent survey showing that 1 out of 5 young men in Europe in the age range of 18-25 years have semen parameters, which indicate that they were sub fertile". Parameters of semen parameters of men presenting in 2003 and 2013, as reported by Nordica fertility Centre, Nigeria, showed a 37% drop in men's sperms count and worsening mean sperm motility in the 10 year survey (Abayomi, 2015). As such, IMSI is a major way to assist conception in these couples.

iv. Surrogates and/ Gestational Carriers (Third Party Assisted Reproductive Technology)

When couples do not achieve pregnancy from infertility treatments or traditional ART, they may choose to use a third party assisted ART method to have a child (ASRM, 2012). Assistance can consist of:

- Sperm Donation
- Egg Donation

- Surrogates and Gestational Carriers
- Sperm Donation

Couples can use donated sperm when a man does not produce sperm or produces very low numbers of sperm, or if he has a genetic disease. Donated sperm can be used with intrauterine insemination or with IVF.

‘Gestational surrogacy is an arrangement where a woman, known as the ‘gestational carrier’, agrees to carry a child for another person or couple, known as the ‘intended parent(s)’, with the intention that the child will be raised by the intended parent(s). The oocytes and/or sperm used to create the embryo(s) in the surrogacy cycle can be either from the intended parents or from a donor(s) (Macaldowie et al., 2012). If a woman is unable to carry a pregnancy to term, she and her partner may choose a surrogate or gestational carrier (ASRM, 2012). A surrogate is a woman inseminated with sperm from the male partner of the couple. The resulting child will be biologically related to the surrogate and to the male partner. This procedure involves making an arrangement with a woman who will be a surrogate. A surrogacy arrangement is an arrangement whereby a woman agrees to become or attempts to become pregnant and bear a child for another person or persons (RTC, 2012). Surrogacy can be used when the female of the couple does not produce healthy eggs that can be fertilized. A pregnancy may be carried by the egg donor (traditional surrogate) or by another woman who has no genetic relationship to the baby (gestational carrier). If the embryo is to be carried by a surrogate, pregnancy may be achieved through insemination alone or through ART. If the embryo is to be carried by a gestational carrier, the eggs are removed from the infertile woman, fertilized with her partner’s sperm, and transferred into the gestational carrier’s uterus. The gestational carrier will not be genetically related to the child. All parties benefit from psychological and legal counseling before pursuing surrogacy or a gestational carrier.

As a successful ART practice in Australia, ‘among the 121 gestational carrier cycles, 30 (24.8%) resulted in a clinical pregnancy and 19 (15.7%) resulted in a live delivery. All 19 babies born to gestational carriers were live born singletons’(Macaldowie et al., 2012). Although the fertility rate has declined in recent years to the lowest rates ever recorded in the United States (Hamilton, Martin and Ventura, 2012), and nearly 20% of women 40 to 44 years of age in the United States are childless (U.S. Census

Bureau, 2010), the desire for children has remained high and unchanged for decades (Newport and Wilke, 2013).

2.8 Factors influencing the use of ART

Assisted Reproductive Technology (ART) services, including in-vitro fertilisation (IVF), intrauterine insemination (IUI), and Gamete Intra Fallopian Transfer (GIFT), can help families struggling with infertility achieve a successful pregnancy, since it has been used for a long time and has a safe track record and high success rate.

Clinical practice can achieve pregnancies in couples where there are no spermatozoa in the ejaculate, efficiently freeze human gametes and embryos, and perform whole chromosome scanning of the pre-implantation embryo (Brown and Harper, 2012).

Besides, the main aim of assisted reproductive technology is to artificially achieve a pregnancy when natural conception has failed and as such, the number of viable embryos may intuitively be improved if the most suitable gametes are involved in fertilization (Brown and Harper, 2012). This is one of the reasons couples struggling with infertility make ART the available and trusted remedy rather than waiting for the usual conventional treatment.

ASRM in 2011 also outlined some factors influencing the use and uptake of ART for infertility management. Among the cogent is the understanding of the nature and procedures of the innovations. These include: understanding the qualifications and experience of personnel, types of patients being treated, support services available, cost, convenience, live birth rates per ART cycle started, and multiple pregnancy rates. Older fertility clinics with ARTs have established live birth rates based on years of experience, while small and new programs may still be determining their live birth rates, although their personnel may be equally well qualified (ASRM, 2011). Every couple wants to use the most/ successful ART program, but many factors contribute to the overall success of a program. A clinic may specialize in certain types of infertility treatment and their costs may vary among programs. Experts often suggest seeing a specialist for further fertility help or assistance if an individual or a couple:

- Have endometriosis or damaged tubes.

- Are considering pelvic surgery for any reason.
- Have had two or more miscarriages.
- Have irregular menstrual cycles or another reason to believe you do not ovulate regularly.
- Have an abnormal semen analysis.
- Are a woman age 35 years or older.
- Have had a pelvic infection.
- Have not conceived in two years despite normal test results (The New York State Task Force on Life and the Law, 1998).

Some of these are the reasons why couples result to the use of assisted reproductive technologies procedures all over the world.

For people wanting to make use of these technologies, experts have urged them to verify their choice of services by assessing their interests with the following questions as outlined by ASRM (2011):

- Are the physicians on board certified in reproductive endocrinology and infertility?
- What pre-cycle screening tests are required? How much do they cost?
- Will my insurance provide coverage for these tests (if they render such service for the insured)?
- How much does the ART procedure cost, including drugs per treatment cycle?
- Do I pay in advance? How much? What are the methods of payment?
- How much do I pay if my treatment cycle is canceled before egg recovery? Before embryo transfer?
- What are the costs for embryo freezing, storage, and transfer?
- How much work will I miss? How much will my partner miss?
- Whom do I call day or night if I have a problem?
- Is donor sperm available in your program? Donor eggs? Donor embryos?
- Do you perform ICSI? If so, when? What is the cost?

- How many eggs/embryos would be transferred in my case?
- Who makes the final decision to cancel the cycle if my response to stimulation is sub-optimal?

All these will help intending individual to make a healthy and worthwhile choice before commencing the procedures.

2.9 Knowledge of the use of assisted reproductive technologies in Nigeria

The last quarter of the 20th century has witnessed several major advances in reproductive medicine. One of the most widely publicised, celebrated and, at the time, controversial medical landmarks in this area was the birth, in 1978, of the first human baby resulting from *in vitro* fertilization (IVF) (WHO, 2002) and since then, IVF, one of the methods and procedures of assisted reproduction, has become a routine and widely accepted treatment for infertility (WHO, 2002). Study carried out in Hong on ART also indicates that more than 60.0% of women reported that they had heard about the various ARTs.

Similar study carried out by Adesiyun, Ameh, Avidime and Muazu (2011) in Northern Nigeria, shows that of the 196 infertile women interviewed, 150 (76.5%) have heard of Assisted Reproductive Technology, 50.7% were aware that the treatment could fail, 36.8% knew it could be applied for male infertility treatment, 9.3% and 18.7% respectively are aware that donor oocyte and sperm could be used for treatment. Study on ART conducted in the Eastern part of Nigeria by Okwelogu, Azuike, Ikechebelu and Nnebue (2012) also gave the knowledge on IVF practice to be 5.9% of the women who are aware of IVF, why 16.0% were aware that the treatment could fail and knew that male infertility could be treated with the practice.

2.10 Perception of couples about assisted reproductive technologies for infertility management

In a study conducted by Adesiyun et al., in 2011, perception on babies conceived from assisted conception treatment revealed that 52.0% of patients interviewed could not comment if they are normal and natural babies. Majority of patients could not affirm if they will agree to the use of donor gamete or zygote for their treatment, all

resulting from the poor knowledge of the technological practice in the region (Olugbenga-Bello, Wasiu, Sunday, Olarewaju, Olaniyan and Oke, 2014). The same study by Olugbenga-Bello et al (2014) also shows that healthcare workers in the clinic constituted about a third of the major sources of the women's awareness on ART, revealing the fact that the use of Assisted Reproductive Technology practice is still low, especially in developing countries, Nigeria inclusive, where challenges of conception may continue as long as education and poverty reduction are not intensified (Olugbenga-Bello et al., 2014). This could also be attributed to the low proportion of those who knew where ART services could be procured or the benefits of the services to solving infertility issues in this region.

2.11 Attitude towards the uptake of assisted reproductive technologies for infertility management

As reported by Olugbenga-Bello., et al (2014), 23.2% of the women attending gynaecology clinics in tertiary institutions in South-western had negative attitude, while 76.8% has a positive attitude to ART. This can be said to have been affected by the decision to undergo ART treatment as perceived by women and men as an attempt to regain control over the situation and their lives (Davidová and Pechová, 2014). Artificial donor insemination, one of the ART procedures, involves use of donor semen to achieve pregnancy in a woman whose husband is severely oligospermic or azoospermic. Practice of this procedure in Nigeria and most of sub-Saharan Africa is mostly limited to a few specialist centres, and even in those centres, the level of acceptability varies as a result of various constraints, including socio-cultural factors such as cultural taboos, perception of the technique as shameful, and religious bias (Ugwu, Odoh, Obi and Ezugwu, 2014).

Attitude towards ART varies with the type of procedure. As reported by Bello, Akinajo and Olayemi, (2014), 58.3% indicated that they had been aware of IVF and 59.3% would accept it as treatment for infertility.

Table 2. 1 Summary of data on attitude, willingness and use of assisted reproductive technologies in Nigeria

Author/year of Publication	Setting	Sample	Findings
Olugbenga-Bello et al, 2010.	Women attending fertility clinics in Osun, Nigeria.	257	76.8% has a positive attitude, 35.6% rejected IVF, one third agreed to opt for ART.
Adesiyun, Ameh, Avidime and Muazu, 2011.	Women attending fertility clinic in Zaria, Nigeria	196	92% agreed to use of ART; 29.3% agreed to oocyte donated; 64.7% said they do not know. 18.0% would not mind the use of donor sperm, 3.3% will not make use of donor sperm; 78.7% patients do not know if they can.
Okwelogu, Azuike, Ikechebelu and Nnebue, 2012	Women attending fertility clinics in Anambra, Nigeria.	500	70(37.2%) accepted to undergo IVF procedure; 79.7% rejected IVF, all rejected surrogacy.
Bello, Akinajo and Olayemi, 2014	Women seeking infertility treatment in Ibadan, Nigeria.	307	59.3% would accept ART; 59.3% would accept IVF as treatment; 37.8% would accept surrogacy as treatment; 35.2% would accept donor eggs and 24.7% would accept donor sperm.

2.12 Willingness of couples towards the uptake of assisted reproductive technologies

Davidová and Pechová, in 2014 reports ‘that the use of the ART has rapidly increased in recent years; not only because of the current trend for postponing parenthood to a later age, but also due to so-called medical tourism. Increasing numbers of foreigners seek health care services, and assisted reproduction in particular in the Czech Republic’. In the study conducted by Jimoh, Saka, Saidu, Salaudeen, Raji, Yahaya, and Dare (2011) among women of reproductive age in Ilorin, Nigeria, the willingness of respondents to utilise ART in general was good ,however ,there are gaps waiting to be filled in terms of factors that will influence the utilization and uptake of ART services ,this include the cost of the treatment options as well as the ethical issues of regulation, gamete donation and surrogacy. A study done in Enugu, south-eastern Nigeria, among medical students in 2008 also showed that only 24 of 81 female respondents (29.6%) were willing to accept donor semen should the need arise, and in Yaoundé, Cameroon, only 19.6% of infertile respondents would actually accept the practice of artificial donor insemination if the need arose (Savage,1992; Onah, Agbata and Obi, 2008; Ugwu, Odoh, Obi and Ezeugwu , 2014) and this has been seen as one of the cheapest ART procedures, ranging from about 50,000–150,000 naira (US\$ 312.50–937.50) (Ugwu, Odoh, Obis and Ezugwu, 2014).

2.13 Challenges involved in assisted reproductive technologies

Assisted reproductive technologies have long been a source of controversy since its inception in 1978. Along with increased use and success rates, the procurement of ART services has occasionally created headlines and controversy when used in circumstances deemed unreasonable by the general public (Dooley, 2014), and despite this breakthroughs recorded from ART, several barriers faced accessibility to this technology including availability and affordability (Olugbenga-Bello et al., 2014). Among the challenges of ART is the issue of paternity in the issue of surrogacy, culture, expensive and time for the procedure. But it has allowed many couples to have children that otherwise would not have been conceived.

2.13.1 Access to this proven technology in resource –poor countries

Access to this proven technology is very miserable for resource-poor countries like Nigeria, not only because of cost implications but also because of lack of enabling infrastructures. Otherwise, a state-of-the-art IVF unit could be equipped with reverse-osmosis water-preparation system, advanced air-purification systems, CO₂ incubators, etc., but without infrastructures like constant electricity and water as well as after-sales maintenance capabilities, the unit could potentially end up being a white elephant (Ekeh, 2011).

2.13.2 Challenges of inducing ovulation

Apart from the challenges of equipment's cost, medications, diagnosis test, consumables and staffing, the challenges of making use of the best strategy in terms of gonadotropin (Gn) injections to induce superovulation is a big problem facing the success and cost of ART treatment. This is because the a major expense for the IVF cycle is the high cost of Gn treatments, and there are other drawbacks of Gn therapy, which include side effects of which ovarian hyperstimulation syndrome (OHSS) is the most significant, inconvenience of daily injections, over a long period of time and potentially fatal side effects (Berendonk, Van Dop and Merkus, 1998; Ekeh, 2011).

2.13.3 Side effects of the medical drugs and procedures

In situation where Gn is not used, there may not be the case of OHSS and associated problems of multiple eggs, including multiple pregnancies, unwanted eggs and embryos. But the need for frequent blood or urine luteinizing hormone assays to monitor egg maturity and then being ready for egg retrieval might discourage the patient or cause stress which may lead to other complications during the process. These procedures had led to high cancellation rate of natural IVF procedures in many countries where they are being practiced (Ubaldi, Rienzi and Ferrero, 2004; Ekeh 2011). Some experts have developed simple approach to IVF procedures, with the use of oral clomiphene citrate with combination of other therapy to help initiate and track ovulation period. Nevertheless, studies had shown that there is a price to pay as clomiphene citrate also exerts anti-oestrogen effects on both the cervical mucus and endometrial linings (Ekeh, 2011).

2.13.4 Poor implantation

Poor implantation of the zygote to the wall of the uterus after clinically proven laboratory procedures has continued to be the rate-limiting step in improving pregnancy with ART and, as such, is driving ovarian hyperstimulation with the consequent risks, and harvest of many oocytes and thence, more embryos than requested for or expected, leading to multiple foetuses. As reported by Medicinenet (2013), the most common complication of ART is multiple foetuses and this is a problem that can be prevented or minimized in several different ways if proper and advance technological procedures are taken and adopted during the process. Success rate of these procedures are not what can be expected in a resource-poor countries like Nigeria.

2.13.5 Proximity of damaging the embryo

Another prominent challenge that are often encountered in the process of ART is the immature eggs issues, which are very sensitive and prone to damage and loss (Ekeh, 2011), which would lead to deformation of the foetus developed during the process. Cases of patients rejecting the outcome of the child formed from the error have been reported in some technically developed countries.

2.13.6 Proper storage of eggs and sperms

A good IVF unit needs a high- tech laboratory with standards, high –tech equipment, and expertise to be able to maintain the eggs, sperms and embryos in an optimal environment in the laboratory. This has been a major limiting factor in the establishment of IVF units, especially in resource-poor countries. It could therefore be possible if government set up one standard IVF laboratory where the procedures could be carried out and handled by experts.

2.13.7 Complications leading to multiple foetuses

The most common complication of ART is multiple foetuses and this is a problem that can be prevented or minimized in several different ways (Medicinenet, 2013). Ethical questions raised have involved the unusually high rate of multiple births

(twins, triplets, etc.) associated with IVF. IVF and other fertility treatments have resulted in an increase in multiple births, provoking ethical analysis because of the link between multiple pregnancies, premature birth, and a host of health problems. This issue is being addressed primarily through the development of better techniques aimed at using fewer fertilized embryos to achieve pregnancy. For example, in the 1980s and 1990s, an average of four fertilized embryos were transferred into a woman's uterus to increase the chance of implantation and pregnancy, however, in the early 2000s, following the implementation of improved methods, just two embryos were transferred, while the same rate of success as with four embryos was maintained (Encyclopaedia Britannica, 2013).

2.13.8 Financial burden of procuring ARTs

'Research also indicates that a greater percentage of those who experience infertility are poor and ART is still not readily covered by the premium health insurance schemes in Nigeria' (Okonufua, 2009; Olugbenga-Bello et al., 2014). Access to medical treatment for infertility is one of the injustices obtainable in the field of reproductive medicine, and due to many factors, including financial incapacity, infertility treatment can therefore be capital expensive, and as such, disparities will exist in access to and use of these services (Adekile, 2012). For instance, the average cost of a single cycle of IVF in the United States has been estimated at more than \$12,000 (Macaluso et al., 2010), this will therefore leads to some people to have far easier access to treatment than others. Many countries, especially those in developing part of the world, are not financially helped in terms of medical care, since higher per cent of the medical bills are out-of-pocket of an individual seeking medical help and those who invest their scarce resources in infertility treatment risk financial ruin (Dyer and Patel (2012). One challenge that cuts across all others is how to make ART more widely available and affordable for all who need it, particularly in developing countries (Fathalla, 2002). Besides, the treatment options are situated in the private sector with very few people able to afford it in Nigeria and this is particularly distressing as majority of the populace may not be able to afford the medical costs (Adekile, 2012). Whereas, in many European countries and in Australia, the cost is subsidized by government and health insurance schemes (Alhassan et al., 2014). Lack of any political decision to

implement services and lack of human and financial resources are other factors highlighted by Makuch and his colleagues in 2010.

2.13.9 Sexual Orientation

As cited in Dooley (2014), “over the past two decades, legislation in several developed nations has ensured that gay men and lesbians have access to ART,” this had resulted to some countries signing into law equity Act. For example, the United Kingdom’s Human Fertilization and Embryology Authority incorporated the Equality Act of 2010, into their code of practice to ensure access to fertility treatments in private clinics regardless of one’s sexual orientation (Dooley, 2014), thus, affirming the decision of the American Society for Reproductive Medicine taken the position that fertility clinics should provide services to patients without regard to sexual orientation (Ethics Committee of the American Society for Reproductive Medicine, 2013), and several legal cases have been filed against clinics for discrimination based on sexual orientation, giving lesbians and gay couples to procure ART at will and without restriction. Although, gay and lesbian parents are increasingly accepted in the United States and other countries, but study conducted by Pew Research Center in 2011 shows that majority of people believe that gay and lesbian couples raising children is either good for society (14%) or is at least not bad for society (48%), but about one-third (35%) continually believed that it is bad for society.

According to Boivin, Rice, Hay, Harold, Lewis, van den Bree and Thapar (2009) in Dooley (2014), social acceptance is important for numerous reasons, such as ensuring that social supports are available to ART parents and their offspring as well as for maintaining the credibility of ART itself, but the woman and child’s health must be the paramount concern with regard to older women seeking ART treatments.

2.13.10 Sex Selection: ART allows prospective parents to select the sex of their child by screening embryos prior to transfer to the uterus, and discarding embryos which are not of the selected sex. The use of ART is ethically justified in terms of the principle of non-maleficence but sex selection for social reasons is much more controversial. In the case of “designer babies”, perhaps one of the most contentious proposed applications of ART is to create “designer babies”, that is, children who are

selected for specific desired traits. In the case of “savior siblings” it is controversial because it is believed that the parents are having them for the wrong reasons. As such, all children should be born for their own sake, not for someone else’s benefit. Besides, savior siblings could be psychologically scarred if they feel they weren’t wanted for themselves, and this could affect their relationship with their parents.

