



SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

OBSTETRICS AND GYNECOLOGY DEPARTMENT

**PREVALENCE OF FEMALE FACTOR INFERTILITY AND
ASSOCIATED FACTORS IN COUPLES SEEKING FERTILITY
CARE IN SPHMMC, ADDIS ABABA, ETHIOPIA**

**INVESTIGATOR: YEKOYE TADELE (MD, OBSTETRICS AND
GYNECOLOGY RESIDENT)**

**ADVISOR: DR, MUSTEFA NEGASH (MD, OB/GYN/REI, ASSISTANT
PROFESSOR OF OBSTETRICS AND GYNECOLOGY,
INFERTILITY AND IVF SPECIALIST, SPHMMC, ADDIS
ABABA)**

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SUMMARY

Background

Infertility is a global issue in reproductive health. Infertility is not only a health problem that affects individuals but also a social problem that affects families, societies, and populations. There is a study limitation on the prevalence and associated factors of female factor infertility in our country.

Objective

This study will be conducted to assess the prevalence and associated factors of female factor infertility in couples seeking fertility care visiting St Paulo's hospital millennium medical college, Infertility clinic, Addis Ababa, Ethiopia, from October 1, 2023 G.C to September 30, 2024.

Method and Material: An institution-based cross-sectional study was conducted in the Department of Obstetrics and Gynecology Infertility clinic, using a structured and standardized questionnaire. A simple random sampling technique was used to select a total of 393 patients. Data was analyzed using Statistical Package for Social Sciences (SPSS) windows version 21.0. Data was presented using tables, graphs and text form. Odds Ratio with 95% Confidence Interval (CI) was used to determine the effect of the independent variables on the outcome variable. Bivariate and multivariate logistic regression was used to identify factors associated with female factor infertility at 95% confidence interval and P-value less than 0.05 was statistically significant.

Result. Total of 393 women were enrolled, 58.8 % had female factor infertility. Of this, 59% had primary infertility and 41 % had secondary infertility. Female factor infertility highly associated with an increase in the age of the women (AOR=0.38; 95%CI; 0.220, 0.658), age at marriage

(AOR=2.844; 95%CI; 1.572, 5.145), previous history of abdominopelvic surgery (AOR=5.199; 95%CI; 2.827, 9.5620) and pain during sexual intercourse (AOR=0.382; 95%CI; 0.167, 0.874).

Conclusion: The prevalence of female factor infertility among women in couples seeking fertility care in SPHMMC is 58.8 %, was high compared to the WHO worldwide estimate, so emphasis should be given to it. Age of the patient, age at marriage, pain during sexual intercourse and history of abdominopelvic surgery were significantly associated with female factor infertility.

Key words: infertility, prevalence, cross sectional study, associated factors, Ethiopia

Table of contents

Contents	Page
Contents	
SUMMARY	i
ACKNOWLEDGEMENT	i
ACRONYMS AND ABBREVIATIONS	vi
LIST OF TABLES	vii
1. INTRODUCTION	1
1.1. Background	1
1.2. Statement of the problem	3
1.3. Significance of the study	4
2. LITERATURE REVIEW	5
2.1. Conceptual framework	8
3. OBJECTIVES	9
3.1. General Objective	9
3.2 .Specific Objectives	9
4. METHODS AND MATERIALS	9
4.1. Study Setting	9
4.2. Study Period	9
4.3. Study Design.....	10
4. 4. Source Population	10
4.5. Study Population.....	10
Inclusion Criteria	10

Exclusion criteria	10
4.6. Sample size determination and Sampling Technique	10
4.7. Measurement.....	13
4.7.1. Study variables	13
4.7.2. Data collection Instruments.....	Error! Bookmark not defined.
4.8. Data collection procedure.....	13
4.9. Operational Definitions.....	14
4.10. Data Quality control.....	14
4.11. Data processing & analysis.....	15
4.12. Ethical consideration.....	15
4.13. Result Dissemination Plan.....	15
5. Result	Error! Bookmark not defined.
5.1. Socio-demographic characteristics of women.....	16
5.2. Obstetric factors.....	16
5.3. Gynecologic factors.....	16
5.4 .Contraceptive and sexual history.....	17
5.5 Substance use lifestyle and medical history.....	17
5.6 Magnitude of infertility.....	17
5.7 Factors associated with female factor infertility.....	26
6.Discussion.....	27
7.Strength and Limitation.....	29
8. CONCLUSION	29
9. Recommendation.....	29
10. Referances.....	30
11.Annexs.....	33
Annex I: Information sheet for patients.....	33
Annex II:	34
Annex III.....	34