IVF has also raised a number of unresolved moral issues concerning the freezing (cryopreservation) of ovaries, eggs, sperm, or embryos for future pregnancies (Encyclopaedia Britannica, 2013).

2.13.11 Non-support of health insurance

Countries around the world have responded to the emergence of assisted reproductive technologies (ART) in a variety of ways and some countries prohibit certain treatment, others support them through health insurance, while other countries permit them but do not help pay for them (Krastev and Mitev, 2013).

According to American Society for Reproductive Medicine(ASRM, 2015) reports that ‘State Infertility Insurance Laws in some states requires all health insurers that cover maternity benefits to cover the cost of in-vitro fertilization (IVF) but health maintenance organizations, commonly called HMOs, are exempt from the law.’ Some of these states implementing the insurance coverage include Arkansas, California, Connecticut, Hawaii, Illinois, Louisiana Maryland, Massachusetts, Montana , New Jersey, New York , Ohio, Rhode Island, Texas and West Virginia. But patients need to meet certain conditions in order to get their IVF covered and these requirements vary with states. For example, in Arkansas requires that patients wanting insurance for IVF to be:

- patient with policyholder or the spouse of the policyholder and be covered by the policy;
- patient’s whose eggs must be fertilized with her spouse’s sperm;
- patient whose spouse have at least a two-year history of unexplained infertility, or the infertility must be associated with one or more of the following conditions: endometriosis; foetal exposure to diethylstilboestrol, also known as DES; blocked or surgically removed fallopian tubes that are not

a result of voluntary sterilization; or abnormal male factors contributing to the infertility.

As such, the California law defines infertility “the presence of a demonstrated condition recognized by a licensed physician and surgeon as a cause of infertility; or the inability to conceive a pregnancy or carry a pregnancy to a live birth after a year or more of sexual relations without contraception”.

For Arkansas, the IVF benefits are subject to the same deductibles and co-insurance payments as maternity benefits. The law also permits insurers to limit coverage to a lifetime maximum of \$15,000 (Arkansas Statutes Annotated, Sections 23-85-137 and 23-86-118), while that of California specifically exempts insurers from having to offer in vitro fertilization coverage. This California law does not require employers that are religious organizations to offer coverage for treatment that conflict with the organization’s religious and ethical purposes. (California Health and Safety Code, Section 1374.55), but the Employment Retirement Income and Security Act of 1974 exempts companies that self-insure from state regulation (ASRM, 2015).

Because of these differences, not all people have the same degree of access to ART, and debate whether health insurance companies should be forced to cover infertility treatment is still a bone of contention in many developed countries, since the cost of procuring vitro fertilization and embryo transfer in Nigeria may range from 350,000–1,500,000 naira (US\$ 2,187.00–9,375.00), depending on the health facility and pre-treatment requirements (Ugwu, et al., 2014). Public health facilities are much cheaper than private health facilities.

2.13.12 Access to medical treatment

Access to medical treatment for infertility is one of the injustices obtainable in the field of reproductive medicine. Due to many factors, including financial incapacity, some people have far easier access to treatment than others. Financial access is an issue because funds are insufficient and scarce and have to be allocated between competing equally important claims (Adekile, 2012).

2.14 Ethical issues in ART for infertility Treatments

Assisted reproductive technology (ART) is the phrase most commonly used to describe medical techniques which increase the likelihood that a woman will have a child. This has however, raised a number of ethical concerns (Shreffler, Johnson and Scheuble, 2010), as such, some of the ethical issues include the risks of some infertility techniques, such as multiple pregnancies and the use of selective abortions (Shreffler et al, 2010), undetermined fate of left over embryos from in-vitro and who owns them, legal status of embryos fertilised in vitro and not transferred in vivo and the likes. Although media coverage of infertility treatments has increased markedly over the past decade, there is a dearth of empirical information about public perceptions of the ethics of infertility procedures (e.g. artificial insemination, in vitro fertilization, donor eggs, surrogate mothering, and gestational carriers) and about the factors that shape them. In countries like Nigeria, where there is no known regulation (or medical organisations) needed to coordinate ART, how will the ethics, process, progress and activities of both the practitioners and the patients be monitored, supervised and evaluated effectively?

‘One of the most numerous ethical and social questions associated with the treatment for infertility through assisted reproduction troubling is the process of selection of patients in terms of their age, marital status sexual identity and medical conditions (such as HIV, infectious diseases, risk of harm for the treated or for the offspring)’ (Ola,2012). As such, there are a lot to be done on this aspect of the innovation.

2.15 Position of Religion in Assisted Reproductive technologies

As observed by Aluko-Arowolo and Ayodele (2014), the foundation of every human society is anchored on religion. Religious responses to ART in the context of infertility and motherhood raise some questions on the use of Assisted Reproductive Technology (ART). Therefore, many religious communities have strong reservation on the legislation regarding marriage, sex and reproduction and modern fertility technology (Aluko-Arowolo and Ayodele, 2014).

From the perspective of religion, infertility, like any other problem in the society is an outcome of sin of disobedience or rebellion and to correct this, and then there is the need for the atonement of sins, as such, majority of the Yoruba in the South-western believe that it should not be a subject of legislation and technological intervention, because science and technology are imperative to demonstrate man's inimitable perfection (Aluko-Arowolo and Ayodele, 2014). But in spite of global understanding and illuminative insight brought about by science and technology, belief in witchcraft, magic and other spiritual powers is still rife in Nigeria and elsewhere in Sub Saharan African (Jegede and Fayemiwo, 2010). To assuage the stigma therefore, the childless women are made to pay repeated visits to herbal practitioners, diviners, spiritualists, syncretic groups of either Muslim or “aladura” sects of the Christianity (Jegede and Fayemiwo, 2010).

Religion and cultures of the various peoples still control the lives and transactions of the various groups in Nigeria. In a study conducted by Jegede and Fayemiwo (2010), religious obligation forbids people to have children through artificial process. As reported, majority (70%) of the respondents were of the opinion that that their religions will not allow them to use ART while considerable proportion (30%) felt comfortable using ART. Similar conclusion was derived in the study conducted by Olugbenga-Bello et al., (2014) were religious belief constituted 66.6% of the major reasons for not supporting ART. All these religious activities are pointing to something peculiar in the health seeking behaviour of infertile men/women, that no matter what, the majority are still consulting healing homes, prayer houses, as some could still not explain the mystery of childlessness (Aluko-Arowolo and Ayodele, 2014).

Nevertheless, the law, religion and culture of the Nigeria people seem to be in firm accord with the code of medical ethics as it relates to abortion and euthanasia in Nigeria (Odia, 2014). As such The Nigeria Penal code regards euthanasia and abortion done (except done in order to save the life of the mother) as murder. This harmony between law, religion, culture and medical ethics, however, does not apply to the medical practices of organ transplantation, assisted conception and its related practices, and limb amputations (Odia, 2014), neither is there any written law or policy document for this medical practice in Nigeria.

2.15.1 Islamic religion and ART

Different conclusions can be of equal ethical merit, related to the different factors that contribute to undertaking ethical reflection. For instance, much consideration of ART involves gamete and embryo donation, but in the Islamic tradition, where conceiving children and raising them in religious faith are particularly important values, so too is the integrity of a family's genetic lineage (Dickens, 2002). Accordingly, in this context, gamete and embryo donation from outside a married couple is ethically unacceptable, but within a marriage artificial techniques may be employed to achieve pregnancy. According to Inhorn and Gürtin (2012) religious considerations illustrate the paramount importance of practicing reproductive medicine according to Islamic law but third-party reproductive assistance is largely banned across the Sunni Muslim world, stretching from Morocco to Malaysia, making this prohibition widely relevant for infertile Muslim couples from many countries. As cited in Inhorn and Gürtin, (2012) Sunni Islam outlined in a seminal *fatwa* (an authoritative religious proclamation issued by an esteemed religious scholar) the following:

- (1) Artificial insemination with the husband's semen is allowed, and the resulting child is the legal offspring of the couple.
- (2) In-vitro fertilization of an egg from the wife with the sperm of her husband, followed by the transfer of the fertilized embryo(s) back to the uterus of the wife is allowed, provided that the procedure is indicated for a medical reason and is carried out by an expert IVF physician.
- (3) An excess number of fertilized embryos can be frozen through cryopreservation. The frozen embryos are the property of the couple alone and may be transferred to the same wife in a future frozen cycle, but only during the duration of the marriage contract.
- (4) Sperm or gonads may be cryopreserved before exposure to radiotherapy or chemotherapy and used later in life by the same individual who has survived cancer treatment.
- (5) Pregnancy in post-menopausal women is allowed using a woman's own cryopreserved embryos, oocytes, or, in the future, ovaries.

2.15.2 The Roman Catholic Church and ART

In contrast, the Roman Catholic branch of Christianity limits acceptable human reproduction to natural intercourse between married couples, but may tolerate transfer of a donated ovum to an infertile woman's reproductive system for natural insemination there by her husband. So Artificial conception may therefore be ethically available to a Muslim but not an observant Roman Catholic couple, and ovum donation may be ethically available to a Roman Catholic but not an observant Muslim couple (Dickens, 2002; Ekeh, 2011).

In-vitro fertilization has been a source of moral, ethical, and religious controversy since its development. Although members of all religious groups can be found on both sides of the issues, the major opposition has come from the Roman Catholic church, which in 1987 issued a doctrinal statement opposing IVF on three grounds: the destruction of human embryos not used for implantation; the possibility of in vitro fertilization by a donor other than the husband, thus removing reproduction from the marital context; and the severing of an essential connection between the conjugal act and procreation (Encyclopaedia Britannica, 2013). Therefore as adherents of classical tradition, Pope John Paul, the second, Pope Benedict XVI and the like have publicly re-emphasized the Catholic Church's opposition to in-vitro fertilization (IVF), saying it replaces love between a husband and wife (Pennings, 2008 ; Aluko-Arowolo and Ayodele, (2014). Pennings (2008) noted that The Roman Catholic Church's doctrine opposes all kinds of ART because, it separates the procreative end of the marriage, conjugal relationship and love, therefore, the end does not justify the goal of marriage regarding conception and reproduction of offspring. The Catholic Church also described reproductive technology as being on a collision course with God creative power. Nigeria is not an exception to this religion dogma.

It is of note that the Roman Catholic Church encourages and officially recognised gamete intra-fallopian tube transfer (GIFT) as the only one of ART for the infertility treatment (Ekeh, 2011).

Opinions of other churches vary and are salient on this matter, as many churches have been seen to encourage and establishes ART fertility clinic in Nigeria. For example, a

discussion with a fertility specialist at Vine Branch Medical Centre, a hospital belonging to the Vine Branch International Church, located in Ibadan, confirmed the existence and the utilization of various ART procedures in their hospitals.

2.16 Culture and Assisted reproductive technologies in South-Western Nigeria

Assisted reproductive technology (ART) gives hope to infertile couples even though only a few can afford it. Studies has shown that couples in the higher socioeconomic group who desire their own biological child can have a child through high technology options like In-vitro Fertilization (IVF), Gamete Intra Fallopian Transfer (GIFT), Intracytoplasmic Sperm Injection (ICSI) at will.

In Africa, infertility is seen as a social and cultural problem affecting individuals and families, thus, making People Living with Infertility (PLWI) to seek solution through different pathways (Aluko-Arowolo, 2014). There was a perceived anticipation of increase in potential for aberrant parental bonding as well as an expectation of probable social stigmatisation of IVF offspring (Peterson, 2005). Yet adoption of these technologies is still fraught with a number of cultural and ethical challenges in many states in South-western Nigeria (Jegade and Fayemiwo, 2010). Legitimacy of a child is paramount to marriage stability in Yoruba culture. Since every family wants to proof that a child is their direct offspring, it becomes abominable for a family to go out of wedlock to have children with the use of any form of ART, believing that these type of children may bring lineage to disrepute (Jegade and Fayemiwo, 2010).

According to study conducted by Jegede and Fayemiwo, (2010) in the south-western Nigeria, it is believed that if a child is not directly conceived through the normal process, such a child will not resemble other members of the family, neither does it speak well of a woman to have a child through mechanical process which has implication for the future of such a child. Therefore, infertility is considered to be a curse and having babies through artificial means is a more serious problem and it is unacceptable by the culture (Jegade and Fayemiwo, 2010). Study conducted by Olugbenga-Bello et al (2014) in another region in the southern Nigeria also shows that societal stigma was perceived as a major side effect towards the uptake of ART while 44% of respondents believed ART babies will not be socially acceptable.

2.17 Influence of families on the choice of ART by infertile persons

The acceptance of babies born through ART procedures incidentally, has the implication, among others, that the ART child would be as welcome and as loved as any other child conceived and born in any other manner. The moral implications of this saying are very important in view of the innumerable differences and enormous variety with which individual babies/human beings come from the hand of God or Nature (WHO, 2002). In view of this, some authors have argued that one of the deeper and more important implications of ART is that it is inevitably concerned with quality control and that this concern has the direct implication that we can no longer say that a child is a child, the handiwork of God, but rather, in this case, a deliberate work of human hands or, more precisely, of human technologists. As such, accepting the child by relatives or the society in which he or she grows may become a dilemma.

In a study carried out by Okwelogu, Azuike, Ikechukwu and Nnebue (2012) in the Eastern part of Nigeria, it was noted that respondents were of the opinion that ART will promote babies as products rather than as human beings to be cherished in their own right. Study conducted by Olugbenga-Bello et al., (2014) also found out that some believe those babies born through ART are artificial while quite handful of respondents submitted that ART babies will be socially accepted by the society or the relations in which the child will live to grow and develop. In view of this, the child may not be accepted in the society or in the family.

To create a peaceful and loving society for such child to develop and grow maximally, The WHO in a report of a meeting on “Medical, Ethical and Social Aspects of Assisted Reproduction” in 2002 advised that families need to be followed up for the impact of assisted reproduction, particularly if assisted reproduction involves a third party in the way of gamete or embryo donation surveillance, particularly its psychosocial component, needs to be carried out in different regions of the world, because it is quite possible that the psychosocial outcome of assisted reproduction may be influenced by the cultural context in which the technologies are used.

Therefore, the social marketing packaging can and needs to be modified or changed if ART is to be firmly planted in the background soil of traditional African culture, customs and practices. Within that background, the category of mystery, the God-metaphor and the constant affirmation of human limitations and fallibility are very important and cannot be easily discarded or ignored (WHO, 2002).

2.18 Laws and regulations on ART

Laws regarding proper procedures to be followed before an ART clinic can be established and or process could be performed vary with countries and region. For some countries, there is well defined ACT or documents, stipulating in details, what is expected of the clinic, the specialist and the patient wanting the procedures. Some have bills, documents and guidelines, whereas, many are operating this delicate medical procedures without anybody regulating their activities in other countries, in which Nigeria is inclusive.

For example, Czech law allows for anonymous sperm and egg donation, which is forbidden in some European countries (e.g. Germany and Austria) (Davidová and Pechová, 2014), whereas in Nigeria, there is no law regarding or taking into considerations these vital reproductive health issue. It therefore shows that Nigeria law is yet to identify the place of ART in medical practice, even as many medical practices are going on in different parts of the countries and in various private health sectors.

For the United States of American, the ACT 2008 has been one of their guiding regulatory bills, dictating the procedures of ART in the States. As such, the Bill has been a source of powerful guides to all procuring the services. For example, Chapter Four, Article 20 of the 2008 ART ACT stipulates the following guiding principles for assisted reproductive technology clinic, its providers and patients.

(1) Assisted reproductive technology clinics shall ensure that patients, donors of gametes and surrogate mothers are eligible to avail of assisted reproductive technology procedures under the criteria prescribed by the rules under this Act and that they have been medically tested for such diseases, sexually transmitted or otherwise, as may be prescribed and all other communicable diseases which may endanger the health of the parents, or anyone of them, surrogate or child.

(2) It shall be the responsibility of an assisted reproductive technology clinic to obtain, from semen bank(s), all relevant information, other than the name, personal identity and address, of possible gamete donors, and assist the couple or individual desirous of the donation, to choose the donor.

(3) When a semen bank receives a request from an assisted reproductive technology clinic for a donor oocyte, a responsible member of the staff of the semen bank will accompany the particular donor to the Assisted Reproductive Technology clinic, and obtain a written agreement from the authority designated for this purpose by the clinic, that the clinic shall, under no circumstances (except when asked by a court of law), reveal the identity of the donor to the recipient couple or individual or to anyone else; the clinic shall also ensure that all its staff is made aware of the fact that any step leading to disclosure of the identify (i.e., name and address) to the recipient couple or individual or to anyone else, shall amount to an offence punishable under this Act.

(4) Either of the parties seeking assisted reproductive technology treatment or procedures shall be entitled to specific information in respect of donor of gametes including, but not restricted to, height, weight, ethnicity, skin colour, educational qualifications, medical history of the donor, provided that the identity, name and address of the donor is not made known.

(5) Assisted reproductive technology clinics shall obtain donor gametes from semen banks that have ensured that the donor has been medically tested for such diseases, sexually transmitted or otherwise, as may be prescribed and all other communicable diseases which may endanger the health of the parents, or anyone of them, surrogate or child.

(6) Assisted reproductive technology clinics shall provide professional counselling to patients or individuals about all the implications and chances of success of assisted reproductive technology procedures in the clinic and in India and internationally, and shall also inform patients and individuals of the advantages, disadvantages and cost of the procedures, their medical side effects, risks including the risk of multiple pregnancy, the possibility of adoption, and any such other matter as may help the couple or individual arrive at a decision that would be most likely to be the best for the couple or individual.

(7) Assisted reproductive technology clinics shall make couples or individuals, as the case may be, aware of the rights of a child born through the use of assisted reproductive technology.

(8) Assisted reproductive technology clinics shall explain to couples or individuals, as the case may be, the choice or choices of treatment available to them and the reason or reasons of the clinic for recommending a particular treatment, and shall clearly explain the advantages, disadvantages, limitations and cost of any recommended or explained treatment or procedure.

(9) Assisted reproductive technology clinics shall ensure that information about clients, donors and surrogate mothers is kept confidential and that information about assisted reproductive technology treatment shall not be disclosed to anyone other than a central database to be maintained by the Indian Council of Medical Research, except with the consent of the person or persons to whom the information relates, or in a medical emergency at the request of the person or persons or the closest available relative of such person or persons to whom the information relates, or by an order of a court of competent jurisdiction.

(10) No assisted reproductive technology clinic shall consider conception by surrogacy for patients for whom it would normally be possible to carry a baby to term. Provided that where it is determined that unsafe or undesirable medical implications of such conception may arise, the use of surrogacy may be permitted.

(11) Assisted reproductive technology clinics shall provide to couples or individuals, as the case may be, a pre-stamped self-addressed envelope to inform them of the results of the assisted reproductive technology procedure performed for the couple or the individual.

(12) No assisted reproductive technology clinic shall obtain or use sperm or oocyte donated by a relative or known friend of either of the parties seeking assisted reproductive technology treatment or procedures.

(13) Every assisted reproductive technology clinic shall establish a mechanism to look into complaints in such manner as may be prescribed.

(14) No assisted reproductive technology procedure shall be performed on a woman below 21 years of age, and any contravention of this stipulation shall amount to an offence punishable under this Act.

(15) All assisted reproductive technology clinics shall issue to the infertile couple/ individual a discharge certificate stating details of the assisted reproductive technology procedure(s) performed on the couple / individual (USA ART Regulation: Act,2008).

2.19 Conceptual Framework

Theory of Reasoned Action (TRA)

Fishbein and Ajzen's (1975) theory of reasoned action, asserts that one's intentions influence over t behaviour. TRA postulates that people are motivated to change based on their perceptions of norms, attitudes, and control over behaviours. Each of these factors can either increase or decrease a person's intent to change his or her behaviour. Intention to change behaviour, then, is thought to be directly related to behaviour change. Table 2.1 shows several important constructs that are involved in these value-expectancy theories: attitude, subjective norm, perceived behavioural control, intention and behaviour.

According to the theory, attitudes toward behaviour are shaped by beliefs about what is entailed in performing the behaviour and outcomes of the behaviour. Beliefs about social standards and motivation to comply with those norms affect subjective norms. The presence or lack of things that will make it easier or harder to perform the behaviours affects perceived behavioural control. Thus a chain of beliefs, attitudes, and intentions drives behaviour.

Constructs in the Theory of Reasoned Action

Attitude : An attitude is a predisposition to or against a particular intention. It comprises a person's beliefs, outcome expectancies, value expectancies that the behaviour or the uptake of ART will lead to certain outcomes or will

aid pregnancy as well as the value the individual places on those outcomes. This may be positive or negative.

Subjective norm : Comprises a person's perception of a social norm (influence of parents, friends and health workers) and his or her motivation to comply with that perceived norm. It looks at the influence of people in one's social environment, which may influence the decision on the willingness to make use of the innovation.

Behaviour Intention : The probability that a person will perform behaviour or opt for ART. That is, the intention to do something comes before behaviour. Intention is governed by both Attitude and Perceived social or subjective norms.

Behaviour :Comprises of both Single, observable action or uptake of ART performed by an individual, friends, neighbours, co-workers, or a category of actions with a specification of target, action, context, and time etc may or may not influence an individual towards its uptake.

Other constructs in the theory include *External variables* such as demographic characteristics of the respondents, reference groups and personality which have influence on *Behaviour belief*, *Evaluation of behaviour outcomes*, *Normative belief* which comprises of the respondents belief of mothers, fathers, friends etc which are capable of influencing an individual towards a choice of adopting an innovation and *Motivation* from friends, partners, society, health workers, place of work, religious houses/practices etc may aid the development of interest in utilising ART.

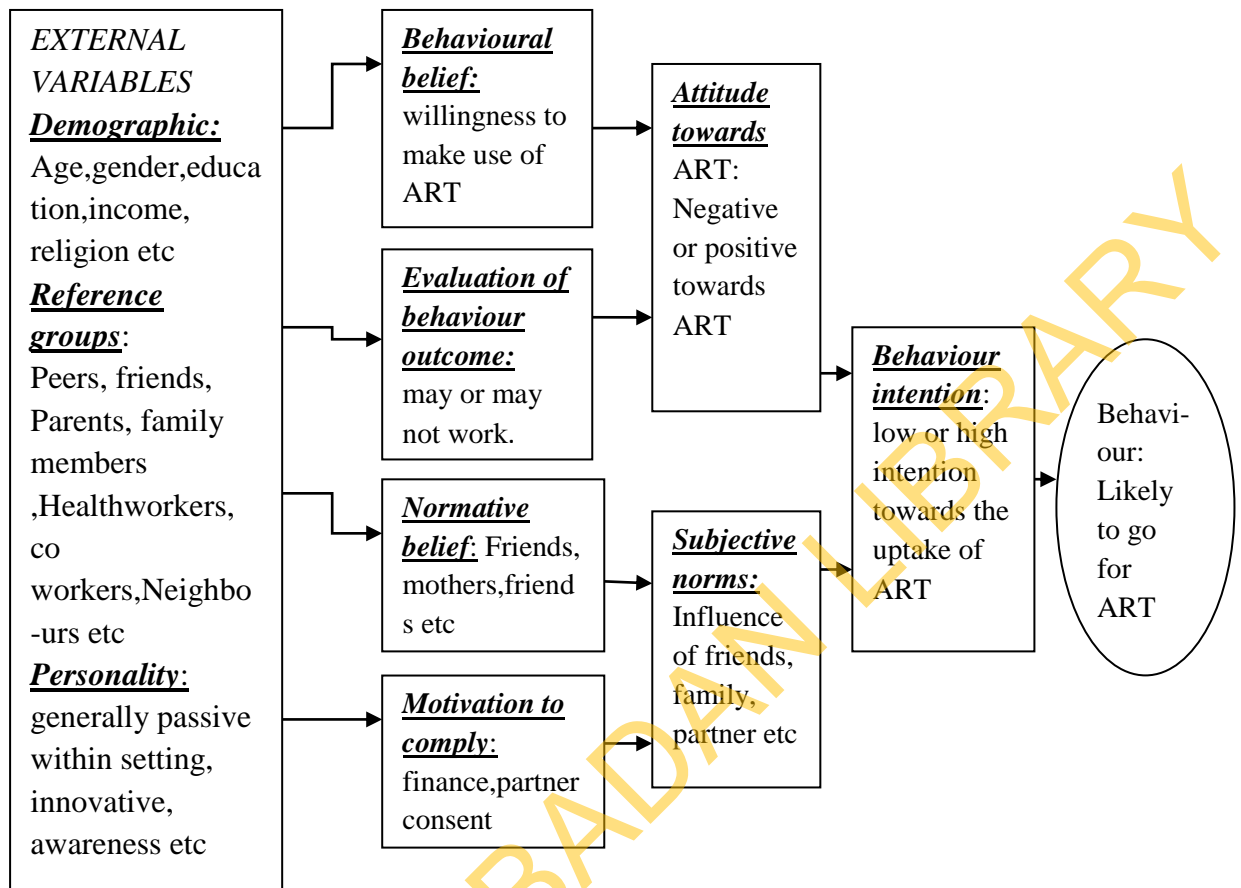


Figure 2.1 Theory of reasoned action (Fishbein M. and Ajzen I. (1975))

In applying this theory, the environmental factors which have potential facilitating ART uses among individuals were noted. These include the social and the physical environments: the policies, availability and accessibility of the services, influence of significant others, government support, individual financial status, sources of information for the willingness to the uptake of ART etc. The tenets guided the framing of questions which probed into these factors (Please, see questions 11, 12, 15, 16 and Section E of the Questionnaire). For example, Questions 11 and 12 inquired into Occupation and Average income, while Question 15 was “Have you ever heard of assisted reproductive technologies Treatment (ART) before? (Please see Appendix II). Willingness or refusal to make use of ART can be influenced by respondents’ knowledge and awareness of the innovation. Question 5 was used to probe this from the respondents.

Likewise, number of children, years of waiting earnestly to conceive, constant visits to the same clinic and years in marriage may constitute external factors influencing the willingness or refusal towards the uptake of ART. This aided in the framing of the following questions: 7, 8, 9, 10, 13 and 14 respectively.

An individual has role models, subjective or social norms who can influence their willingness to the uptake of ART: they include neighbours, educated parents, friends, co-workers, health workers etc. These people constitute the observational learning sources that can encourage the adoption of this innovation. Question 16 and 40 were asked to probe this significant others. For example, Question 16 inquired sources of awareness of ART: “where did you get to know of assisted reproductive technologies treatment (ART)’. These significant orders can therefore encourage an individual willingness to opt for this health services to manage infertility issues (Questions 29 and 30 of section D).

Motivation towards the uptake of ART was verified using questions 25 and 38. For instance question 38 is: ‘Are you willing to make use of ART opportunity for yourself if the services are provided in this hospital’?

Behavioural belief about and evaluation of behavioural outcomes or expectations from the uptake of ART have great influence on influencing individual’s attitude. As such, questions in Section C of the instrument were used to probe the attitude of the respondents towards the uptake of ART

Intention or willingness to perform or make use of ART can result to good behaviours. Questions 37-39 were used to probe respondents' intentions and the likely good or bad behaviour.

Nevertheless, there are other factors which may serve as hindrances to the manifestations of acquired behaviour by an individual which are not outlined by Fishbein and Ajzen. These confounders, which may be positive or negative in nature, need not be neglected. As such, Questions 8, 9, 10, 13 and 14, and section F of the Questionnaire will help determine these.

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CHAPTER THREE

METHODOLOGY

3.1 Study Design and scope of study

A descriptive cross-sectional study, using quantitative research method was administered for this survey design and was carried out in Adeoyo Maternity Teaching Hospital gynaecological clinic in Ibadan North Local government, to seek information about the attitude of infertile persons and their willingness towards the uptake of assisted reproductive technologies in management of infertility.

3.2 Description of study area

This study was hospital based and was carried-out in at the gynaecological clinic of Adeoyo Maternity Teaching Hospital in Ward 3 (Yemetu) in Ibadan North Local government, in Ibadan. The hospital is located in south western Nigeria. Ibadan city has an area of 3,080 km square (km²) (1,190 sq mi) and a population of about 3,800,000 according to 2006 census. The hospital used for the study was a state owned public health institution.

This hospital is highly patronised by Ibadan residents, especially those of low and middle socio- economic status. It also serves as referral centre for many primary health centres and private clinics within Ibadan and its environs. Presently, the Teaching Hospital has clinical and non-clinical departments. The clinical departments include: gynaecological clinic, gynaecological wards, labour room, lying-in-ward I, II, II, antenatal ward, immunization, post caesarean section ward, family planning, physiotherapy, main and minor theatre, Life Saving Scheme (LSS), Pharmacy, Medical records, Laboratory, X-ray, sexually transmitted infection (STI) unit, casualty unit, DOT (Tuberculosis) and leprosy clinic. The non-clinical departments also include the administration, account, laundry, crèche, electrical, maintenance, catering, tailoring, main medical store, zonal medical store and health education unit. It renders tertiary health-care services that always attract highest number of patients. The obstetrics and Gynaecological department of the hospital has two (2) consultants

and about 10 doctors including the officers, senior medical and principal medical officers.

3.3 Study Population

This study was carried out among individuals visiting the gynaecological clinic, especially for infertility issues and who are currently receiving care and utilising the clinic for medical care. The target population consisted of individual (male and female) who are married and were within the age-group of 20 and above. Patients who attended routine appointment as stated by their consultants during the periods of 3rd September to 8th of October 2015 were recruited into the study.

3.4 Sample Size Determination

The study sample for this research was calculated using the Kish Leslie sample size formula of 1965 for cross-sectional studies. This same formula was also used by Daniel (1978), and Kibikiwa (2008) which is:

$$N = Z^2 pq / D^2$$

N = sample size collected or minimum sample size

D= degree of accuracy set at 0.05 (precision set at 5.0%)

Z= standard normal deviation set at 1.96 normal interval at 5 % (95.0% confident interval)

p= the proportion of the target population estimated to have a particular phenomenon of interest in the study.

In recent and similar studies conducted by Panti and Sununu in 2014 and Obuna et al in 2012 in an hospital settings on infertility, the prevalence of infertility were 15.7% and 15.4% respectively. From these research works, the average prevalence of infertility was derived as follow:

$$\frac{15.7\% + 15.4\%}{2} = 15.55, \text{ approximated to } 15.6\%$$

Thus, mean value of the prevalence is 15.6%

The sample size for this study will therefore be calculated using this mean value and the following formula:

$$N = Z^2 pq / D^2$$

q= proportions that does not have the characteristics being investigated (q= 1-p),
q= 1-0.1555=0.8445

Therefore, the sample size $N = (1.96)^2 \times 0.1555 \times 0.8445 \div (0.05 \times 0.05)$

$$N = (3.8416 \times 0.1555 \times 0.8445) \div 0.0025$$

$$N = 0.504477951 \div 0.0025$$

$$N = 201.37$$

Approximately 201

Therefore, the minimum sample size (N) is 201, which implies that a minimum of two hundred and one respondents should be recruited, after which the non-response rate was calculated and the result shown below:

A non-response rate of 10% of 201 $(201 \times 10) \div 100 = 20.1$

Twenty (20) non-response rate was then added to the calculated minimum sample in order to address any possible case of incomplete response, $201 + 20.1 = 220$.

Therefore, the sample size is 220.

Of these 220 participants, 18 did not meet the inclusion criteria : 2 were below the age of 20, and 3 were older than age 55; 6 were between the ages of 28- 35 years but were not married and 7 did not answer the questions on willingness to make use of ART.

Surveys from the remaining **202** participants were used for the final analysis.

3.5 Sampling techniques

A probability sampling method was employed in this study. The study made use of 202 of about 1500 individuals who utilized the gynaecological clinic for infertility treatment in the Hospital annually, and the respondents were selected through a simple random sampling method with the use of clinic records and the weekly appointment register in the gynaecological clinic obtained from the clinical staff.

The following procedures were adopted for recruitment:

First, a consecutive number was assigned to every individual who came to the clinic on appointment, check-up or treatment through the use of patients' cards and receipts submitted to the clinic record officer on the day of data collection. An average of 20

patients visited the clinic on clinic days. The clinic runs from Monday through Thursday, making use of Mondays and Thursdays for registrations, data collection and booking of appointment for new patients, while Tuesdays and Wednesdays were used for consultations with gynaecologists for those on appointment as scheduled by their doctors. The register in which the patients' data were recorded during their visit to the clinic serves as a sampling frame.

Secondly, a systematic random sampling of eligible patients was performed sequentially using every 2nd interval from the list of those who were present on each days of the clinic till the desired sample size was achieved.

Thereafter, individual selected were briefed of the study and its objectives. Eligible participants who refused to participate were replaced with other patients who consented and signed the consent form before administration of instruments for data collection. Those who asked questions about the study were informed about its objectives. Data were collected by the researcher and his assistants, explanations were also provided to those who sought explanation on the various forms of assisted reproductive technologies under investigation. An average of 10 respondents was interviewed daily for 6 weeks. Collection of data was carried out using these steps every day until the required sample size was achieved.

During the periods of data collection, 255 persons with infertility issues at the gynaecological clinic were approached to participate in the study. Of this 255 persons contacted and invited to participate, 220 consented. This gave 88% response rate in the study.

3.6 Inclusion and Exclusion Criteria

Inclusion

The study involved:

1. Persons who have fertility related problems as reported by the patients themselves.
2. Persons who were willing to participate.
3. individual who gave consent.

4. individuals who were between the ages 20 and 55 years.

Exclusion

The study excluded:

1. Persons who do not have fertility related problems as reported by the patients themselves.
2. Individual/ Persons who were not willing to participate.
3. individual who didn't give consent.
4. individuals who were below the ages 20 and above 55 years.

3.7 Instrument for data collection

For the study, the data was collected quantitatively. A semi structured questionnaire was used for data collection (See Appendix-ii). The questionnaire contained five different sections. Each section of the questionnaire focused on:

Socio-demographic data: these include age, sex, educational level, marital status, occupation, ethnicity, religion, years in marriage, number of children, experience of infertility, years of waiting before conception, income per month, duration of clinical visitation.

Sources of the awareness of assisted reproductive technologies, these included friends, family, neighbours, media, and church/mosque, mentor and health providers.

Attitude towards the use of assisted reproductive technologies. This section included attitudinal questions which focused on belief on ART, influence of religion towards ART, influence of cost of the procedures, influence of spouse.

Willingness towards the use of assisted reproductive technology for infertility control focused more on the willingness to share information about ART, willingness to make use of selected ART, such as IVF, GIFT, ICSI and gestational surrogacy. Questions on the willingness to make use of donated sperms and eggs by third party were also structured into this section.

The fourth section which identified numbers of respondents who are presently utilizing various forms of ART, also aided in identifying the types and place of

procurement of such ART by respondents, with a view to identifying the success rate of the procedure ART.

Section which helped identified factors that were responsible for non –uptake of assisted reproductive technologies was also considered in the designed instrument.

Responses were obtained using administered questionnaires. The questionnaires were interviewers' administered as majority of the respondents could not fill the questionnaires themselves. Some of the questionnaires were translated to Yoruba from English for those who were unable to understand the interview in English language and were back translated to English.

3.8 Validity and reliability of instruments

Relevant literature and formulated objectives guided the development of the instrument. The instrument was also reviewed by my research supervisor, and colleagues. The supervisor's comments and corrections were used to further enhance the quality of the instrument.

Following review and approval by the project supervisor, twenty questionnaires were pretested among 20 infertility patients: these individuals were recruited from the gynaecological clinic of Jericho Specialist Hospital, Jericho, in Ibadan South West Local Government, Oyo State, which is similar to the main study area as regards population, characteristics and socio-demography. The pre-test excluded patients who were not married, and those whose age were below 20 and above 55 years of age. After the administration of the questionnaires, they were asked about the simplicity of each question, whether they understood the questions or not and suggested the removal of some questions, language and options as they were not applicable to the respondents.

The instrument was revised after the pre-test as some questions were removed and some added. Question number 10, "How long have you been waiting for the fruits of the womb" was reversed, as this sound religious rather than scientific. More so, the questions number 30A-D on the types of assisted reproductive technologies couples were willing to make use were simplified, with the modification of technical medical terms used by the researcher. More so, questions 21, 23, 26 and 27 on attitudes were rectified, and more questions were added in other to effectively probe the respondents.

These amendments helped ascertain the effectiveness of the instrument in collecting appropriate data relevant to the research objectives.

Reliability test : The instrument was pre-tested among individuals having problems with conception and who were utilising the gynaecological clinic at Jericho Specialist Hospital, Jericho, located in Ibadan South West Local Area of Oyo State for various gynaecological services, especially inability to conceive as at when due and wanted. Reliability coefficient of the questionnaire was determined using the Cronbach's Alpha technique. Reliability coefficients of 0.744 and frequencies analysis were used to adjudge the questionnaire as being reliable.

3.9 Data collection procedures

Data collection for the main study took place within the period of 3rd September to 8th of October, 2015. The questionnaires were interviewer administered. Data were collected with the support of four research assistants who were given training on communication, manner of approach and method of data collection without creating scene and offence. These research assistants were given four hours training for two days and they were later assessed through the display of a well-coordinated demonstration and return-demonstration skills. They were assessed and made to complete and sign confidentiality forms before the commencement of the study. The respondents were interviewed using a revised edition of the pre-tested and semi-structured questionnaire.

3.10 Data processing and analysis

The semi structured questionnaire was administered by the principal investigator and trained research assistants. The questionnaire was serially numbered for control and recall purpose. Unique identification code was assigned to each respondent's questionnaire for correct data entry and analysis. The processing of the data included sorting, editing, collection and scoring of questionnaires. All administered questionnaires were thoroughly examined for completeness, they were then collated, sorted, edited and analysed using the Statistical package for the Social Sciences software version 22 (SPSS Inc., Chicago, IL, USA).

The quantitative data were analysed using descriptive statistics and chi-square. The results were displayed in tables and charts. Cross tabulation of variables were also carried out. Chi-square test was used to test for significant associations between variables. A p-value of less than 0.05 was considered as statistically significant.

Responses from attitude questions from the respondents towards the uptake of assisted reproductive technologies were categorized using a 9-point scale. The attitudinal scores of the respondents were computed based on only three categories of responses: Agree, Undecided and Disagree.

Each selected questions on the scale were assigned a score of 1 mark and the total number of questions on the scale was 9, therefore, the total score per respondent was 9.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having “Negative attitude”, while scores ranging from 5-9 was categorized as “Positive attitude”. Likewise, the total attitudinal points were summed, frequency and percentages were calculated.

On the analysis of willingness to make use of assisted reproductive technology, frequency and percentage values of respondents’ willing to make use of ART were compared and discussed extensively. Likewise, frequency and percentage value of the types of ART an individual was willing to utilise were also analysed, compared and discussed.

The questionnaires were stored in a place that will be safe to ensure that un-authorized persons have no access to them.

3.11 Ethical considerations

The following ethical procedures were adopted for this study:

Research protocol was submitted to the Oyo State ministry of Health Ethics Review Committee for approval prior to commencement of the study (Appendix iv).