ACRONYMS AND ABBREVIATIONS

BMI	Body mass index
CI	Confidence Interval
CFRM	Centre for Reproductive Medicine
HMIS	Health Management Information System
IVF	In vitro Fertilization
OR	Odds Ratio
SPHMMC	Saint Paul's Hospital Millennium Medical College
SRHR	sexual and Reproductive Health and Rights
SPSS	Statistical Package for Social Sciences
SSI	Surgical Site Infection
STI	Sexual Transmitted Infection
TB	Tuberculosis

LIST OF TABLES

List of tables	Pages
Table 1.Distribution of socio-demographic characteristics among women enrolled in the study at SPHMMC.....	18
Table 2: Obstetrics factors among women enrolled in the study at SPHMMC.....	20
Table 3: Gynecologic factors among women enrolled in the study at SPHMMC.....	22
Table 4: Sexual history among women enrolled in the study at SPHMMC.....	24
Table 5: Substance use, lifestyle, and medical history among women enrolled in the study at SPHMMC.....	25
Table 6: Bivariate and multivariate logistic regression analysis of factors associated with female factor infertility in women enrolled in the study at SPHMMC.....	26

LIST OF FIGURES

Figure 1: Distribution of Age of the women enrolled in the study at SPHMMC.....	19
Figure 2: Duration of marriage of the women enrolled in the study at SPHMMC.....	19
Figure 3: outcome of pregnancy and fertility performance among women enrolled in the study at SPHMMC.....	21
Figure 4: age at marriage of women enrolled in the study at SPHMMC.....	21

1. INTRODUCTION

1.1. Background

Infertility is a disease of the male or female reproductive system characterized by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse [1]. It can be subdivided into primary infertility, that is, no prior pregnancies, and secondary infertility, infertility following at least one prior conception [2]. Fecund ability is the ability to conceive. In those attempting conception, more than 85 percent will be pregnant by one year. Infertility is common and affects 10 to 15 percent of reproductive aged couples [1]. Infertility is thought to affect millions of individuals and couples worldwide often with devastating societal and health consequences, including social stigma, economic hardship, and poor physical and mental wellbeing [1, 3]. Evidences, collected from 195 countries and territories worldwide between 1990 and 2017, showed that infertility cases were increasing and the risk of becoming infertile is higher in women than in men. The age standardized prevalence of infertility increased by 0.37% annually for women and 0.291% annually for men [4].

The source of infertility can be woman, man, both, or unexplained [6]. To be able to conceive, a woman should have properly functioning ovaries, uterus, and adequate and patent fallopian tubes to aid ovulation. Any factor that disturbs these organs and ovulation can hinder conception causing infertility [9]. Female infertility may be due to polycystic ovary syndrome, hormonal disorders, premature ovarian failure, genital infections, endometriosis, fallopian tube obstruction, congenital uterine anomalies, uterine synechiae, and prolonged use of oral contraception, sociocultural factors, or other medical complications [7]. Female infertility is triggered by the increase in age of the female, smoking, excessive weight loss or gain, consumption of alcohol, emotional stress, and physical stress. It is important to diagnose and treat infertility in time to increase the chances of conception. The medication can be administered on the basis of diagnosis [10]. Men are merely responsible for 20–30% of infertility cases but contribute to as many as 50% of the total cases [8].

Women in developed countries tend to suffer primary infertility predominantly. In contrast, higher rates of secondary infertility are seen in developing countries, reflecting the high prevalence of tubal disease from sexually transmitted, post-abortion and puerperal infections in these countries [11]. Female fertility begins to decline after 30 years of age, drops quite rapidly after 35 years, and precipitously declines after 40 years, owing to a decline in both the quantity and quality of ovarian follicles [12, 13]. For patients diagnosed with infertility, psychological pressure rises and the relationships between family members deteriorate [14], which may greatly affect the quality of life. In addition, the declining birth rate could potentially worsen the aging problem.

The prevalence of infertility has been increasing alarmingly with more than 48 million couples and 186 million individuals worldwide [1]. Regardless of the widespread consequences of infertility, the provision of infertility medical care is limited in developing countries, including Africa, since greater attention is given to the problem of overpopulation and waiting to encourage childless couples to accept their condition. The prevalence of infertility in Africa is higher than that in other continents and range from 20% to 35% [15]. The pooled prevalence of primary and secondary infertility is 49.9% and 49.8%, respectively, and the main causes of infertility are oligospermia and pelvic inflammatory disease for men and women respectively [15]. According to study done in three government Hospitals in Addis Ababa in 2021, the overall prevalence of infertility was 27.6%, of these, 14.4% had primary infertility and 13.2% had secondary infertility [5]. A study performed in Dessie identified that age at first pregnancy, age at menarche, menstruation flow in days, history of STI, and multiple sexual partners were the determinant factors of infertility [16]. A study done in Adama identified that being rural residence, husband engaged in high temperature occupation, eating diet enriched with saturated fat, not undergoing adequate sex, Menstruation flow greater than 3 days, ever used contraceptives and chronic pelvic pain were identified as determinants of women's primary infertility[17].

Few studies have shown that the problem of infertility is increasing worldwide and in Ethiopia. To reduce the problem of infertility, individual and group efforts should be supported by evidence. As part of future pieces of evidence, this study intends to assess the prevalence of female factor infertility and its associated factors among couples seeking fertility care in SPHMMC.

1.2. Statement of the problem

Infertility is thought to affect millions of individuals and couples worldwide [1], given the global burden of infertility; more should be done to improve the prevention, management and treatment of infertility worldwide. Addressing infertility is an important component of sexual and reproductive health and rights (SRHR) but has not been a major focus in the global SRHR agenda. Understanding the magnitude of infertility is critical for monitoring, assessing, and improving equitable access to quality fertility care services, as well as addressing risk factors for and consequences of infertility [18]. Infertility causes psychological problems such as anxiety and depression and affects the family and community to which the patient belongs as well as wider society [14]. Psychiatric morbidity was seen in 46.4% of infertile women [19] and the relationships between family members deteriorate [14], which may greatly affect the quality of life. Although not life-threatening, the detrimental influence of infertility to patients, their families, and society should not be underestimated. The declining birth rate could potentially worsen the aging problem.

Infertility is more than a quality of life issue, with far-reaching consequences for public health, including psychological distress, social stigma, economic stress, marital disagreements, negative pregnancy outcomes, and later-onset adult diseases [4]. In many African countries, the success of marriage overlies the ability of a woman to bear children, and being infertile leads to serious psychological trauma and social stigma [15]. Although it is a common problem for both sexes, social blame and stigma are universally laid on women [20]. In Ethiopia, marriage, parenthood, and children are highly valued, and women are defined in the context of motherhood, which limits their role in the private sphere [21]. A study performed in Addis Ababa regarding women's infertile experience showed diverse negative emotional and psychological effects [22]. It is also associated with marital instability; both males and females are engaged in sex with multiple partners to prove their fertility.

Infertility is an important global health problem, but does not receive enough attentions and political will to directly address the problems associated with infertility especially in developing countries [23]. So far, no study has comprehensively evaluated on prevalence of female factor

infertility and associated factors in SPHMMC and this study will determine prevalence and associated factors of female factor infertility as a clue for better infertility treatment and fertility outcome.

1.3. Significance of the study

Female factor infertility is a common cause of infertility in couples seeking fertility care that we often face in our medical practice. But its exact prevalence and associated factors are not known in SPHMMC, since it is one of the infertility centers giving IVF nationally and different fertility care services.

This study will help as a baseline to know the prevalence of female factor infertility in couples seeking fertility care in the hospital and it may help to develop targeted intervention. It also creates awareness for the couples on factors associated with female factor infertility.

In addition, the study will serve as a base for future studies and policy makers to design different strategies to improve quality of care. It will also important for the couples to act on possible risk factors and can contribute to the overall understanding of infertility.

2. LITERATURE REVIEW

Systematic review and meta-analysis was conducted from 133 published infertility prevalence studies to estimate the prevalence of infertility in world populations (from 1990 to 2021) showed that pooled estimates of lifetime and period prevalence of 12-month infertility were 17.5% and 12.6%, respectively[18].

In another Systematic review conducted from 15 cross sectional studies on prevalence of primary and secondary infertility in Pakistan (n= 6400) showed that 56.25% had primary infertility and 43.2%) had secondary infertility. In this study the marriage age is increasing which impacts reasons with male variables and unexplained infertility greater generally observed with increasing age of marriage. Female component stays a principle reason for the infertility including some unexplained reasons and means [32].

Cross-sectional was conducted to analyze the prevalence and risk factors of infertility in a Mongolian population of 1919 participants showed that infertility incidence of 8.2%, with primary infertility at 2.76% and secondary infertility at 5.47%. In this study the prevalence of infertility was significantly higher amongst the rural population ($P < 0.001$). It also showed that the most significant risk factors for infertility are advanced age, alcohol consumption, an unfavorable gynecological history and some diseases also pose a risk to fertility [25].

As reported after cross-sectional study done on etiology and risk factors associated with infertility in the southern region of Iran (n= 255) shows that most common causes of male and female infertility were varicocele (49.4%) and ovulation disorders (57.5%), respectively. In this study there was a significant association between female factor infertility and level of education, age of women, women's age at marriage, number of abortions, alcohol consumption, presence of an underlying disease, and BMI ($P < 0.005$)[26].

In Ukraine a retrospective multicenter cohort study was conducted to assess the role of surgical site infections types associated with obstetric and gynecological surgeries as a cause of infertility among women reproductive age showed the prevalence of surgical site infection (SSI) was 67.9%. The prevalence of SSI among primary infertility group and secondary infertility group women was 67.5% and 71.4%, respectively [27].