Research assistants were adequately trained and scrutinised and made to sign confidentiality assurance form before the commencement of the study.

Permissions were obtained from the fertility clinics that were used for both pre-test and the main study. Permissions were also obtained from the matron of the clinic where the main study was conducted every day before the commencement of data collection.

Informed consent was obtained from each of the respondents after explaining to them the objectives of the study and their liberty to choose to participate or not to participate in the study. Outcomes of daily collected data were made known to the matron of the gynaecological clinic.

Confidentiality of each participant was maximally maintained during and after the collection of data. It was ensured that names and address of the participants were not written on the questionnaire. The data were collected and kept in a secured place where and away from public access.

3.12 Limitations

Among the limitations discovered during the course of the study was the issue of parental status of the couples. Parental status of the respondents varied, that is, some already had children, some second child, while some were still childless. It is possible that these couples will have different attitudes towards the uptake of ART for infertility treatment.

As observed during the administration of the questionnaires, some of those who have heard of ART were still of the perception that all procedures relating to ART involved formation of babies in the test tubes by 'wise and demonic' medical practitioners. As such, their willingness towards the uptake of the procedure was still aligned to their perception, which might be difficult to change during the course of the interview.

CHAPTER FOUR

RESULTS

4.1.0 Socio-demographic characteristics

A total of 202 respondents participated in the study. Respondents interviewed were all married. The ages of the respondents ranged from 22- 55 years of age, with a mean age of 34.28 ± 6.548 . Majority 116(57.4%) of the respondents were between 30-39 years of age, few 51 (25.2 %) of the respondents were within the age group 20-29 years of age, 26 (12.9%) falls under the age group 40-49 years of age and the remaining respondents were 50 years of age and above 9(4.5%) as shown in Table 4.1.

Majority of the respondents 92.1% belonged to the Yoruba ethnicity, followed by Igbo ethnic group 5.4%, 1.5% are from Delta and 1.0% from Hausa ethnic group.

Majority of the respondents 88.6% were female, while 11.4% were male. Almost all the respondents 98.5% were married, 1.0% were either divorced or separated, and 0.5% being a widow.

Muslims dominated the larger number of the respondents 50.0%, while 49.0% were Christians, with the least respondents 1.0% being from the African tradition religion. Majority of the respondents 55.0% had tertiary education; followed by 35.1% of the respondents with secondary education as their highest level, few 7.4% had primary education and the least 2.5% had no formal education.

A good number of the respondents 59.4% were traders/artisans, 32.2% were government/private/office workers, 8.4% of the respondents were unemployed/homemaker/retired/ or unable to work.

Table 4.1.0 shows the relationship between the numbers of study respondents and their socio-demographic characteristics. N = 202

Variables	No (%)
Sex	
Male	23 (11.4)
Female	179(88.6)
Age (years)	
20-29	51(25.2)
30-39	116(57.4)
40-49	26 (12.9)
50 +	9 (4.5)
Ethnic group	
Yoruba	186(92.1)
Igbo	11(5.4)
Delta	3(1.5)
Hausa	2(1.0)
Marital status	
Married	199(98.5)
Divorced/Separated	2(1.0)
Widowed	1(0.5)
Number of children	
1	45(22.3) *
2	31(15.3)
3	13(6.4)
4	3(1.5)
Religion	
Islam	101(50.0)
Christians	99(49.0)
African tradition	2(1.0)
Level of Education	
No formal education	5(2.5)
Primary education	15 (7.4)
Secondary education	71 (35.1)
Tertiary education	111(55.5)
Occupation	
White collar job (Office/Govt. workers)	65(32.2)
Blue collar Job (Artisan/Trader)	121(59.9)
Not employed (Homemaker/Retired/Unable to work)	16(7.9)

(*Total percentage not equal to 100 because those with no child was excluded)

Most of the respondents 110 (54.5%) are experiencing primary infertility, 92(45.5%) are experiencing secondary infertility (Figure 4.2). Among those experiencing secondary infertility, 15.3% of the respondents still want more children even after having two, while 6.4% and 1.5% of the respondents are still eager to have more children even after having three and four children respectively.

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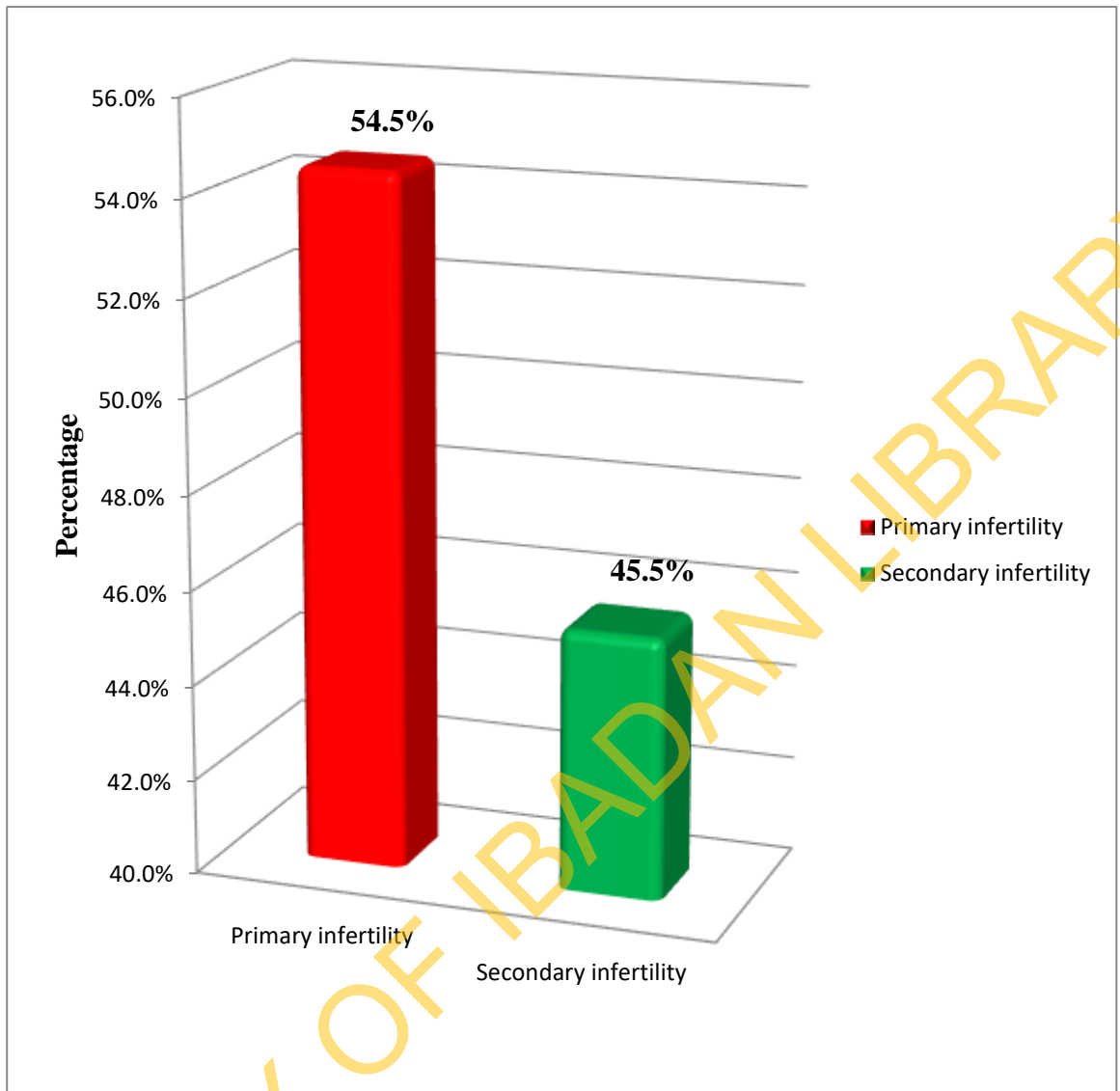


Figure 4.2 Shows types of reported infertility among respondents (%)

Years of waiting for conception for those experiencing primary varies, with those waiting within a year being 31.8% respondents, those between 1 and 2 years were 29.1% respondents, between 3 and 4 years, 15.5% respondents; between 5 and 6 years were 6.4% respondents, between 7 and 8 years was 3.6% respondents, between 9 and 10 years were 3.6%, while those who have been waiting for 10 years and above were 8.2% respondents. (Table 4.1.2)

Majority 32.6% of the respondents wanting to have another child were those who are been expecting or anxious within a year, 22.5% have been anxious and wanting to have another children between 3 and 4 years, 15.7% were between 1 and 2 years; 14.6% of the respondents have been waiting to have conception for over ten years, while 6.7% of the respondents have been anxious for the past 5 and 6 years and 4.5% between 7 and 8 years. All these individuals wanting to have more children were classified as persons experiencing secondary infertility.

Table 4.1.2 Relationship between experience of infertility and years of waiting/duration of infertility

Duration of infertility	No (%)
Primary infertility	
Within a year	35(31.8)
Between 1 and 2	32(29.1)
Between 3 and 4	17(15.5)
Between 5 and 6	7(6.4)
Between 7 and 8	6 (5.5)
Between 9 and 10	4(3.6)
10 years and above	9(8.2)
Total	110

Duration of infertility	No (%) *
Secondary infertility	
Within a Year	29(32.5)
Between 1 and 2 Years	14(15.7)
Between 3 and 4 Years	20(22.4)
Between 5 and 6 Years	6(6.7)
Between 7 and 8 years	4(4.9)
Between 9 and 10 Years	3(3.3)
Ten Years and above	13(14.5)
Total	89

*Total do not add up to 93 because non respondents have been removed

Of the 199(98.5%) married persons who responded to the question on *years in your marital relationship*, 55(27.6%) of the respondents had spent between 3-5 years in their matrimonial home; 47(23.6%) had spent between 1-2years, 46(23.1%) had spent 11 years or more. While 39(19.6%) had spent 6-10years, others 5(2.5%) are less than a year in their matrimonial homes. (Figure 4.3)

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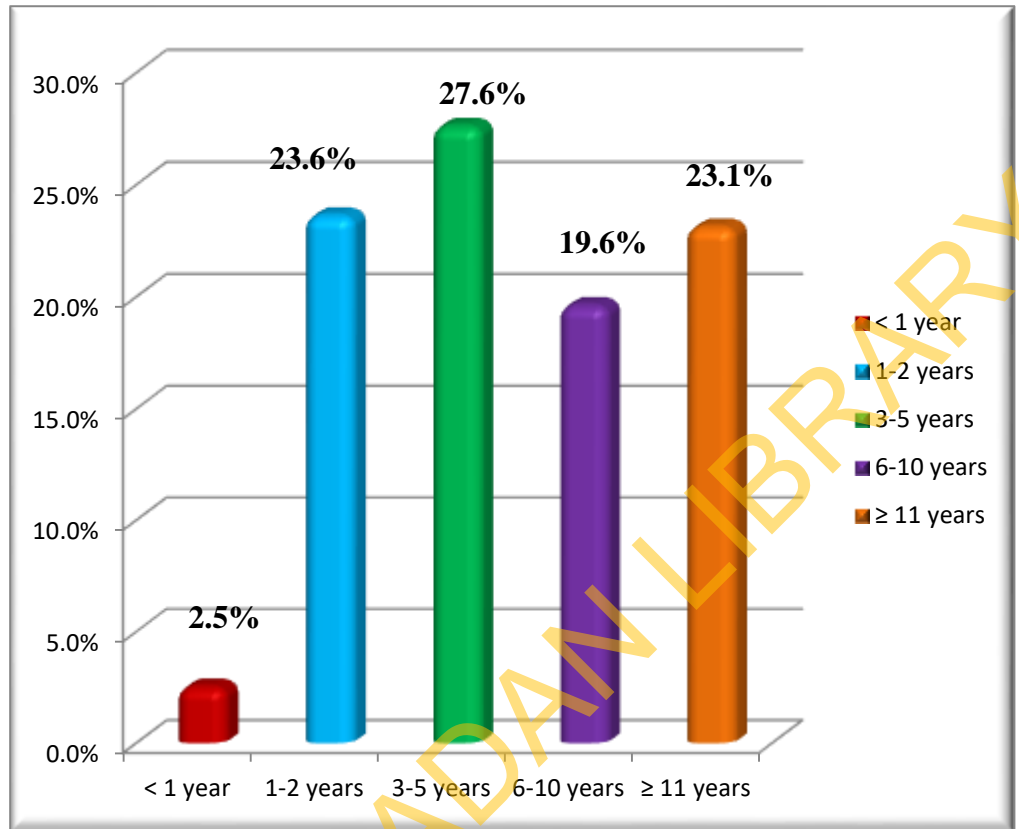


Figure 4.3: shows reported duration in marriage of the respondents

On clinic appointment by consultants, 35 of the respondents are just coming for the visit consultation while 167 respondents have visited their doctors for more than once as scheduled by their consultants. Of those who have been coming to the clinic more than once, 126 respondents have been coming between 1-6 months, 23 respondents have been on appointment over 7 – 12 months, 9 of the respondents have also been on the clinic appointment for over 25 months; while 4 respondents have been on the visit row for over 19-24 months, 4 are have also visited the clinic between 13-18 months for gynaecological consultations (Table 4.1.3). As such, the mean for the months of visitation by the respondents was 6.87 ± 11.270 .

Table 4.1.3 Relationship between respondents and clinic visits with their consultants.

N= 167

Variables	No (%)
Clinic visits (months)	
1-6	126(75.4)
7-12	23 (13.8)
13-18	4 (2.4)
19-24	4 (2.4)
25 and above	10(6.0)

Of the 202 respondents, only 94(46.5%) ever heard of assisted reproductive technologies, while 108 of the respondents never heard or knew anything about it. Sources of those who knew about it include friends, Health providers/Doctors/Nurses/Pharmacist, mass media (TV/Radio/internet), Books/prints/magazines/newspapers/, family members/spouse, church/mosques and neighbours/co-workers/business partner respectively.

4.2.1 Attitudes towards the uptake of assisted reproductive technologies (ART) for infertility management.

On whether respondents will **prefer assisted reproductive procedures to traditional use of herbs and concoctions for treatment of infertility**, majority 102(52.3%) Agreed, 60(30.3%) disagreed, 34(17.4%) could not decide on this and 6(3.0%) of the respondents gave no indication or response to this question. (Table 4.2.1).

Whether respondents can **encourage colleagues or friends in the neighbourhood to procure ART**, 127(64.1%) Disagreed, affirming that they cannot do so; 52(26.3%) Agreed to encourage them if they would like it, 19(9.6%) were never sure they can do it, while 4 respondents gave no indication of their readiness to do so.

On the question **“I cannot withstand the procedures of ART because it will cause me harm”** most (49.5%) of the respondents disagreed, believing that the procedures will never cause harm; 24.6% of the respondents agreed and believed that ART procedures involves and can cause harms, as such they cannot make use of it, 25.1% respondents never decided on this, while 11 respondents gave no response to the nature of the procedures.

On the whether the **baby born through this procedures will be deformed or not**, majority (49.5%) of the respondents disagreed, believing such baby will be normal and healthy without deformity, while 24.3 % of the respondents believed such baby will be deformed, no matter how careful the procedure was, while 26.2% of the respondents never were undecided. Table 4.2.1

“Women and men who seek or go for ART are weak, so I cannot make use of it for conception”, 54.9% of the respondents disagreed with this question. While 26.2% of the respondents agreed to this conception that women who seek or intends seeking the assistance of experts in the field of assisted reproduction technologies for conception are weak, 18.9% of the respondents where yet to decide on this.

Table 4.2.1 Attitudes of the respondents towards the use of assisted reproductive technology (GIFT, ICSI, GS and IVF).

Statements	Agree(%)	Disagree(%)	Undecided(%)	Total*
I don't believe ART is a new way of finding lasting solution to infertility	82(41.2)	86(43.2)	31(15.6)	199
Will prefer this technology to the use of traditional treatment through herbs or local concoctions for infertility	102(52.3)	59(30.3)	34(17.4)	195
Cannot encourage anybody to make use of ART for conception	52(26.3)	127(64.1)	19(9.6)	198
Religion does not go against ART	103(50.0)	69(34.8)	26(13.1)	198
ART is too expensive, therefore I cannot encourage its use for infertility management	65(33.5)	82(42.3)	47(24.2)	194
I will never be in support because it is against my own beliefs and faith	59(30.1)	114(58.2)	23 (11.7)	196
I am of the opinion that Praying is better than making use of ART	106 (53.0)	69(34.5)	25(12.5)	200
I cannot encourage my spouse to make use of ART for conception	99(50.8)	77(39.5)	19(9.7)	195
I cannot withstand the procedures of ART because it will cause me Harm	49(24.6)	100(50.3)	50(25.1)	199
Babies born through ART will be deformed	49(24.3)	100(49.5)	53(26.2)	202
Women and men who seek for ART are weak, so I cannot make use of it for conception	51(26.2)	107(54.9)	37(18.9)	195

*Some of the total did not add up to 202 because non respondents have been removed.

GIFT= Gamete Intrafallopian Transfer

ICSI=Intra-Cytoplasmic Sperm Injection

GS =Gestational carrier (surrogate)

IVF=In Vitro Fertilization

4.3.1 Categorization of respondents' attitude towards the uptake of assisted reproductive technologies (GIFT, ICSI, GS and IVF) for infertility management.

A total of 202 respondents attitudinal responses towards the uptake of assisted reproductive technologies were categorized using a 9-point scale. Attitudes of the respondents were computed based on only three categories of responses: Agree, Undecided and Disagree.

Each selected questions on the scale attracts a score of 1 and the total number of questions on the scale is 9, therefore, the total score per respondent is 9.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having "Negative attitude", while scores ranging from 5-9 was categorized as "Positive attitude". As such, the total attitudinal points were summed, frequency and percentages were calculated.

From the result, majority 52.0% of the respondents have Negative attitude, while 48.0% have Positive attitude towards the uptake of assisted reproductive technologies for management of infertility (Table 4.3.1).

Table 4.3.1 Categorization of respondents attitudes towards the uptake of assisted reproductive technologies (GIFT, ICSI, GS and IVF) (N=202).

Categories	No (%)
Negative attitude	105(52.0)
Positive attitude	97(48.0)

4.4.1 Willingness towards the uptake of GIFT, ICSI, GS and IVF

The question on whether respondents are **willing to share information about assisted reproductive technologies for the management of infertility** with friends, neighbours, family members or community members having similar health challenge of infertility, 132 respondents made known their intention to joyfully share the information, while 50 respondents were not willing to share such information, 17 of the respondents were not sure of carrying out such task and 3 gave no answer.

On the **willingness to make use of assisted reproductive technology for themselves if services are provide in the government public hospital**, 100 (49.5%) respondents declined, saying they cannot make use of the services; 85 (42.1%) were of the opinion that they can make use of ART if provided, but 17 (8.4%) said they don't know maybe they can make us of it (Figure 4.4).