In another systematic review and meta-analysis done from nine studies comprising 1827 infertile patients in Iran on association of Chlamydia trachomatis and Neisseria gonorrhea with female infertility showed the high prevalence of Chlamydia trachomatis and Neisseria gonorrhea infections in infertile women, Chlamydia trachomatis infection potentiates female infertility in 76.47% of women [28]. A Cross-Sectional Study done on infertility prevalence and associated factors among women in Henan Province, China (n= 765) showed that prevalence of infertility was 24.58%, 6.54% had primary infertility and 18.04% had secondary infertility. In this study age, history of gynecological surgeries and decreased ovarian reserve may increase the risk of infertility [33].

A Cross-Sectional Study done on infertility prevalence and associated factors among women in Seoul, South Korea (n=2274) showed that 19.48% were infertile, 72.2% had primary infertility and 27.8% had secondary infertility. In this study age $\geq$ 35 years, body mass index $\geq$ 23, and a history of artificial abortion were significant risk factors for infertility ($p < 0.001$) [29]. In another Cross-Sectional Study done on infertility prevalence and its causes in the population of Pakistan (n= 2657) showed that 7% were infertile, 23.11% had ovulatory failure, 15.08% had a tubal blockage and 20.96% of the cases were related to male infertility. Ovulatory failure was the most common cause of female infertility in this study [30].

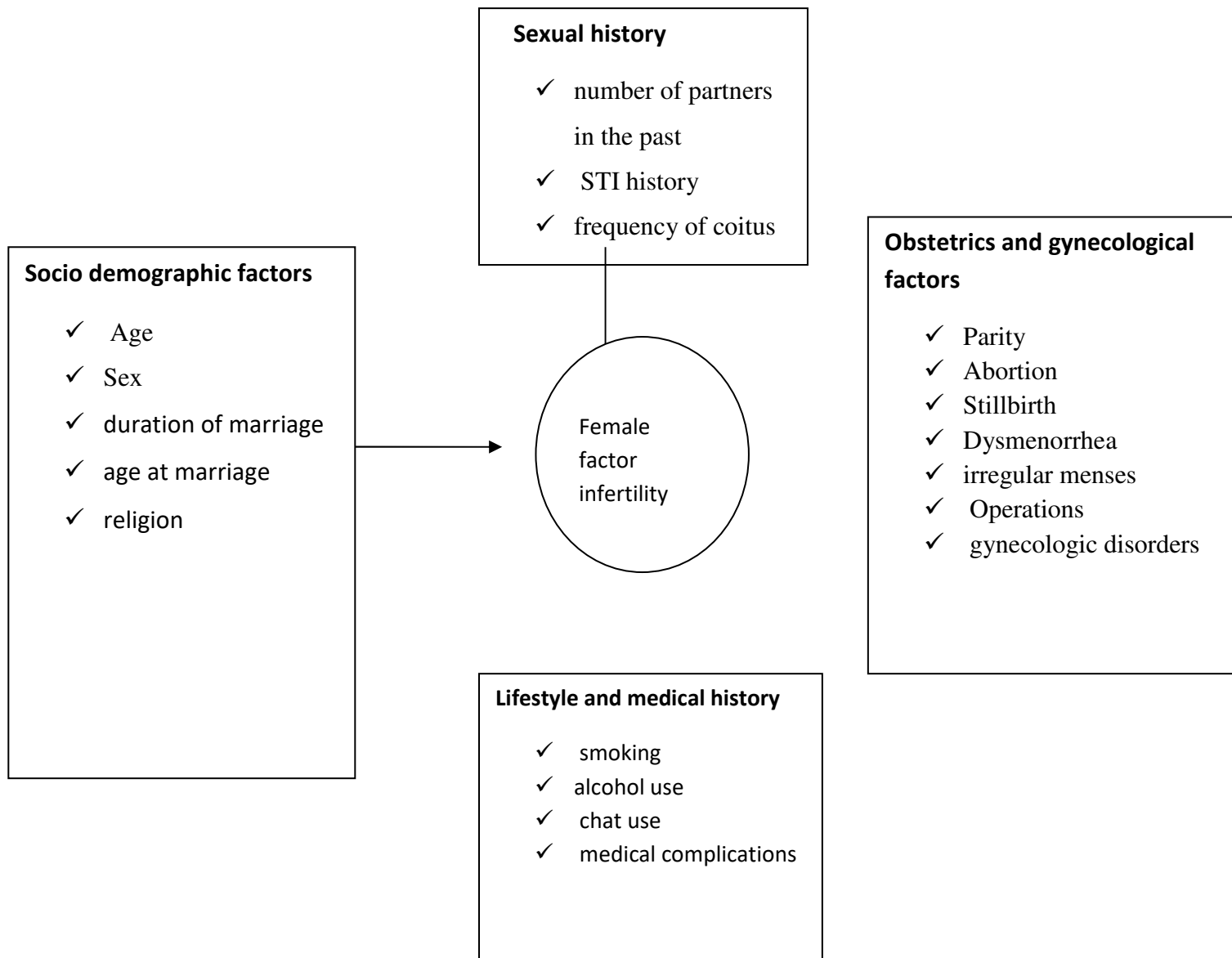
A Cross-Sectional Study done to assess prevalence and risk factors of infertility among Saudi women (n= 270) implicated that 28.9% had defect in ovulation, 7.4% had tubal adhesion or obstruction and male factors was 12.6%. In this study a statistically significant relationship was found between types of infertility with age and marital duration, contraceptive methods, duration of contraception used, mother age and medical problems [31].

In Africa, Systematic review and meta-analysis was done from 20 studies on the prevalence of infertility in Sudan showed that the pooled prevalence of overall infertility, primary infertility, and secondary infertility were 13% and 35% respectively. In this study the prevalence of infertility factors were 41%, 27%, 16%, and 17% for female, male, combined factors, and unexplained factors, respectively. Women with infertility were mainly present because of ovulatory disorders (ovulatory factors, 36%; polycystic ovary syndrome, 38%) [24].

From an institutional based cross-sectional study done in Bayelsa State, South-South Nigeria to assess pattern of infertility among infertile couples (n= 1,027) incidence of infertility was 18.2%. In this study Female factor alone was responsible for infertility in 54.0% of the cases, while male factor alone was identified in 19.2%, of the cases. Tubal factor was the most common (55.6%) cause of infertility, with tubal blockage being the commonest (49.2%) tubal pathology [34].

A study done from on finding from a multicounty and demographic health surveys from 10 East African countries (n= 38,020) to determine the pooled prevalence of secondary female infertility and its association with under nutrition showed that the proportion of women who have secondary infertility was 16.32% ,of which 26.94% were undernourished [35].

2.1. Conceptual framework



3. OBJECTIVES

3.1. General Objective

- To assess prevalence and associated factors of female factor infertility in couples seeking fertility care at SPHMMC, Addis Ababa, Ethiopia, from October 1, 2023 to September 30, 2024.

3.2 .Specific Objectives

1. To determine the prevalence of female factor infertility in couples seeking fertility care at SPHMMC infertility clinic.
2. To identify factors associated with female factor infertility in couples seeking fertility care at SPHMMC infertility clinic. .

4. METHODS AND MATERIALS

4.1. Study Setting

The study was conducted at St. Paul's Hospital millennium medical college, which is a tertiary level hospital located in Addis Ababa, Ethiopia. SPHMMC is one of the largest public hospitals in the country and provides academic, research and medical services. The hospital was established in 1968 GC by the Emperor Haile Selassie in collaboration with the German Evangelical Church and it is currently governed by a board under the federal ministry of health. In addition to an inpatient capacity of more than 700 beds, on average 1200 emergency and outpatient clients are seen daily in the hospital. The collage has more than 2800 clinical, academic and administrative staffs that provide medical specialty service including fertility care to the patients who are referred from all over the country. Regarding infertility centers, all public hospitals except Amanuel specialized hospital in the city have obstetrics and gynecology wards that perform the first assessment, diagnosis, and some provision of treatments, but IVF is given nationally at St. Paulo's hospital and at 6 private centers in Addis Ababa.

4.2. Study Period

- The study was conducted from October 1, 2023 to September 30, 2024.

4.3. Study Design

Hospital based cross-sectional study was conducted by using a validated standard questionnaire.

4.4. Source Population

All women within the reproductive age group and attending the obstetrics and gynecology units either for infertility-related complaints or for obstetrical reasons in SPHMMC.

4.5. Study Population

All reproductive-age women and married for more than 1 year attending SPHMMC, CFRM.

Inclusion Criteria

- ✓ Married women/cohabited who were in the reproductive age group (15–49 years) and who tried to conceive for more than a year.
- ✓ the couple is living together for at least one year

Exclusion criteria

Those women who:

- ✓ had tried to conceive for less than one year
- ✓ Are in any form of contraceptives.