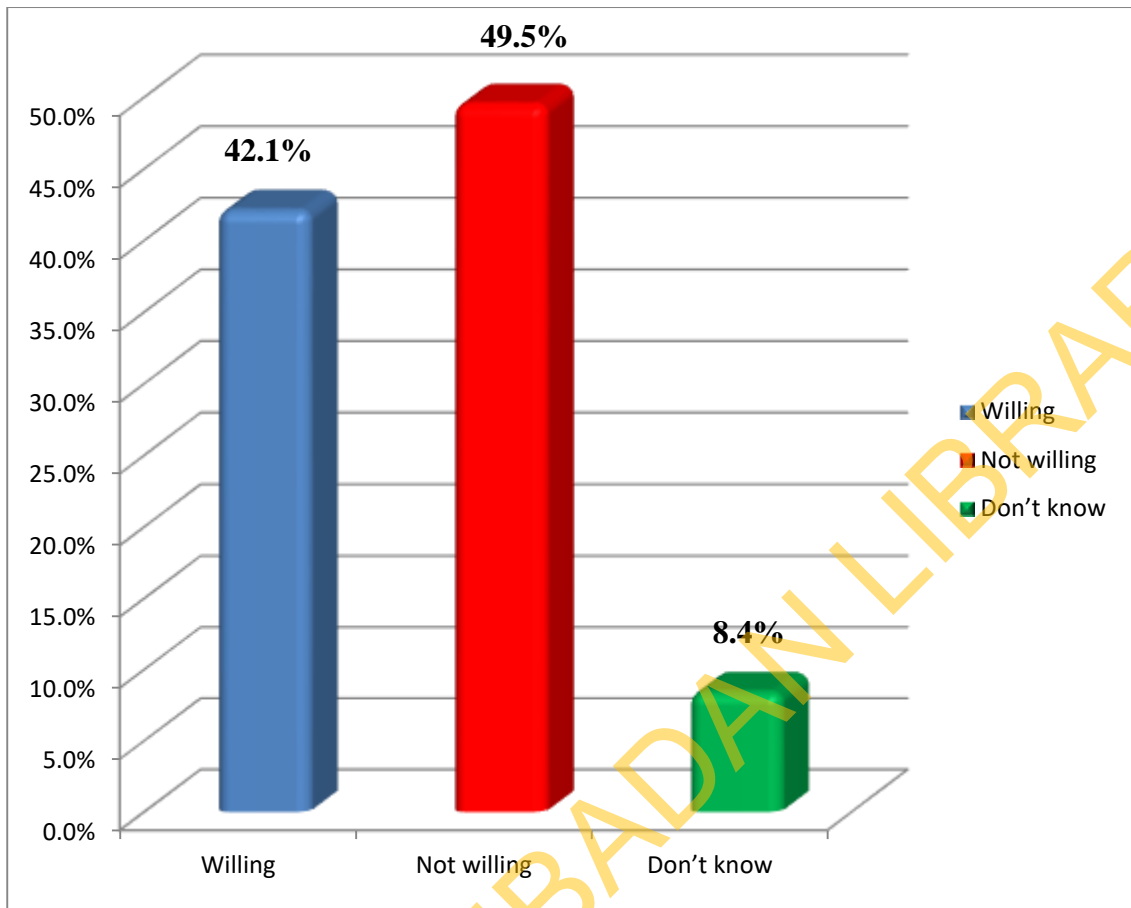


Figure 4.4 shows responses of the respondents towards the uptake of assisted reproductive technology.

From the 85(42.5%) respondents who gave indication and made their opinion and interest known to make use of the ART, the question “**which of the following assisted reproductive technologies will you be willing to make use of if provided,** the following results were obtained(Table 4.4.1).

Table 4.4.1 Assisted reproductive technologies willing to utilize by respondents for the management of infertility (N=85)

Types of ART	Yes (%)	No (%)	Don't know (%)	Total
GIFT	43(50.6)	17(20.0)	25(29.4)	85
ICSI	39(45.8)	23(27.1)	23(27.1)	85
GS	9(10.6)	60(70.6)	16(18.8)	85
IVF	68(80.0)	1(1.2)	16(18.2)	85

*GIFT= Gamete Intrafallopian Transfer

ICSI=Intra-Cytoplasmic Sperm Injection

GS = Gestational carrier (surrogate)

IVF=In Vitro Fertilization

4.4.2 Willingness to accept or donate reproductive egg/sperm

Majority, 165 (84.2%) of the respondents answered ‘No’ to **willingness to accept donated sperms for conception**; just few 21(10.7%) agreed and said “Yes” to make use of sperms for themselves or permit their wives to make use of third party sperms, but 10(5.1%) respondents were yet to decide.

On the other hand, one-third (84.2%) of the respondents gave a “No” answers to **‘can you make use of zygote or fertilized egg donated by another woman who is not your spouse to help you have children’**, while a few 20(10.6%) respondents were willing to accept donor’s egg for conception, and 13(7.0%) respondents were yet to decide on this.

On **“can you donate your own reproductive egg (Oocyte) / Sperm for the benefits of other people having challenge of inability to conceive”**, majority 133(68.2%) responded “No”, 49(25.1%) respondents agreed to donate for those who are in need if requested but 13(6.7%) respondents were yet to decide.(Figure 4.4.2a-c)

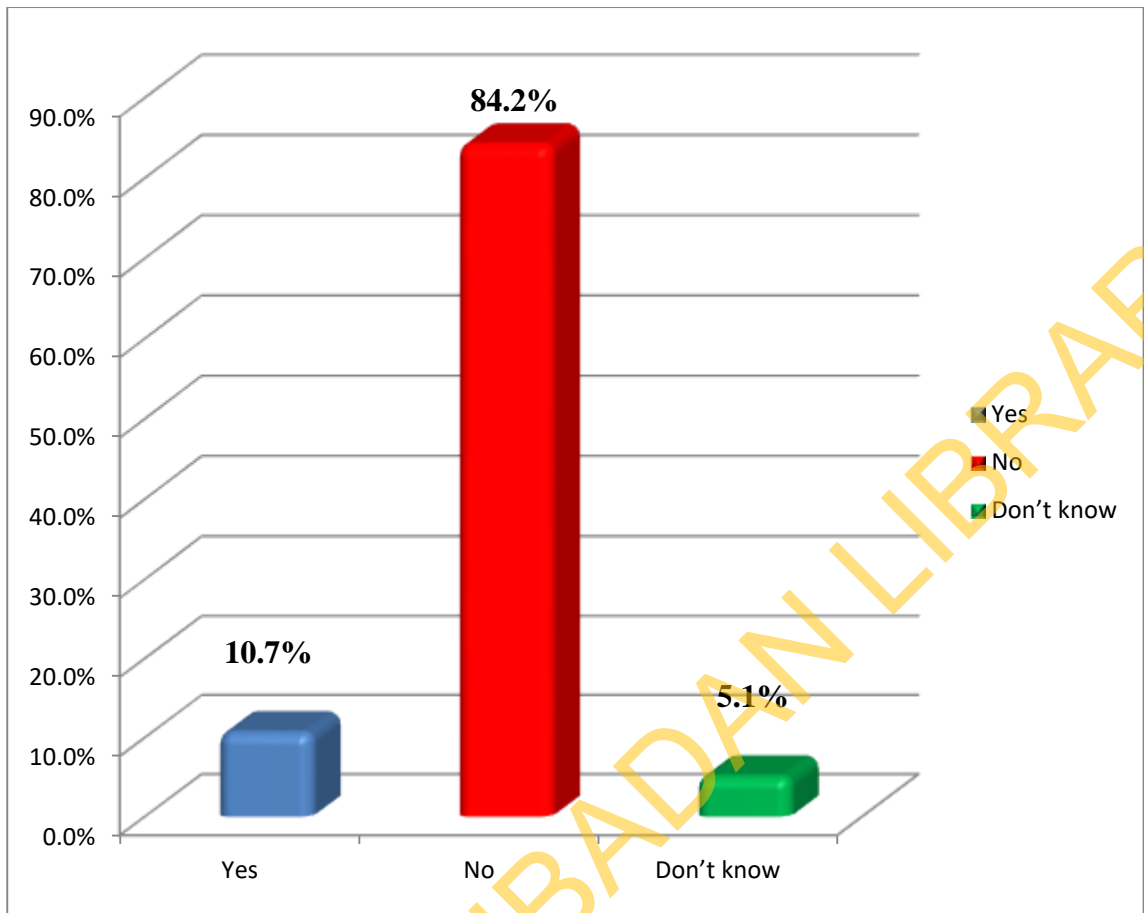


Figure 4.4.2a shows willingness to accept donated sperm

(Total do not add up to 202 because non respondents have been removed)

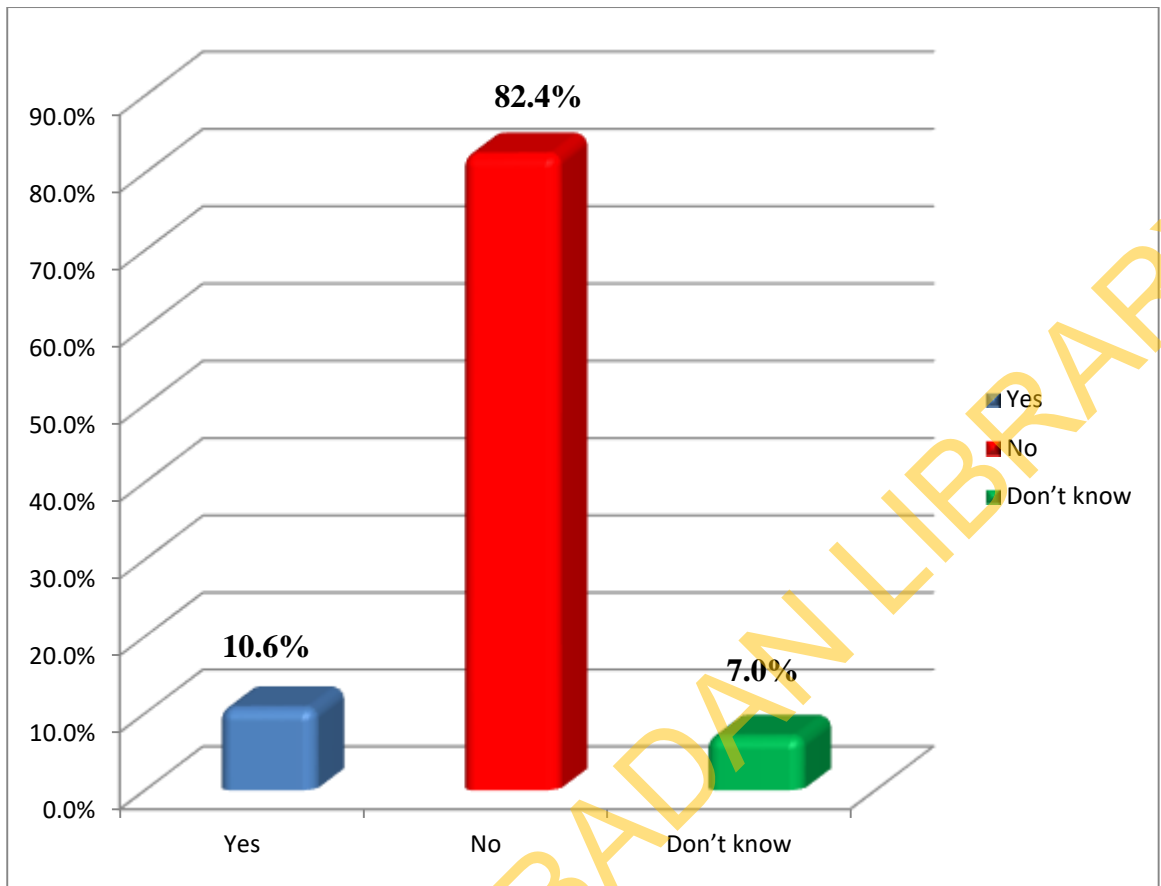


Figure 4.4.2b shows willingness to use reproductive egg donated by another woman (Total did not add up to 202 because non respondents have been removed).

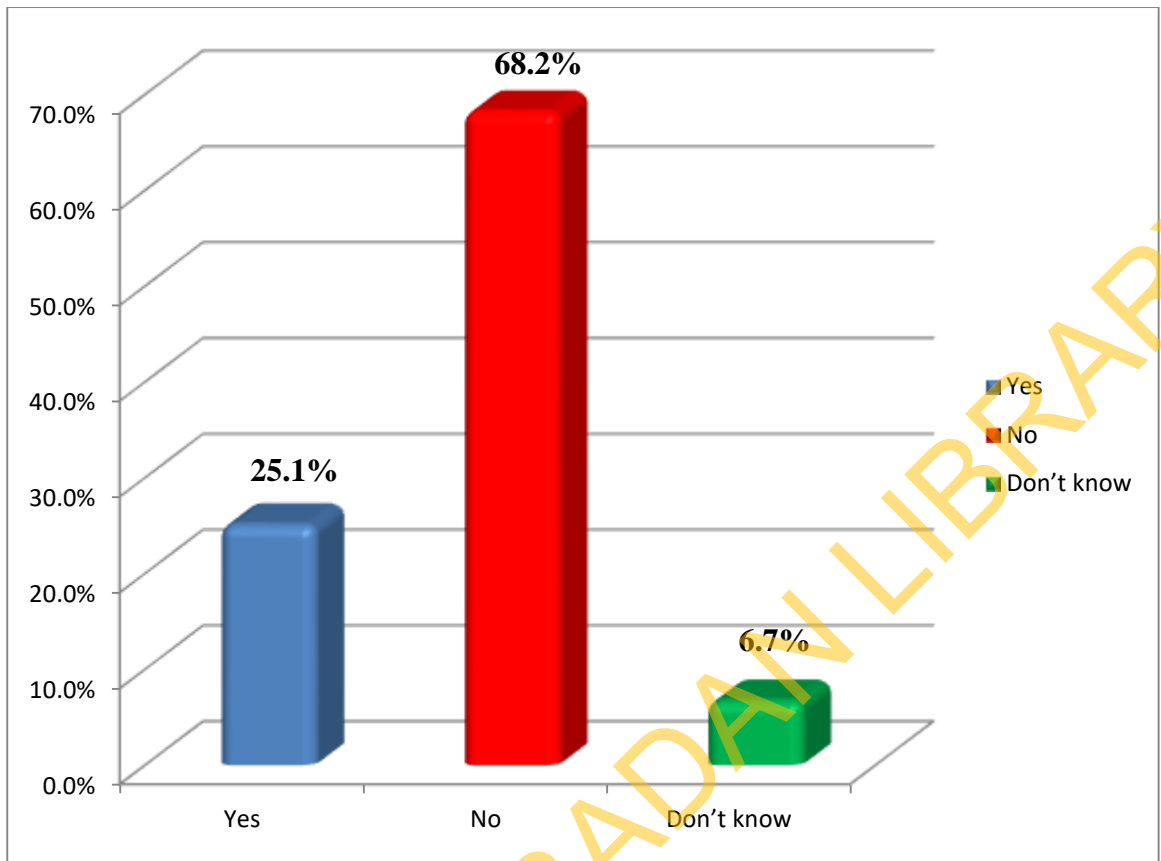


Figure 4.4.2c shows willingness to donate reproductive egg/sperm for others (Total did not add up to 202 because non respondents have been removed).

4.5.1 Respondents currently making use of any of the ART

Out of the 202 respondents who were interviewed, only 1 client is currently making use of In-vitro fertilization at Vine Branch Fertility Centre, Dandaru, Ibadan, Oyo State.

On the question of **the duration on the selected ART**, the respondents have been on IVF for 12months.

“What will you rate the efficacy of the ART you have used or currently using,” the respondent rated the procedure to be **fair**.

To identify the significant order who introduced her to the use of ART, the respondent identified her family Doctor as the source and motivator to the adoption of the ART.

4.6.1 Factors militating against uptake of Assisted Reproductive Technologies

Below are identified factors listed by respondents that are restricting the willingness to make use of ART.

Among all the 202 respondents, only 15 respondents were optimistic about opting for the procedure without any impediments, while others gave a reason or another.

(Table 4.6.1).

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Table 4.6.1 shows factors identified for non-uptake of ART

Variables indentified by Respondents	N^o	%*
Cost to procure ART too expensive or non-availability of money/funds	84	41.6
I don't like, believe or have interest in the use of ART/machine for conception and I can conceive by myself	75	37.1
Belief in God's intervention and I prefer natural sexual intercourse	40	19.8
Procedure may not be perfect, effective, natural and baby will be deformed and abnormal	39	19.3
Procedures, side effects, fear of risks and hospital visits may be too stressful/painful and unbearable	32	15.8
Spousal agreement or willingness to opt for ART	32	15.8
Religion and belief negate the use of ART for conception	27	13.4
Poor knowledge of ART procedures by patients, access to ART clinic and absence of qualified medical personnel	25	12.4
Child will be segregated/ stigmatized or regarded as bastard by people, relatives/in-laws/friends	22	10.9
No factor can prevent me except if there is age restriction from making use of ART	19	9.4

***Multiple responses**

4.7.1 Test of Hypotheses 1

Ho: The first hypothesis stated that there would be no significant association between the demographic characteristics of the respondents and their willingness towards the uptake of assisted reproductive technology.

In order to have a clear view of the association between variables, Fisher's Exact Test set at $p\text{-value} < 0.05$ was used to ascertain the true relationship of all being considered in the socio-demographic characteristics with willingness towards the uptake of ART.

A total of 85(42.1%) of the respondents were willing to make use of ART (GIFT, ICSI, GS and IVF), while 100(49.5%) were opposed to its use; 17(8.4%) were yet to decide or don't know what to do. A total of 202 respondents were interviewed. Of this, 23(11.4%) were male while 179(88.6%) were female. The association between sex of the respondents and willingness towards the use of ART was not significant. Therefore, there is no significant association between sex of the respondents and their willingness towards the uptake of ART (GIFT, ICSI, GS and IVF). ($X^2=4.927$, $df=2$, $p\text{-value}=0.085$).

Respondents within the age group 30-39 years of age had the highest frequency of infertility 116(57.4%) compared to respondents within the age-group 20-29 years with a frequency of 51(25.2%), respondents within the age-group 40-49 years and respondents who are 50+ years who had the least frequency 9(4.5%). Therefore, the association between the ages of respondents was not found to be significant with willingness towards the uptake of assisted reproductive technologies (GIFT, ICSI, GS and IVF). ($X^2=0.520$, $df=6$, $p\text{-value}=5.191$).

Respondents with tertiary education were found with the highest frequency and percentages of infertility. A total of 111(55.5%) had tertiary education, of which 50(58.8%) were willing to use ART. Also, 71(35.1%) had secondary education as their highest level of education, of which 24(28.2%) are willing to make use of ART. Fifteen (7.4%) had primary education as their highest level of education, compared to 5(2.5%) with no formal education, of which 3(2.5%) were willing to make use of ART. Therefore, the association between level of education and willingness to make use of GIFT, ICSI, GS and IVF was found not to be statistically significant ($X^2=0.418$, $df=6$, $p\text{-value}=6.051$) (Table 4.7.1a).

Respondents who were married were the major target for the study and were found to be the highest (98.5%), compared with 1.0% of the respondents who were divorced/separated and a percent for those widowed. Therefore, the association between marital status and willingness to make use of GIFT, ICSI, GS and IVF was found not to be statistically significant ($X^2=3.629$, $df=4$, p -value=0.617).

Respondents who were of Islamic religion were found to be the highest (50.0%), of which 54.1% were willing to make use of ART, followed by Christianity religion in which 43.5% were also willing, compared with African traditionalist were just 2.3% were only willing to opt for it. With these, the association between religion and willingness to make use of GIFT, ICSI, GS and IVF was found not to be statistically significant ($X^2=4.962$, $df=4$, p -value=0.261). (Table 4.7.1a).

Respondents who have spent between 3-5 years in marriage dominated the study with 55(28.6%) being the highest. Those who have spent between 1-2years have 47(24.5%) of the study population, while were of Islamic religion were found to be the highest (50.0%), of which 54.1% were willing to make use of ART, followed by Christianity religion in which 43.5% were also willing, compared with African traditionalist were just 2.3% were only willing to opt for it. Among these respondents with different marriage years, 23 of those who have spent 11 years and above were willing to make use of ART, followed by 21 respondents among those who have spent between 6-10 years, and 19 of the respondents who have spent between 1-2 and 16 respondents who have spent 3-5 years respectively were also willing, with the least being those who have spent between 1-2years having just 1 respondent who was willing to make use of ART. With these, the association between years in marriage and willingness to make use of ART was found not to be statistically significant ($X^2=9.567$, $df=8$, p -value=0.268). (Table 4.7.1b).