4.6. Sample size determination and Sampling Technique

The required sample size required for the study was calculated using a single population proportion formula with the following assumptions: 95% confidence level, 5% margin of error, and 50% proportion because no previous study performed in Ethiopia. Prevalence of female factor infertility is considered as independent predictor.

$$n = (Z_{\alpha/2})^2 * p (1 - p) / w^2$$

$$n = 1.96^2 * 0.5(1-0.5) / 0.05^2 = 384$$

$$\text{Total} = 384$$

Where;

- ✓ n = minimum sample size
- ✓ $Z_{(\alpha/2)}$ = The desired level of statistical significance (1.96)
- ✓ $p(1-p)$ = A measure of variability
- ✓ W = the margin of error = 5%

The total number of patients visiting infertility clinic unit in estimated 12 months period is around 5000 patients and based on this the population is less than 10000, we will use the following population reduction formula;

$$n_f = \frac{n_0}{1 + \frac{n_0}{N}}$$

$n_0 = 384$, N = number of patient who were seen in the previous months as base which is 5000.

$n_f = 384 / 1 + 384 / 5000 = 384 / 1.0768 = 357$ and considering 10% drop out so my final sample size will be 393.

All eligible patients who had infertility from October 1, 2023 to September 30, 2024 at SPHMMC Infertility clinic were considered study subjects. List of patients who had female factor infertility was obtained from Patient registration book and on the hospital's HMIS database. All medical registration was listed from one to N. Then study units were selected by simple random sampling technique (with K value of 15) till I get 393patients.

4.7. Measurement

4.7.1. Study variables

4.7.1.1. Dependent Variable

Female factor infertility

4.7.1.2. Independent variables

- Sociodemographic characteristics: age, sex, duration of marriage.
- obstetrics and gynecological factors: parity, abortion, stillbirth, dysmenorrhea, irregular menses, operations, age at menarche, history of infertility
- sexual history: number of partners in the past, STI history, frequency of coitus
- lifestyle and medical history: smoking, alcohol use, chat use, medical complications

4.7.2. Data collection Instruments

Case records of all the infertile couples that presented to the Infertility Clinic for evaluation, from October 1, 2023 to September 30, 2024, were retrieved and relevant data were extracted from the case records using a pre-designed questionnaire , for data analysis. Data was collected by using a questionnaire, which contained various elements associated with infertility risk factors. The questionnaire was adapted from the reviewed previous literature. The questionnaire was prepared in English and was translated to local languages by an interviewer.

4.8. Data collection procedure

The data for this study was collected from patient chart and direct from the patient at infertility clinic. The data was collected by structured check list developed for this study by kobo toolbox. Other data's such as socio-demographic data, behavioral factors, comorbidities was collected from the patients' medical record, Sociodemographic factors and other pertinent information which were not documented from medical records was obtained from patients or attendants via telephone documented from medical and was filled on a well prepared checklist that is attached in the annex below. The data was collected by nurses and residents. The data collectors were

given one day training on the checklist. The data collectors were continuously supervised by the primary investigator during data collection process.

4.9. Operational Definitions

Infertility is defined as if they fulfilled the following criteria.

- Married for at least the past 12 months/6 months if the age of the patient is beyond 35 years.
- Who was not using contraceptives in the time one year before the date of the interview?
- Either had not conceived in the past (primary infertility) or had conceived in the past but not in the last 12 months up to the date of the interview.
- Either breastfeeding or no breastfeeding but had been 12 months or more since she had seen her first post-delivery menses.

Regular coitus: Sexual intercourse at least two to three times per week.

Current substance use refer to the use of drugs or alcohol and including substances ,cigarettes, illegal drugs, prescription drugs, inhalants, and solvents in the past 30 days.

Past substance use refer to the history of using drugs or alcohol, and include substances cigarettes, illegal drugs prescription drugs, inhalants, and solvents before one month.

Primary infertility a condition in which a couple who has been married for at least one year and has never achieved conception despite having regular unprotected sexual intercourse.

Secondary infertility a condition in which a couple who had at least one previous conception irrespective of the outcome was trying to conceive for the last year or more had regular intercourse.

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4.10. Data Quality control

The questionnaire was pretested with 5% of the sample size to ensure any relevant information was not missing out. After pre-testing; all the necessary modification was incorporated. Each day

the collected data was checked for accuracy and completeness by principal investigator. The participant's names were not collected and the collected data was stored in a secure location.

4.11. Data processing & analysis

The collected data was checked for completeness and consistency by the investigator. The collected data was cleaned, coded and entered into EPI- Info version 7 and then exported in to SPSS Version 21.0 for analysis. Appropriate descriptive analyses was performed to describe the study population characteristics in terms of the variables by calculating frequencies, mean and proportions and results was presented in tables and bar charts.

In the analysis of the association between predictor variables and outcome variable, bivariate and multivariable analyses was carried out using logistic regression model. Odds ratio at confidence interval 95% was used to compute the level of association and p-value at less than 0.05 will be considered as a cut-off point for statistical significance. Adjusted and crude odds ratios (OR) and their 95% confidence intervals (CI) was used as indicators of strength of association.

4.12. Ethical consideration

The ethical clearance was obtained from SPHMMC ethical review committee, written consent was obtained from hospital administration, and from department of obstetrics and gynecology. Letters of permission was presented to card room and Saint Paul hospital medical director office. Informed consent or permission was obtained from the study participant. Confidentiality of the information was ensured using codes rather than names during registering data. Consent was obtained from patients before proceeding to data collection.

4.13. Result Dissemination Plan

After conducting the research, findings will be presented during defense. The result of the study will be submitted to SPHMMC department of obstetrics and gynecology. The study will be submitted to journal clubs for publication and to annual conferences for presentation.

5. RESULT

5.1. Socio-demographic characteristics of women

A total of 393 respondents participated in the study, with 100 % response rate. All women who participated in the study were married and had been living with their partners for 12 months or more. Most of the respondents (209, 53.2%) were in the age range of 31–40 years, and the mean age of women was 34 ± 5.3 years. Approximately 265 (67.4%) respondents had been living with their partners for 12 months - 60 months and 126 (32.1%) respondents had been living with their partners for more than 60 months. Approximately 201 (51.1%) of respondents were married with the age of 31 -35 years and 173 (44%) were married with the age of 21-30 years (Table1, figure 1)

5.2 Obstetrics factors

Approximately 162 (41.2%) had been pregnant before. Of this, 73 (45.2%) had one child and 17 (10.5%) had two children, while the rest 6 (3.7%) had three or more children. On average, approximately 106 (65.3%) respondents were in the age group of 21-30, 32 (19.8%) were in the age group of 16-20 years and 24 (14.8 %) were in the age group of 31 years and above during their first pregnancy. Of women who had been pregnant previously, 46 (28.4%) had faced abortions, 22 (13.5 %) had ectopic pregnancy and 2 (1.2 %) had still birth. 137 (84.5%) were pregnant after 6- 12 months of initiating sexual intercourse, 12 (7.4 %) after 12-24 months and 13 (8%) after 3-6 months of initiating sexual intercourse. None of them was breast feeding in the past 24 months among women who had live birth (Table 2).

5.3 Gynecologic factors

Among respondents, 237 (60.3%) of them had been trying to become pregnant for the past 2 to 5 years and 106 (27%) of them had been trying to become pregnant for more than 5 years. Approximately 324 (82.4%) had regular menstrual cycle, 69 (17.6 %) had irregular menstrual cycle with 47 (12%) their menstrual pattern is every 35 days , 16(4%) every 15-21 days and 6(1.5 %) every 15 days .Among this,329 (83.7 %) had 3- 8 days of menstrual blood flow,48 (12.2 %) had less than 3 days of menstrual blood flow and 16 (4.1 %) had greater than 8 days of menstrual blood flow .44(12%) of patients had pain during menses and 40 (10.2 %) had pain during sexual intercourse. 109 (27.7 %) had a previous operation in which the highest percentage (50 ,45.8%) had myomectomy ,(22,20.8 %) had salpingectomy and (33 ,30.2 %) had other gynecologic surgeries . Among respondents, 98 (24.9%) had been diagnosed with gynecological disorders. Approximately 125 (31.8%) respondents had either been evaluated or treated for infertility. Approximately 80(20.4) % of women had an abortion before, out of which 51 (63.8%) had an abortion at least once in their lifetime and 29 (32.8 %) had 2 and more abortions .62 (64.7%) of them are spontaneous abortions.

Among respondents, 204(51.9 %) of them had age at menarche between 15-18 years and 186 (47.3 %) had age at menarche between 12-15 years (Table 3).

5.4 Contraceptive and sexual history

All of the respondents were not using any form of contraceptives in the past 12 months. Approximately 200 (50.9%) respondents had one partner, and 193 (49.1%) had more than one partner in the past. Among respondents, 105 (26.7%) had been treated for STIs before and 31 (7.9 %) had been treated for TB. Approximately 355 (90.3%) had sexual intercourse two to three times per week, while approximately 14 (3.6%) had sex only once per week. Only 31 (7.9 %) of respondents know fertility periods in menstrual cycle, 362 (92.1%) of them did not know fertility periods (Table 4).

5.5 Substance use, lifestyle, and medical history

Among respondents, approximately 17 (4.3%) and 2(0.5%) were past and current alcohol users, respectively. Approximately 4 (1%) and 5(1.3%) reported a history of smoking cigarettes and Chat chewing, respectively. 36 (9.2 %) of the respondents had past or current history of medical disorders. Approximately 16 (4.1%) and 6 (1.5 %) had a history of thyroid disorders and diabetes, respectively and 14 (3.6 %) had other medical disorders but only 2(0.5 %) of the respondents are on medication for the medical disorders currently (Table 5).

5.6 Magnitude of infertility

Among studied 393 female partners 231 (58.8%) had female factor infertility. Of this, 59% had primary infertility and 41 % had secondary infertility.