Occupation of the respondents was categorized into White collar job (office/government worker), blue collar job (Artisan, Trader, Farmer etc) and Not employed (homemaker, student, retiree, those unable to work etc). Majority (32.2%) of the respondents who are in the group of blue collar have the highest respondents (52.9% willing to make use of ART with, were respondents with white collar job have 37.6%

willingness, with the least being those without job/ employment having 9.4% willingness. With these, the association between occupation and willingness to make use of ART was found not to be statistically significant ($X^2=6.450$, $df=4$, $p\text{-value}=0.148$).

Years of waiting for conception by those having reported cases of Primary infertility varies. Those who have been waiting within a year have the highest percent (30.0%) of willingness to make use of ART, followed by those who have been waiting between 1-2 years (24.0%), then, those who have been waiting for 10 years and above (14.0%), those who have been waiting to conceive between 3-4 years and 5-6 years (10.0% and 10.0% respectively); the least being those who have been waiting for 7-8 years and 9-10 years having 8.0% and 4.0% willingness respectively. The association between years of waiting for those having Primary infertility cases and willingness to make use of ART was found not to be statistically significant ($X^2=11.614$, $df=12$, $p\text{-value}=0.418$).

Likewise, years of waiting for conception by those having reported cases of Secondary infertility varies too. Those who have been waiting for over 10 years were found to have the highest percent (29.4%), followed by those who have been waiting for between 5-6years (17.7%), were those who have been waiting within a year, 1-2years and 3-4 years have 14.7%. 14.7% and 14.7 % respectively; with the least being those who have been waiting for 7-8years (5.9%) and 9-10 years (2.9%) respectively. The association between years of waiting for those having Secondary infertility cases and willingness to make use of ART was found to be statistically significant ($X^2=29.746$, $df=12$, $p\text{-value}=0.000$). Therefore, we reject the null hypothesis.

Analysis was also carried out to find the association between respondents' clinic appointment and willingness towards the uptake of ART. Of those who were just visiting the clinic during the period of data collection for the first time, 17.0% were willing to make use of ART, while 80.0% of those who have been coming to the clinic often and according to appointment were also indicated their interest towards the uptake of ART. The association between clinic visits (first timer and frequent user) and willingness to make use of ART was found not to be statistically significant ($X^2=1.727$, $df=2$, $p\text{-value}=0.425$). (Table 4.7.1c).

Table 4.7.1(a) Association between socio-demographic characteristics and willingness toward the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Willingness to make use of ART						
	Yes (%)	No (%)	Don't know(%)	Total	Df	X ²	P-value
Sex:							
Male	14(16.5)	9(10.6)	0(0.0)	23	2	4.407	0.095
Female	71(83.5)	91(91.0)	17(100)	179			
Total	85	100	17	202			
Age:							
20-29	23(27.1)	22(22.0)	6(35.2)	51	6	4.695	0.563
30-39	45(52.9)	60(60.0)	11(64.7)	116			
40-49	13(15.9)	13(13.0)	0(0.0)	26			
50+	4(4.7)	5(5.0)	0(0.0)	9			
Total	85	100	17	202			
Education:							
No Education	3(3.5)	1(1.0)	1(5.9)	5	6	6.588	0.320
Primary	8(9.4)	6(6.0)	1(5.9)	15			
Secondary	24(28.2)	42(42.0)	5(29.4)	71			
Tertiary	50(58.8)	51(51.0)	10(58.8)	111			
Total	85	100	17	202			
Marital status:							
Married	85(100)	97(97.0)	17(100)	199	4	3.629	0.617
Divorced/Separated	0(0.0)	2(2.0)	0(0.0)	2			
Widowed	0(0.0)	1(1.0)	0(0.0)	1			
Total	85	100	17	202			
Religion:							
Islam	46(54.1)	45(45.0)	10(58.8)	101	4	4.962	0.261
Christianity	37(43.5)	55(55.0)	7(41.1)	99			
African Traditions	2(2.3)	0(0.0)	0(0.0)	2			
Total	85	100	17	202			

Table 4.7.1(b) Association between socio-demographic characteristics and willingness toward the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Willingness to make use of ART						
	Yes(%)	No(%)	Don't know(%)	Total	Df	X ²	P-value
Years in marriage*							
Less than a year	1(1.25)	4(4.2)	0(0.0)	5			
1-2 years	19(23.7)	23(23.9)	5(31.2)	47			
3-5years	16(20.0)	33(34.3)	6(37.5)	55	8	9.567	0.268
6-10years	21(26.2)	15(15.6)	3(18.8)	39			
≥11years	23(28.8)	21(21.8)	2(12.5)	46			
Total	80	96	16	192			
Occupation							
White collar Job	32(37.6)	28(28.0)	5(29.4)	65			
Blue collar Job	45(52.9)	67(67.0)	9(52.9)	121	4	6.450	0.148
Not employed	8(9.4)	5(5.0)	3(17.6)	16			
Total	85	100	17	202			
Primary infertility waiting years**							
Within a year	15(30.0)	16(34.8)	4(28.6)	35			
1-2years	12(24.0)	16(34.8)	4(28.6)	32			
3-4 years	5(10.0)	8(17.4)	4(28.6)	17			
5-6 years	5(10.0)	2(4.3)	0(0.0)	7	12	11.614	0.418
7-8years	4(8.0)	1(2.2)	1(7.1)	6			
9-10years	2(4.0)	2(4.3)	0(0.0)	4			
>10years	7(14.0)	1(2.2)	1(7.1)	9			
Total	50	46	14	110			

(*Total did not add up to 202 because non respondents have been removed)

(**Total did not add up to 202 because value of Primary infertility was 110)

Table 4.7.1(c) Association between socio-demographic characteristics and willingness toward the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Willingness to make use of ART						
	Yes(%)	No(%)	Don't know(%)	Total	Df	X ²	P-value
Secondary fertility waiting years**							
Within a year	5(14.7)	24(46.2)	0	29			
1-2years	5(14.7)	8(15.4)	1	14			
3-4 years	5(14.7)	13(25.0)	2	20			
5-6 years	6(17.7)	0(0.0)	0	6	12	29.746	0.000
7-8years	2(5.9)	2(3.8)	0	4			
9-10years	1(2.9)	2(3.8)	0	3			
>10years	10(29.4)	3(5.8)	0	13			
Total	34	52	3	89			
Clinic appointments							
First timer :Yes	17(20.0)	17(17.0)	1(5.9)	35	2	1.727	0.425
No	68(80.0)	83(83.0)	16(94.1)	167			
Total	85	100	17	202			

.** Total did not add up to 92 because non respondents have been removed and value of Secondary infertility was 92).

Ho: Test for Hypotheses 2

The second hypothesis stated that there would be no significant association between attitude of the respondents and their willingness towards the uptake of assisted reproductive technology.

Among the total of 202 respondents, attitudes of the respondents was computed based on only three categories of responses: Agree, Undecided and Disagree.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having “Negative attitude”, while scores ranging from 5-9 was categorized as “Positive attitude”. As such, the total attitudinal points were summed, frequency and percentages were calculated.

Of the 105(52.0%) of the respondents who have Negative attitude, 73 (73.0%) were not willing to make use of assisted reproductive technologies, while 68(80.0%) of those who have Positive attitude 97(48.0%) towards the uptake of assisted reproductive technologies were willing to make use of it (Table 4.7.2).

Therefore, the association between attitude of the respondents and their willingness to make use of GIFT, ICSI, GS and IVF was found to be statistically significant($X^2=61.481, df =2, p\text{-value}=0.000$). Therefore, we rejected the null hypothesis.

Table 4.7.2 Association between attitude of the respondents and their willingness toward the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Willingness to make use of ART						
	Yes (%)	No (%)	Don't know(%)	Total	Df	X ²	P-value
Categorised attitude							
Negative	17(20.0)	73(73.0)	15(88.2)	105	2	61.481	0.000
Positive	68(80.0)	27(27.0)	2(11.8)	97			
Total	85	100	17	202			

Ho: Test of Hypotheses 3

The third hypothesis stated that there would be no significant association between demographic characteristics of the respondents and their attitude towards the uptake of assisted reproductive technology.

In order to have a clear view of the association between variables, Fisher's Exact Test set at $p\text{-value} < 0.05$ was used to ascertain the true association of all the variables being considered in the socio-demographic characteristics with attitude towards the uptake of ART.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having "Negative attitude", while scores ranging from 5-9 was categorized as "Positive attitude". As such, the total attitudinal points were summed, frequency and percentages were calculated.

Of the 23 male and 179 female interviewed, 18.0% of the male have Positive attitude and 5.7% have Negative attitude towards the use of ART, while 82.0% of the female have Positive attitude and 94.3% have Negative towards the use of ART. Therefore, the association between sex and attitude towards the uptake of GIFT, ICSI, GS and IVF was found to be statistically significant ($X^2=6.972$, $df =1$, $p\text{-value}=0.013$). Therefore, we rejected the null hypothesis (Table 4.7.3a).

Respondents between the ages of 30-39 years were found to have the highest Positive attitude (59.8%), followed those in ages group 20-29 years having Positive attitude of 20.6%, while ages 40-49 years and 50+ years have 14.4 % and 5.2% respectively. The association between ages of the respondents and attitude towards the uptake of GIFT, ICSI, GS and IVF was found not to be statistically significant ($X^2=2.368$, $df =3$, $p\text{-value}=0.505$).

Respondents with tertiary education were found to have the highest Positive value (57.7%) towards the uptake of ART, while those with Secondary education have 32.0%, compared with 7.2% Positive attitude of those with Primary education, with the least being respondents with No formal education having 3.1% Positive attitude towards the uptake of ART.(Table 4.7.3a). The association between level of education of the respondents and attitude towards the uptake of ART was found not to be statistically significant ($X^2=1.196$, $df =3$, $p\text{-value}=0.788$).

Respondents who were married were found to have the highest percent Positive attitude value (100%), being the only group of people with the right attitude towards the uptake of ART, but the association between marital status of the respondents and attitude towards the uptake of ART was found not to be statistically significant ($X^2=2.375$, $df =2$, $p\text{-value}=0.498$).

Respondents who were Islam were the highest attitude towards the uptake of ART. Of these, 51.5% of the respondents who were Islam were found to have a Positive attitude while 48.6% have Negative attitude towards ART, compared with Christians who were found to have 48.5% Positive attitude and 49.5% Negative attitude towards the uptake of ART. The association between marital status of the respondents and attitude towards the uptake of ART was found not to be statistically significant ($X^2=1.583$, $df =2$, $p\text{-value}=0.568$). (Table 4.7.3a)

When compared with attitude, respondents who have spent more than 11years in marriage have the highest Positive attitude towards the uptake of ART, being 26.1% of those who have Positive attitude, while those who have been in marriage for 3-4years have 25.0% Positive attitude, were those between 6-10 years, 1-2 years and less than a year have 23.9%, 20.7% and 4.3% Positive attitude respectively, but the association between years in marriage and attitude towards the uptake of ART was found not to be statistically significant ($X^2=5.229$, $df =4$, $p\text{-value}=0.265$). (Table 4.7.3b)

Occupations of the respondents were also compared. Respondents who were grouped into blue collar job (Artisans, traders, businessmen/women) were found to have the highest Positive attitude, being 57.7% of those with Positive attitude, while those who are in the group of white collar job have 33.0% Positive attitude, with the least being those were Not employed having 9.3%. The association between occupation of the respondents and attitude towards the uptake of ART was found not to be statistically significant ($X^2=0.644$, $df =2$, $p\text{-value}=0.759$). (Table 4.7.3b)

When compared with attitude, respondents who were experiencing Primary infertility within a year were found to have highest Positive attitude towards ART, being 35.8% of those with Positive attitude, while those experiencing Primary infertility between 1-

2years have 20.8%, were those who have been experiencing the health issue for between 3-4 years and above 10years have 13.2% and 13.2% Positive attitudes respectively, compared with those between 5-6years, 7-8years and 9-10 years which have 7.5%, 5.7% and 3.8% Positive attitude respectively. The association between years of experience of Primary infertility and attitude towards the uptake of ART was found not to be statistically significant ($X^2=6.811$, $df =6$, $p\text{-value}=0.339$).Table 4.7.3b.

Respondents experiencing Secondary infertility within a year and those between 3-4 years and above 10 years were found to have highest Positive attitude towards ART, being 20.9%, 20.9% and 20.9% respectively, while those experiencing secondary infertility between 1-2years and 5-6 years have 13.9% and 13.9% respectively, compared with those between 7-8years and 9-10 years which have 4.7%, and 4.7% Positive attitude respectively. Therefore, the association between years of experience of infertility Secondary and attitude towards the uptake of ART was found to be statistically significant ($X^2=13.034$, $df =6$, $p\text{-value}=0.029$).Table 4.7.5c. Therefore, we rejected the null hypothesis.

When compared attitude, those who have been coming to the gynaecological clinic routinely and according to appointment, were found to have the highest Positive attitude of 81.4%, compared with those who were just coming for the first time(as recorded during the period of interview) were found to have 18.6% Positive attitude. Therefore, the association between clinic appointments and attitude towards the uptake of ART was found not to be statistically significant ($X^2=0.197$, $df =1$, $p\text{-value}=0.712$).Table 4.7.3c.

Table 4.7.3(a) Association between socio-demographic characteristics and attitude toward the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Attitude towards the uptake of ART					
	Negative attitude(%)	Positive attitude(%)	Total	Df	X ²	P-value
Sex:						
Male	6(5.7)	17(18.0)	23	1	6.972	0.013
Female	99(94.3)	80(82.0)	179			
Total	105	97	202			
Age:						
20-29	31(29.5)	20(20.6)	51			
30-39	58(55.2)	58(59.8)	116	3	2.368	0.505
40-49	12(11.4)	14(14.4)	26			
50+	4(3.9)	5(5.2)	9			
Total	105	97	202			
Education:						
No Education	2(1.9)	3(3.1)	5			
Primary	8(7.6)	7(7.2)	15	3	1.196	0.788
Secondary	40(38.1)	31(32.0)	71			
Tertiary	55(52.4)	56(57.7)	111			
Total	105	97	202			
Marital status:						
Married	102(97.1)	97(100.0)	199			
Divorced/Separated	2(1.9)	0(0.0)	2	2	2.375	0.498
Widowed	1(0.95)	0(0.0)	1			
Total	105	97	202			
Religion:						
Islam	51(48.6)	50(51.5)	101			
Christianity	52(49.5)	47(48.5)	99	2	1.583	0.568
African Traditions	2(1.9)	0(0.0)	2			
Total	105	97	202			

Table 4.7.3(b) Association between socio-demographic characteristics and attitude towards the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Attitude towards the uptake of ART					
	Negative attitude(%)	Positive attitude(%)	Total	Df	X ²	P-value
Years in marriage*						
Less than a year	1(1.0)	4(4.3)	5			
1-2 years	28(28.0)	19(20.7)	47			
3-5years	32(32.0)	23(25.0)	55	4	5.229	0.265
6-10years	17(17.0)	22(23.9)	39			
≥11years	22(22.0)	24(26.1)	46			
Total	100	92	192			
Occupation						
White collar Job	33(31.4)	32(33.0)	65			
Blue collar Job	65(61.9)	56(57.7)	121	2	0.644	0.759
Not employed	7(6.7)	9(9.3)	16			
Total	105	97	202			
Years of experience of Primary infertility **						
Within a year	16(28.0)	19(35.8)	35			
1-2years	21(36.8)	11(20.8)	32			
3-4 years	10(17.5)	7(13.2)	17			
5-6 years	3(5.3)	4(7.5)	7	6	6.811	0.339
7-8years	3(5.3)	3(5.7)	6			
9-10years	2(3.5)	2(3.8)	4			
>10years	2(3.5)	7(13.2)	9			
Total	57	53	110			

(*Total did not add up to 202 because non respondents have been removed)

(**Total did not add up to 202 because value of Primary infertility was 110)

Table 4.7.3(c) Association between socio-demographic characteristics and attitude towards the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Attitude towards the uptake of ART					
	Negative attitude(%)	Positive attitude(%)	Total	Df	X ²	P-value
Years of experience of Secondary infertility *						
Within a year	20(43.5)	9(20.9)	29			
1-2years	8(17.4)	6(14.0.)	14			
3-4 years	11(23.9)	9(20.9)	20			
5-6 years	0(0.0)	6(13.9)	6	6	13.034	0.029
7-8years	2(4.3)	2(4.7)	4			
9-10years	1(2.2)	2(4.7)	3			
>10years	4(8.7)	9(20.9)	13			
Total	46	43	89			
Clinic appointments						
First timer :Yes	17(16.2)	18(18.6)	35	1	0.197	0.712
No	88(83.8)	79(81.4)	167			
Total	105	97	202			

.*Total did not add up to 92 because non respondents have been removed and because value of Secondary infertility was 92)

Determination of magnitude of relationship between attitudes towards the uptake of assisted reproductive technologies and sex of the respondents

Logistic regression analysis was used to determine the magnitude of relationship between attitude of the respondents towards the uptake of assisted reproductive technologies and their sex (Male and Female). Logistic regression was used for estimating or measuring the magnitude of the relationship after adjusting for a number of potential confounding factors. The coefficients obtained through logistic regression by definition denote the magnitude of the increase or decrease in the logs odds produced by one unit of change in the value of (sex) and this indicate the effect of an individual factor on the logs odds of attitude with the remaining variables held constant. Therefore, relationship between attitude towards the uptake of ART and sex shows that there was a significant association ($X^2=6.972$, $df=1$, $p\text{-value}=0.013$). From this analysis, female respondents are 3.5 times more likely to have positive attitude than male respondents towards the uptake of ART ($P\text{-value}= 0.012$, $OR =3.508$, 95% $CI: 1.321\text{-}9.307$) (Table 4.7.4).

Table 4.7.4 shows logistic regression analysis between attitude and sex

Variables	Odds Ratio	95%CI	P-value
Sex: Male	3.506	1.321- 9.307	0.012
Female*			

*Reference category

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Determination of magnitude of relationship between attitude of the respondents towards the uptake of assisted reproductive technologies (ART) and Years of experience of Secondary infertility

Logistic regression analysis between attitude towards the uptake of assisted reproductive technologies and Years of experience of secondary infertility was used for estimating or measuring the magnitude of the relationship after adjusting for a number of potential confounding factors. The coefficients obtained through logistic regression by definition denote the magnitude of the increase or decrease in the logs odds produced by one unit of change in the value of (Years of experience of secondary infertility) and this indicate the effect of an individual factor on the logs odds of attitude with the remaining variables held constant. As such, relationship between Attitude and Years of experience of secondary infertility shows that there was a significant association ($X^2=13.034$, $df =6$, $p\text{-value}=0.029$). From this analysis, those who have been waiting within a year are 5 times less likely to have Positive attitude towards the uptake of ART than those who have been waiting for between 1-2years, 3-4years , 5-6 years, 7-8 years, 9-10 years and 10 years and above ($P\text{-value}=0.026$, $OR =0.200$, $95.0\% \text{ CI: } 0.049 - 0.824$). (Table 4.7.5)

Table 4.7.5 shows logistic regression analysis between attitude towards the uptake of ART and Years of experience of Secondary infertility

Variables	Odds Ratio	95%CI	P-value
Years of experience of Secondary infertility			
Within a year*			
1- 2years	0.200	0.049-0.824	0.026
3- 4 years	0.353	0.068-1.624	0.174
5-6years	0.364	0.084-1.583	0.178
7-8 years	717988828.7	0.00-	0.999
9-10 years	0.444	0.045-4.374	0.487
10 years and above	0.889	0.061-12.885	0.931

***Reference category**

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Ho: Test of Hypotheses 4

The fourth hypothesis stated that there would be no significant association between types of infertility and the respondents' attitude towards the uptake of assisted reproductive technology.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having "Negative attitude", while scores ranging from 5-9 was categorized as "Positive attitude". As such, the total attitudinal points were summed, frequency and percentages were calculated.

Most of the respondents 110(54.5%) are experiencing Primary infertility, 92(45.5%) are experiencing secondary infertility

Of these, 54.3% of those experiencing Primary infertility have Negative attitude towards the uptake of ART, while 54.6% have Positive attitude.

On the other hand, 45.7% of those experiencing Secondary infertility have Negative attitude towards the uptake of ART while 45.4% have Positive attitude. Therefore, the association between types of infertility and attitude towards the uptake of ART was found not to be statistically significant ($X^2=0.003$, $df=1$, $p\text{-value}=0.960$).Table 4.7.6

Table 4.7.6 Association between types of infertility and attitude towards the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Attitude towards the uptake of ART					
	Negative attitude(%)	Positive attitude(%)	Total	Df	X ²	P-value
Types of infertility						
Primary	57(54.3)	53(54.6)	110	1	0.003	0.960
Secondary	48(45.7)	44(45.4)	92			
Total	105	97	202			

Ho: Test of Hypotheses 5

The fifth hypothesis stated that there would be no significant association between respondents' willingness to donate reproductive egg/sperm and their attitude towards the uptake of assisted reproductive technology.

As a way of categorizing the responses, any respondent that score between 0- 4 points was categorized as having "Negative attitude", while scores ranging from 5-9 was categorized as "Positive attitude". As such, the total attitudinal points were summed, frequency and percentages were calculated.

Majority 133(68.2%) of the respondents were not willing to donate their reproductive egg/sperm for others, while 49(25.1%) respondents agreed to donate for those who are in need if requested, but 13(6.7%) respondents were yet to decide.

Of those who agreed to donate their egg/sperm, 12.0% have Negative attitude towards the use of ART, while 39.0% have Positive attitude, compared with 81.0% Negative attitude and 54.7% Positive attitude of those who disagreed to the donate of reproductive egg/sperm, were those who were yet to decide have 7.0% Negative and 6.3% Positive attitude respectively. Therefore, the association between willingness to donate reproductive egg/sperm and attitude towards the uptake of ART was found to be statistically significant ($X^2=19.040$, $df =2$, $p\text{-value}=0.000$). (Table 4.7.7)

Table 4.7.7 Association between willingness to donate reproductive egg/ sperm and attitude towards the uptake of ART (GIFT, ICSI, GS and IVF)

Variables	Attitude towards the uptake of ART					
	Negative attitude(%)	Positive attitude(%)	Total	Df	X ²	P-value
Willingness to donate reproductive egg/sperm:						
Yes	12(12.0)	37(39.0)	49			
No	81(81.0)	52(54.7)	133	2	19.040	0.000
Don't know	7(7.0)	6(6.3)	13			
Total	100	95	195			

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Socio-demographic characteristics of respondents

The ages of the respondents having infertility health issue ranges from 22- 55 years of age, which is in line with study conducted by Ugwu et al (2014), with a mean age of 34.28 ± 6.548 this is also in line with study conducted by Olugbenga-Bello et al (2014) and Bello, Akinajo and Olayemi, (2014). Majority of the respondents were within the range of 30-39 years of age, this age range is also in agreement with the study conducted by Ugwu et al (2014) in Enugu, South-eastern Nigeria.

Majority of the respondents belonged to the Yoruba ethnic group, this could be traced to the fact the study location is situated in the south-western part of the country where the Yoruba's are the predominant ethnic group, as evidenced in Olugbenga-Bello,(2014). The two most popular religious groups were almost equally represented in this study with 101 (50.0%) being Muslims, and 99(49.0%) being Christians which can also be traced to the fact that the study location is comprised of these two major religious, and the health issues in investigation is devoid of religious practices. All respondents interviewed were married, giving room to ascertain fully the opinions of individuals who are directly involved in the issue being addressed.

Majority 179(88.6%) of the respondents were female while 23(11.4%) were male. This is in agreement with Fledderjohann, (2012) in a study in Ghana which described how the blame for infertility is disproportionately attributed to women only, thus giving reasons to why highest numbers of patients being recorded in the gynaecological clinic are female. The women demonstrated a significantly higher rate in the clinic attendance than the men, probably because they are the ones who bear more of the socio-cultural and psychological brunt of infertility in any traditional African society, Nigeria inclusive (Ugwu, et al, 2014).

The predominance 110(54.5%) of Primary infertility than secondary infertility (45 [22.3%]) was an interesting one. This study agrees with a similar study conducted in Ibadan by Bello et al (2014), where most of the respondents surveyed had primary infertility and with the findings of some works which reported primary and secondary

trend in the developed world where primary infertility is higher (Puscheck and Woodad, 2009 as cited in Olugbenga-Bello, 2014), but was in contrast to what was reported by Orhue and Aziken (2008) and in Panti Sununu,(2014) where primary and secondary infertility were 32.8% and 67.2% respectively.

In this study, high number 116(57.54%) of respondents with cases of infertility was observed among individuals whose age ranged from 30-39 years of age. This study was in tangent with what was found in Ugwu et al (2014) and Bello, Akinajo, Olayemi, (2014) where the peak incidence of infertility was in the 30–39-year age category (74.5%) for female respondents. The reason for could be that at age 20-29, majority had married and more concerned about their infertility in terms of social, age, early signs of menopause, hence, their increased presentation at the fertility clinics at age 30-39.

In this study, higher proportion 120(59.4%) of unskilled (traders, artisan) individuals who had a low socio-economic status sought medical infertility treatment earlier and more than women with higher socio-economic status and education. This is in contrast with the findings of Olugbenga-Bello (2014) where higher level of education and socio-economic status has been shown to influence health seeking behaviour. This may be due to the socio-demographic characteristics of patients who visit the public hospital, where majority of the inhabitants are traders, artisans and commercial workers. It is, however, upon the commercial sector that the city's development mainly depend (The Postgraduate School information content Portal, UI).

Majority with tertiary educational status 111(55.5%) had significantly influenced the awareness of the 94 respondents who had heard of ART. This means that as the educational level increases there is tendency for high awareness and ART acceptability.

Almost half 94(46.5%) of the respondents had heard of assisted reproductive technology, this was in agreement with study conducted Olugbenga-Bello (2014), where only 46% of the respondents were aware of ART, and with that of Bello et al., (2014) in Ibadan, Nigeria, where 42.7% were aware and heard of ART, with source varying from friends, Health providers/Doctors/Nurses/Pharmacist, mass media (TV/Radio/internet), Books/prints/magazines/newspapers/, family members/spouse, to church/mosques and neighbours/co-workers/business partner.

Years of waiting of most of the respondents was found to be responsible for the willingness to make use of ART, as many who had been waiting for more than 5 years during the interview were found to be willing to listen, ask more questions, seek additional help and information of the procedures. Duration of infertility was also found to significantly influence acceptability of ART as women who had been infertile for 5 years or more were less likely to opt for ART unlike women who had been infertile for less than 5 years. This may be due to medical services frustration, years of continuous visits to the clinic without conception which is leading to biological, psychological and social phenomenon or problem (Davidová and Pechová, 2014) arising from friends, families, in-laws and neighbours.

Unlike age which was a risk factor for both outcomes (infertility or infertility service use), this study found association between sex and attitude towards ART and between years of experience of Secondary infertility and attitude towards ART respectively. This was in agreement with what Louis et al (2013) found out in a study conducted in USA. This may be to the health seeking behaviours of the respondent or such discrepancies suggest that these factors may have more to do with care-seeking behaviours rather than infertility, per se (Louis et al, 2013).

5.2 Attitude towards the uptake of assisted reproductive technologies

Positive attitude of respondents towards the uptake of assisted reproductive technology was relatively high 97(48.0%), while 105(52.0%) have Negative attitude. From the result, majority of the respondents have Negative attitude, this is in agreement with what was reported by Jimoh et al (2011), where 78(70.4%) of the respondents have Negative attitude towards ART.

This high Negative attitude towards ART might be due to the education level, culture, beliefs and or traditions of the people in the community. When crossed tabs with willingness, association exist between the attitude of the respondents and willingness to opt for ART, this found a statistically significant association.

5.3 Assessment of Types of Assisted reproductive technologies willing to Utilize

Willingness and awareness about assisted reproduction technologies (ART) is high while the majority of the respondents believe that ART is beneficial. This finding is consistent with the views of Okonofua in Benin City and Jimoh et al, (2014) in Ilorin, Nigeria. Remarkably, 132 (65.3%) respondents will advise and share information about the existence of assisted reproductive technologies with friends, relatives, neighbours and couples with infertile couples to choose the ultimate path way of IVF and other ART procedures if need arises, when conventional treatment has failed instead of waiting for divine time (Jimoh, et al ,2014; Ombelet, 2007). Eighty five of the respondents, who made their intention known to make use of assisted reproductive technology for themselves if services are provided in the government public hospital, gave an indication of their willingness to make use of the services.

From the 85(42.5%) respondents who gave indication and made their opinion and interest known, Forty three (50.6%) of the respondents made a choice to utilize Gamete Intrafallopian Transfer (GIFT). The choice of this may be as result of the respondents' belief in medical procedure that will only assist in the insemination of prepared oocytes without fertilization before transfer into the recipient body. Thirty nine (45.8%) declared their intention for Intra-Cytoplasmic Sperm Injection (ICSI). Sixty eight 68(80.0%) respondents made intention to utilize In Vitro Fertilization (IVF), this is in tangent with findings of Bello et al., (2014) where 59.3% had intentions and willingness to accept IVF as treatment for infertility. This increase in the choice of IVF as one of the most preferred option may be due to the fact that most of those whose chose this procedure are aware of IVF through media advert of one of the private fertility clinic in the city, as reported in similar study in Europe and the U.S, where 90 percent knew of IVF (Adashi, Cohen, Hamberger, Jones, de Kretser, 2000), and probably the respondents have tried several medical services and religious solutions without success. Besides, this may also be due to the fact that considerable percent believed in the efficacy and certainty of achieving pregnancy with IVF. This was because majority (85) of those are aware of ART solely knew IVF as the only available ART procedure in this field, as observed during the interview. Likewise, interview conducted also shows that the respondents are more concerned with and

interested in the medical procedures that will solely involve the mixture of couples sperms and eggs for fertilization only.

Only 9 of the respondents chose to make use of Gestational Surrogacy. This may be due to the fact that Gestational Surrogacy as a procedure in Nigeria is not as just common (Seour, 2001). As cited in Bello et al (2014), studies have shown that people that practise a religion and people that attend church are less accepting of surrogacy. Awareness about surrogacy is low and is in contrast with the study conducted by Jimoh et al in 2011 in Ilorin, but the issues of practice remains unpredictable while the issue of payment as a surrogate remains a key issue (Jimoh, et al, 2011).

5.4 Willingness to make use or donate sperms/ovules for conception

Majority, 165 (84.2%) of the respondents were in disagreement to the use of sperms donated by another person who is not their spouse to help have children use of sperms donated by another person who is not their spouse to help have children, while few 21(10.7%) agreed or said “Yes” to making or permitting their wives to make use of donor’s sperms. This was in contrast with what found by Adesiyun et al (2011) where about 42 percent signified intention to donate. The unwillingness might be as a result desire for genetic relationship with their offspring, suggesting a decrease due to gamete donation (Bello et al., 2014). On the other hand, one-third (84.2%) of the respondents were in disagreement to making use of zygote or fertilized egg donated by another woman to help have children, while just a few (10.6%) of the respondents were willing to make accept donor’s zygote/ovule for conception. It is therefore not surprising that almost all respondents were not willing to serve as egg donors. As observed by Jimoh et al.,(2011), a novel egg sharing scheme which allows a donor who is financially incapable of paying for her own ART treatment to donate some of her own eggs for a more financially capable person in need of donated eggs will obviously reduce appreciably the stigma, logistical problems as well as the easy availability of donors, and this has been reported to be one of the cheapest ART procedures, in which a couple can easily get a donated sperms or eggs at a price of generally about ₦50,000– ₦150,000 (Ugwu, et al, 2014). Thus, a lot of resources could be saved by the practice of artificial donor insemination in Nigeria.

In similar view, majority 68.2% of the respondents were not willing to donate their own reproductive egg (Oocyte) / Sperm for the benefits of other people having challenge of inability to conceive, while 25.1% of the respondents agreed to do so.

5.5 Utilization of Assisted Reproductive Technologies in Ibadan North local government

Out of the 202 respondents who were interviewed, only 1 client is currently making use of In-vitro fertilization at Vine Branch Fertility Centre, Dandaru, Ibadan, Oyo State. The respondent rated the procedure to be fair even after one year utilization of the service. This may be due to many factors, which may include age of the respondents, health factors, nature of the procedures and the challenges of full investigations of the previous medical health, may include genetic abnormalities, and certain acute and chronic diseases, behavioural risk factors (e.g., body weight, smoking) and exposure to certain environmental, occupational, and infectious agents (CDC.2014).

5.6 Factors militating against uptake of Assisted Reproductive Technologies

High cost, expensive or non-availability of money/funds for ART service delivery has been identified by almost half of the respondents (84) as limiting factors that would prevent intended individual from the uptake of ART for infertility management. Greater percentage of those who experience infertility are poor and ART is still not readily covered by the premium health insurance schemes in Nigeria' (Okonufua,2009;Olugbenga-Bello et al., 2014). Almost all the respondents were of the opinion that ART procedure would be utilized if cost is at minimum and bearable amount. Many of them who rejected ART said that the procedure is very costly considering the socio-economic situation in Nigeria (Kissin, Kulkarni, Kushnir Jamieson, 2014). This is in harmony with the findings of a study which reported that a large majority of the population cannot afford ART infertility treatment which is considered very costly (Olugbenga-Bello et al., 2014).

Respondents perception about and attitude about ART had also resulted in a factor where about 66 respondents gave an indication that they would not opt for ART

because they do not like, believe or have interest in the use of ART/machine for conception.

People in this part of the world are known to be very religious, and this is seen in the fact that 37 respondents believed that through God's intervention, desired outcome will be achieved, as such, they would not opt for ART. This was in line with what one of the factors identified by Ugwu et al (2014) in Enugu, thus giving reasons for non-willingness to make use of ART for conception.

Spousal agreement or willingness to opt for ART has been identified by 28 respondents as a factor that may prevent or necessitate their willingness. As identified, many of these clients were of the opinion that decision are not taken by one of the spouse alone; rather it should be a collective effort of both parties in reaching agreement that are beneficial to the procurement of the innovative service for conception.

Some mentioned religion and belief as a barrier to the uptake of ART, which gave rise to their unwillingness. Nevertheless, 51.0% of those who responded to this question in the attitude section were of the opinion that their religion those not forbid any medical help that would be beneficial to health and life.

Fears of the safety/risks of the procedures of ART were also identified by few people. This they believed will result to medical procedure which would lead to an unpleasant health and procedural outcomes, as such, willingness to opt for the service was truncated.

Majority based their belief on faith rather than on the actual success rate of treatment. Other factors identified by respondents include age restriction to the uptake/use of the procedure, perceptions/stigmatization of the baby by relatives/in-laws/friends not being a natural baby, segregation and labelling of such child as bastard by people, future side effects; imperfection, effectiveness and reliability of the procedures to yield expected outcomes; presence or absence of qualified medical personnel for the procedures, poor knowledge of ART procedures by the couples or individual in need of ART services, and some believed they can conceive without the help of any ART as observed in Bello et al, 2014, where 28% desire to conceive themselves; and others said they will prefer and cannot replace sexual intercourse with ART.

While all these factors identified by of these respondents, 15 respondents were of the conclusion that no factor or hindrance can prevent them from making use of ART for fertility provided it would yield the desired results.

5.7 Conclusion

From the foregoing, it can be seen that the willingness of the respondents to utilize ART treatment in general is good. However, there are gaps waiting to be filled in terms of factors that will influence the majority accepting the uptake of assisted reproductive technologies for infertility management.

Prevalence of primary infertility observed shows that there are more to health education of marriage counselling and medical examination prior to marriage. More need to be done on health- educating women on the concept of ovulation and menstrual cycles.

The reoccurrence of infertility case among age 30-39 years of age shows there is more to be done on this age group to prevent the reoccurrence and manifestation of this health issue among this age group.

Willingness of respondents to make use of assisted reproductive, especially IVF was statistically significant with the attitude of the respondents. As such, more should be done in promoting and advancing this field so as to help couples who are facing infertility challenge have access to preferred ART procedures.

5.8 Implications of Findings for Health Promotion and Education

Findings from this study have health promotion and education implications and thereby the need for planning and implementation of multiple health strategies that will help to tackle the inherent problems in this findings.

Health education and public enlightenment

There is need for more awareness on assisted reproductive technologies to help couples make choices effectively.

Public enlightenment programs including awareness have potentials in dispelling the inherent conceptions of those who have negative attitude towards the nature of ART. The use of well-tailored information, education and communication materials (jingles) through media to give out information regarding the safety, uniqueness, procedures and benefits of ART to people experiencing delay in conception, so as to reach out to a large number of the target population and thereby influence their knowledge, attitude and willingness.

More should also be done to create meaningful and convincing health programs on the concepts of infertility to the public in order to health educate the general public on healthy lifestyles, needs for prompt gynaecological consultations in case of sexually transmitted infections (STIs) and dangers of self-medication that are also contributory factor to an urban settings like Ibadan city.

Advocacy for the involvement of government in the establishment of a standard ART centres for the benefits of couples, research and development will help reduce the endless pains of these expectant mothers and reduce the huge amount of money being carted away by foreign ART experts during the course of hospital visit to other countries by rich and educated couples, else, the less privilege couples may end up dying in weekly consultations, hopes, religious practices, use of local concoctions, assaults, abuse and pain till death takes them away. Enlisting the services of religious leaders in the campaign is advocated because of the level of religious bias against acceptance of this procedure in our environment.

5.9 Recommendations

1. It is recommended that government should do more on girl child education so as to increase their knowledge about infertility issues. There is also an urgent need for strategically tailored health promoting and educating information to women of reproductive age group in Adeoyo Maternity Teaching in Ibadan North Local government area of Oyo State, to help reduce the age group mostly affected with this health issue.
2. Partial or total funding of process of ART services in Adeoyo Maternity Teaching in Ibadan North Local government area of Oyo State, will go a long

way to restoring hope to patients who are ceaselessly trying to conceive by all means and at all cost.

3. There is need of the government to partner with international and private fertility centres to help commence ART treatment procedures in the hospital as anticipated by intending individual having this challenge.
4. Health professional should also provide more enlightenment on the existence of ART during clinic health education classes to individual attending the gynaecological clinic at Adeoyo Maternity Teaching hospital, to enable those who are willing to make use of ART make informed decision.

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APPENDICES

APPENDIX I

INFORMED CONSENT FORM

Title of the research: ATTITUDE AND WILLINGNESS OF INFERTILE PERSONS TOWARDS THE UPTAKE OF ASSISTED REPRODUCTIVE TECHNOLOGIES IN IBADAN NORTH LOCAL GOVERNMENT AREA.

Name and affiliation(s) of researcher(s) of application(s): This study is being conducted by AKANDE Oluwayemi Samson, Department of Health Promotion and Education, University of Ibadan.

Purpose(s) of research: To investigate attitude of infertile couples and their willingness towards the uptake of assisted reproductive technologies in management of infertility in Ibadan North Local Government, Oyo State.

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research: Selected individual at the gynaecological /fertility clinic of Adeoyo Maternity Teaching Hospital in the local government area will be administered a semi-structured questionnaire. Participants will be required to give correct information that was required by the questionnaire.

Expected duration of research and of participant(s)' involvement: You are expected to be involved in this research for just a day. You will be required to give correct information during the school hours. Required information will be collected just once.

Risk(s): You will be exposed to no risk whatsoever during your participation in this research. No risk will be incurred by filling the questionnaire.

Cost(s) to the participants, if any, of joining the research: Your participation in this study will not cost you anything. It will only take about 10minutes only.

Benefit(s): This is to help policy makers in develop policy and strategies that will help in the adoption of measures that will help in revising existing health policies, increase funding of health system and enactment of healthy public policies that will be favourable to both the health system and reproductive health issues.

Confidentiality: All information collected in this study will be given code numbers and no name will be recorded. This cannot be linked to you in anyway and your name or any identifier will not be used in any publication or reports from this study.

Voluntariness: Your participation in this research is entirely voluntary.

Due inducement(s): You will not be paid any fees for participating in this research.

Modality of providing treatments and action(s) to be taken in case of injury or adverse event(s): No injury or adverse events whatsoever are envisaged in this study.

What happens to research participants and communities when the research is over: The outcome of this study will be made available to the hospital through the Chief Medical Director of the Health institution. There will be proper briefing about the benefits of the research.

Statement of person obtaining informed consent: I have fully explained this research to _____ and have given sufficient information, including about risks and benefits, to make an informed decision.

DATE:..... SIGNATURE:.....

NAME:.....
.....

Statement of person giving consent: I have read the description of the research or have had it translated into language I understand. I understand that my participation is voluntary. I have enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE:_____SIGNATURE:_____

S/N_____

Detailed contact information including contact address, telephone, fax, e-mail and any other contact information of researcher(s), institutional HREC and head of the institution.

If you have any question about your participation in this research, you can contact the principal investigator, Name: AKANDE Oluwayemi Samson of the department of Health Promotion and Education, Phone: 08060741395 and E-mail: akandesam6@gmail.com

APPENDIX II

QUESTIONNAIRE

ATTITUDE AND WILLINGNESS OF INFERTILE PERSONS TOWARDS THE UPTAKE OF ASSISTED REPRODUCTIVE TECHNOLOGIES IN IBADAN NORTH LOCAL GOVERNMENT AREA

Dear Respondent,

My name is **AKANDE OLUWAYEMI SAMSON**, a Postgraduate Student of the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan. The purpose of this study is to investigate **Attitude and Willingness of infertile Persons towards the Uptake of Assisted Reproductive Technologies in Ibadan North Local government**. The findings from this study will help in the design of programmes and formulation of policies aimed at improving fertility in this institution. The survey will only take about 10 minutes to complete and participation is voluntary. By participating, you will not experience any risk. If you decide to complete the survey, your identity will be kept strictly confidential and will be used for the purpose of this research only. Please note that you do not have to write your name on this questionnaire, also try and please give honest answers to the questions asked as much as your maximum co-operation will assist in making this research a success.

Would you want to participate in the study? 1) **YES**() 2) **NO**()

Please, append your signature as an agreement to participate in the study.....

Thank you for your interest in this study.

Important Instruction(s): Please, Do Not Write or Supply Your Name.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTIC

Instructions: In this sections please tick (✓) in the appropriate boxes that correspond to your answers or complete the spaces provided.

1. **Gender:** 1. Male () 2. Female ()

2. **Marital status:** 1. Married () 2. Never married () 3. Divorced/separated ()
4. Widowed ()

3. **Religion:** 1.Christianity () 2.Islam () 3.Traditionalist. 4. Others ()

4. **Ethnicity:** 1.Yoruba () 2.Igbo () 3.Hausa () 4.Others ()

5. **Level of Education:** 1.Primary education only () 2.Secondary Education()
3.Tertiary()4. No education ()

6. **What is your present Age:**

7. **Number of children:** a) None yet () b)1 () c)2() c)3 () d)4()

8. **Years in marriage.....**

9. How long have you been expecting children (*if you DON'T have any issue yet?*) a) Within a year () b) Between1 2yrs () c) Between34yrs ()
d) Between5 6yrs () e) Between78yrs () f) Between9yrs10yrs ()
g) More than10yrs and above () h) None of the above ()

10. How long have you been expecting children (*if you HAVE a child already?*) a) Within a year() b) Between12yrs() c) Between34yrs()
d) Between56yrs() e) Between78yrs() f) Between9yrs10yrs ()
g) More than10yrs and above () h) None of the above()

11. **Occupation:** a). White collar (office worker, government Worker etc () b) Blue collar (artisan, Trader, farmer, etc.) () c) Not employed (homemaker, student, retired, or unable to work) ()

12. **Average income per month:** a) Less than #10,000 () b) Between#10,000 #90,000() c) Between#100,000-#190,000(d) Between#200,000-#290,000() e) Above#300,000() f) None ()

13. Is this your first time of coming to this hospital fertility clinic? YES () NO()

14. For how many months have you being coming to this fertility clinic.....

SECTION B: SOURCES OF INFORMATION ABOUT ASSISTED REPRODUCTIVE TECHNOLOGIES (ART)

S/N	STATEMENT	YES	NO	IDON'T KNOW
15	Have you ever heard of assisted reproductive technologies Treatment (ART) before?			
16	If “YES” to question 15,from where did you get to know/hear of assisted reproductive technologies treatment(ART)(Please tick the appropriate sources of your information of ART in the front of the options below).If “NO” to question15, please skip to question 17			
	i. Friends			
	ii. From family members			
	iii. Neighbour/Co-tenants/Co-workers or sellers/Business partner			
	iv. From the TV or Radio			
	v. From Books or Newspaper			
	vi. From the Internet			
	vii. From Church or mosque members			
	viii. From a mentor			
	ix. Health provider/Doctor/Nurses/Pharmacist etc			
	x. Others (please specify).....			
	xi. None			

SECTION C: ATTITUDE TOWARDS THE USE OF ASSISTED REPRODUCTIVE TECHNOLOGY (ART)

	STATEMENT	AGREE	UNDECIDED	DISAGREE
17	I don't believe ART is a new way of finding lasting Solution to inability to conceive.			
18	I will prefer this new technology to the use of herbs for the treatment of inability to have children			
19	I cannot encourage anybody to use ART for reproduction or to have babies of their own			
20	My religion does not go against the use of Reproductive technology for conception, so I can use it			
21	The cost of ART is too expensive, therefore I do Not encourage It use for conception			

22	I will never be in support of ART because it is against my own beliefs and faith			
23	I am of the opinion that praying for children is better than making use of ART for conception			
24	I can encourage my spouse to make use of this technology for childbearing			
25	I cannot withstand the procedures of ART because It will cause me harms than expected			
26	I believe babies born with the aid of ART will be deformed, therefore I cannot make use of ART			
27	Women and men who seek for ART are weak, so I cannot make use of it for childbearing			

SECTION D: WILLINGNESS TOWARDS THE USE OF ASSISTED REPRODUCTIVE TECHNOLOGY FOR THE MANAGEMENT OF INABILITY TO CONCEIVE AS WHEN EXPECTED.

	STATEMENT	YES	NO	DON'T KNOW
28	Will you be willing to share information about ART with others?			
29	Are you willing to make use of ART if the services are provided in this hospital?			
Which of the under listed A, B, C D assisted reproductive technologies will you be willing to make use.				
30A	Gamete intrafallopian transfer(GIFT): An ART procedure in which both gametes (female eggs and sperms) are transferred to the woman's womb after being prepared in the laboratory, but the eggs and sperms ARE NOT FERTILISED IN THE LABORATORY before inserting into the woman's body.			
30B	Intracytoplasmic sperm injection (ICSI): A procedure in which A SINGLE SPERM is injected into the egg shell of the woman, done in the laboratory without involving sexual intercourse of both you and your partner, before being transferred to the womb of the woman			

30C	Gestational surrogacy is an arrangement where a woman, known as the gestational carrier , agrees to carry another person’s sperms and eggs IN HER OWN BODY FOR 9 MONTHS until it becomes a grown baby, but will be later raised by the people who donated the sperms and eggs into the body of the gestational carrier or woman.			
30D	In vitro Fertilisation (IVF) : Procedure whereby an egg (or more than one egg) is taken from the body of a woman and combined with sperms in laboratory TO ENSURE THAT IT IS FERTILISED FIRST by the sperm. If fertilisation is successful and the fertilised egg continues to develop to form an embryo (a tiny baby-like structure), the embryo is later transferred back into the woman’s womb to form pregnancy.			
31	Can you make use of sperms donated by another person who is not your spouse to help you have children			
32	Can you make use of zygote or fertilised egg donated by another woman who is not your spouse to help you have children			
33	Can you donate your own reproductive egg(Oocyte)/Sperm for the benefits of other people having challenge of inability to conceive			

SECTION E: Questions on maybe you are currently utilizing ART in other clinic (Please answer this section if you are currently making use of ART services **ONLY**, if **NOT**, please skip to **SECTION F**)

STATEMENT	YES	NO	DON'T KNOW
34. Are you currently making use of any of the ART in any other clinic?			
If “NO” to Question 34, please skip to Question			
35. If “YES” to question 34, which of the ART innovations are you utilising?			
36.....			
37. Which clinic/hospital are you currently making use of this/these ART services.....			
38. For how long have you been on this/these ART?.....			
39. What will you rate the efficacy of the ART you have used: Good () Fair() Poor()			
40. Who introduced you to the use of this/these ART (please specify).....			

SECTIONF: FACTORS THAT MAY BE RESPONSIBLE FOR NON UPTAKE OF ASSISTED REPRODUCTIVE TECHNOLOGIES FOR INFERTILITY MANAGEMENT *(Please, list those things that you think may prevent you from making use of assisted reproductive technologies for conception, even If you are willing to make use of it)*

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

Thank you for participating in this study

UNIVERSITY OF IBADAN LIBRARY

APPENDIX III

IWE-IBEERE

IFILELE, IWA ATI IFE TI TOKOTAYA SI ONA IFIKUN TI IRANLOWO IBISI IMO ERO FUN AKOSO TI AILESABIYAMO.

Eyin onidahun mi tooto,

Oruko mi ni **AKANDE OLUWAYEMI SAMSONI** moje akeko gboye lati Ipolongo Ilera ati Eko, Eka Ilera-Ilu, Eko-isegun, Unifasiti Ibadan ti Ibadan. Awon idi ti iwadi yi ni lati se iwadi iwa ati ife ti awon tin woju Olorun si ona awon ifikun ti Iranlowo ibisi ero to fun isakoso ti ailesabiyamo.

Awon awari ati iwadi yi yio ran wa lowo lati se awon oniruru eto ati igbese ti a le mulo lati mu iyipada rere ba eto isegun nipa ailesabiyamo lasiko ni ile iwosan yi. Awon iwadi yi ko ni koja iseju mewa lati pari, sugbon ikopa je atinuwa ati pe e le pinu lati mu wa ni didopin ti ko ba wu yin. Nipa kikopa, e ko ni iriri eyikeyi ewu. Bi e o ba pinu lati pari awon iwadi yi, idanimọ re yoo wa ni ipamo ni asiri ti ao si lo fun idi i iwadi yi wa fun nikan. Jowo kiyesi pe o ko ni lati ko oruko re lori iwe ibeere yi, tun gbiyanju ati jowo fun wan i idahun si awon ibeere.

Se e fe lati kopa ninu iwadi? (1) Beeni { } (2) Beeko { }

Jowo, e bu owo lu iwe yi bi adehun lati kopa ninu iwadi

E seun fun ife yin lat ko pa ninu iwadi yi.

Pataki ilana (s): **Jowo, Mase Ko tabi pese oruko re .**

Eka A: Awon oun idamo oludahun

Awon ilana: Ni yi ruju jowo to ami (√) ni apoti ti o badogba lati dahun si eyi ti e ro wipe o ba yin jo.

1. Eda: 1. Okunrin { } 2. Obirin { }
2. Ipo igbeyawo: 1. Tis elyawo { } 2. Nko tin se iyawo { } 3. Ilemosu / ya { } 4. Opó { }
3. Esin: i. Elesin Kristi { } ii. Musulumi { } iii. Elesin ibile { } iv. Esin o miran { }
4. Eya: i. Yoruba { } ii. Igbo { } iii. Hausa { } iv. Eya miran (salaye).....
5. Ipele ti Eko ti e ka: i. Iwe mefa pere { } ii. Eko Girama { } iii. Eko unifasiti eko { } iv. Ko si eko { }
6. Ojo ori oludahun ibeere? :
7. i.) Omo meloolorun fun yin : (ii). ko ti si/ Mo woju Oluwa fun eso inu { }
8. Odun melo le ti lo ninu igbeyawo
9. O ti to odun melon i e ti woju Oluwa fun eso inu ti e ko ba ti bi omo kankan ri? i) Bi odun kan si Meji { } .ii) Bi odun meta si merin { } .iii) Bi odun marun si mefa { } iv) .Bi odun meje si mej { } v) Bi odun mesun si mewa vi) Oti le ni odun mewa soke { }

10. O ti to odun melon i e ti woju Oluwa fun eso inu lehin igba ti e ti bi i) Bi odun kan si Meji { } .ii)Bi odun meta si merin { } .iii) Bi odun marun si mefa{ } iv) .Bi odun meje si mej { } v) Bi odun mesun si mewa vi) Oti le ni odun mewa soke { }
11. Kini ise yin: 1.Alakowe (osise ofiisi,osise ijoba ati beḅe lo) { } 2 .Akose (Onise owo, Onisowo, agbe, ati beḅe lo) { }3 .Nko ni ise oojo (akeko, Afeyinti, tabi nko lagbara lati siṣe)
12. Iye owo ti a gba fun osu: 1.Laarin # 10,000 si # 90,000 { } 2. Laarin # 100,000 si # 190,000 { } 3.Laarin # 200,000 si # 290,000 { } 4.O koja # 300,000 { }5.O kere ju # 10,000 6.Nko gba owo osu
- 13.Se akoko wa yin si eka ile itoju yin nii yii : 1.Beeni 2.Beko
14. O ti to osu bi melo ni e tin wa bi ?.....

Eka B: Imo nipa iwa awon tin woju Olorun si ona awon ifikun ti Iranloḅo ibisi ero to fun isakoso ti ailesabiyamo

	GBOLOHUN NIPA IMO	BEENI	BEE KO	NKO MO
15	Nje e ti gbo nipa Iranloḅo ero igbalode fun iseto ailesabiyamo?			
16	Nibo tabi enu tani e ti gbo nipa ero igbalode fun iseto ailesabiyamo yi? i. Lati odo awon ore ii. Lati odo awon abami gbe/alabasisie po or onisowo bi ti tiyin iii. Lori TV/Radio iv. Ninu pele iwe/ninu iwe iroyin v. Lori ero ayelujara vi. Lati odo Olufisun vii. lati odo omo ijo viii. Eleto eko isegun oyinbo / Dokita / Noosi / Oloogun oyinbo ati be be lo ix. Lati ibomiran (jowo so eyi ti o je)..... x. Ko si			

IPIN D: Iwa awon tin woju Olorun si ona awon ifikun ti Iranlowo ibisi ero to fun isakoso ti ailesabiyamo

	GBOLOHUN NIPA IWA	Mo fara mo	Nko fara mo	Nko mo
17	Mo ti ri idasile ti iranlowo awon ona ti ibisi fun lohun ailesabiyamo isoro bi titun kan aseori ninu oogun			
18	Mo feran ona igbalode yi lati fi se eto itoju ailesabiyamo ju agbo ibile lo			
19	Emi ko le se iwuri fun eniken lati lo ero igbalode yi fun atunse ailesabiyamo			
20	Emi ko aala nipa ohun ti esin mi wi ninu lilo ero titun igbalode yi fun iranlowo			
21	Owo bogoi ni eto yi yoo gba, nitorina nko ni ife si			
22	Nko ni fowo si lilo ero nitori pe o lodi si mi, ki o si ba igbagbo mu			
23	Mo gbagbo ninu adura fun pipese omu ju sise awon lilo ti ero yi fun iranlowo			
24	Nko le se iwuri fun oko mi tabi aya mi lati se lilo ona yi fun omu bibi			
25	Iru omo ti a ba bi nipa se eto yoo je abirun, nitorina, nko le se iwuri re			
26	Emi ko le farada awon ilana ti ero igbalode yi o fa nipa liloo fun eto omo bibi yoo fa alebu si omo ti bat i pase re bi bo ti wu k'ori			
27	Eto yi wa fun awon ti iseda won ko pa, nitorina nko le loo.			

IPIN E: Ife si lilo iranlowo ibisi fun isakoso ailesabiyamo

	GBOLOHUN NIPA IFE SI LILO IRANLOWO IBISI FUN ISAKOSO AILESABİYAMO	BEENI	BEEKO	NKO MO
28	Se o le rii daju wipe awon ti o mo ti o ni isoro ailesabiyamo gbo koko alaye nipa ero igbalode yi fun iseto omo bibi nipase re bi?			
29	Se e setan lati se lilo anfani ero yi yi fun ara re?			
30	Ewo Ninu Awon Liana Ero Igbalode Yi Fun Iranlowo Ibisi Omo Le Setan Lati Lo Fun eto Omu Bibi			
A	Gamete intrafallopian transfer (GIFT): Ilana ti an gba da ato omokunrin ati nkan omobirin po ninu ile isegun ki a to tipase isegun oyinbo gbe sara obirin ki o le di omo lara obirin naa			
B	Intracytoplasmic Sperm Injection (ICSI): ilana ninu eyi ti mu ato kan soso nikan lati je ko dapo mo gege itele eyin obirin lai si ibalopo ajoşepo ti awon mejeeji			

C	Gestational Surrogacy (GS): Ilana eto ti a gba lati gbe omo sinu ara obirin kan fun elomiiran pelu eto ipinnu ti o ye koro			
D	In Vitro Fertilization (IVF): ilana ti a gba da ato ati eyin ara obirin po , ti a si je ki idapo yi di imisi omo ki a to gbee sinu obirin na lati j k'o dogbo ki a to bi			
31	.Nje o le l ato omokunrin ti kin se ti oko re sughbon lati odo okunrin meran lati ran o lowo lati loyun tabi ni omo bi?			
32	Nje o le lo nkan omobirin ti o ti doyun ti a gba lara obinrin meran lati ran o lowo lati ni omo bi?			
33	Mo le da ato ara mi/nkan omo obirin mi fun anfani elomiran lat fi sabiyamo			

IPIN E: Ibeere lori boya e nlo eto ero igbalode yi lowolowo

Ibeere	Beeni	Beko	Nko mo
34.Nje e nlo eto ero igbalode yi lati sabiyamo bi? Ti o ba ti " BEḂENI " fun Ìbèèrè 34			
35 Eru eto ero aisebayiyamo wo le nlo.....			
36.....			
37. Ile iwosan wo ni e tin se eto yii ?.....			
38. Fun bi odun tabi osu melo le tin lo eto ero yi?			
39.Bawo le se le sapejuwe anfani ti e ri ni Ilio eto ero ibisi yi i.O dara () ii. o ku die ka to () iii. Ko dara ()			
40. Ta ni a so fun yin nipa ilo ti ero eto isodomo yi (jowo so pato).....			

IPIN F: Idinwo ti o le se okunfa fun ailelo iranlowo ibisi imo ero fun isakoso ailesabiyamo

(Jowo, toka si awon okunfa ti o le se di yin lowo lati ma se lilo ti iranlowo ibisi imo ero fun eto omo bibi)

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

Adupe fun asiko yin ti e lo lati dahun ibeere wonyi.

Appendix IV
Ethical Approval letter