Table 1.Distribution of socio-demographic characteristics among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

variables	Categorical variable	frequency	percentage
Age at marriage in years	Less than 20	1	0.3%
	21-30	173	44%
	31-35	201	51.1%
	Greater than 35 years	18	4.6 %
Age in years	18-30	146	37.2%
	31-40	209	53.2%
	41-49	38	9.7%
duration of marriage	12 months-60 months	265	67.4%
	greater than 60 months	126	32.1%

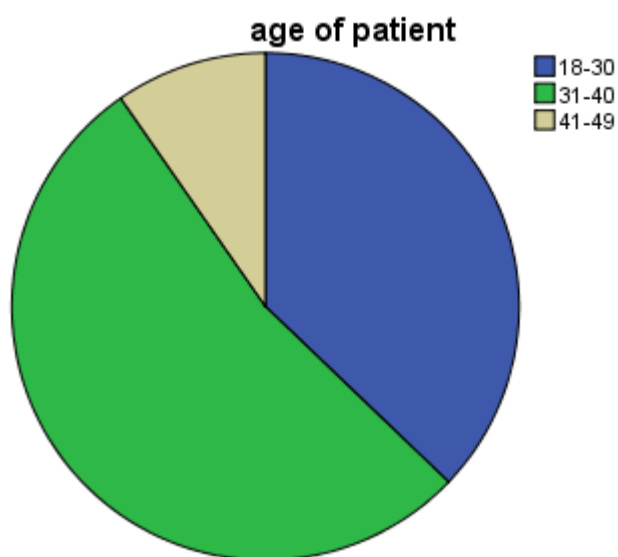


Figure 1. Distribution of Age of the women enrolled in the study at SPHMMC

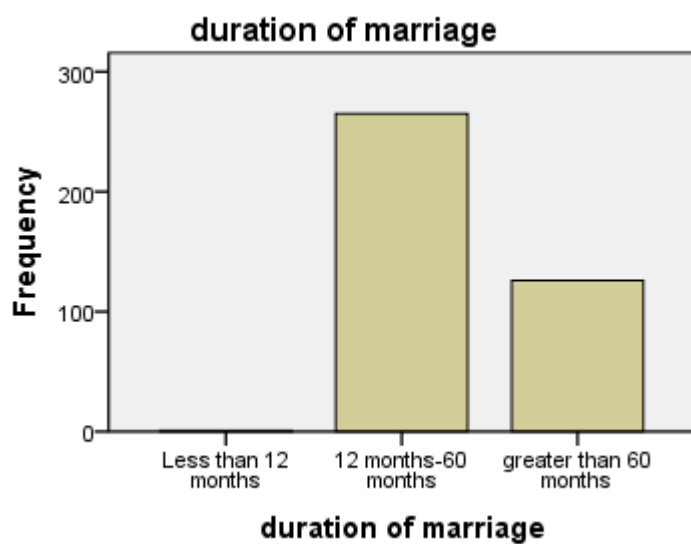


Figure 2. Duration of marriage of the women enrolled in the study at SPHMMC

Table2. Obstetrics factors among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

variables	Categorical variable	frequency	percentage
How many times have you been pregnant	1	91	23.2%
	2	41	10.4%
	3 and more	30	7.6%
number of children	1	73	45.2%
	2	17	10.2%
	3 and more	6	3.7%
Duration of intercourse before pregnancy	3months-6 months	13	8%
	6 months-12 months	137	84.6%
	12-24 months	12	7.4%
Are you pregnant before	Yes	162	41%
	No	231	59%

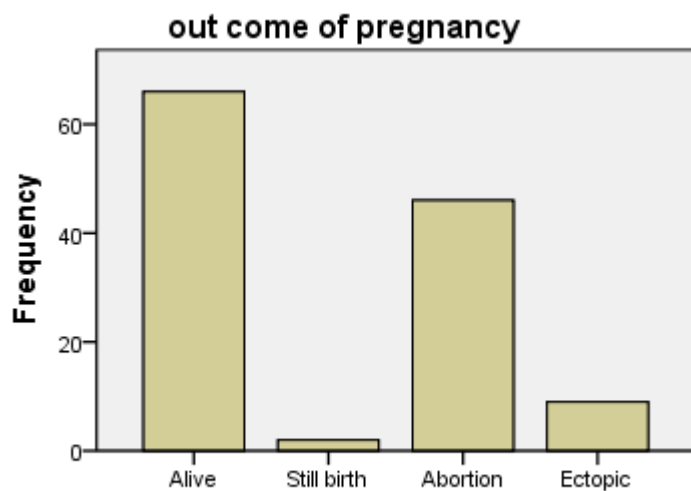


Figure 3 .outcome of pregnancy and fertility performance among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

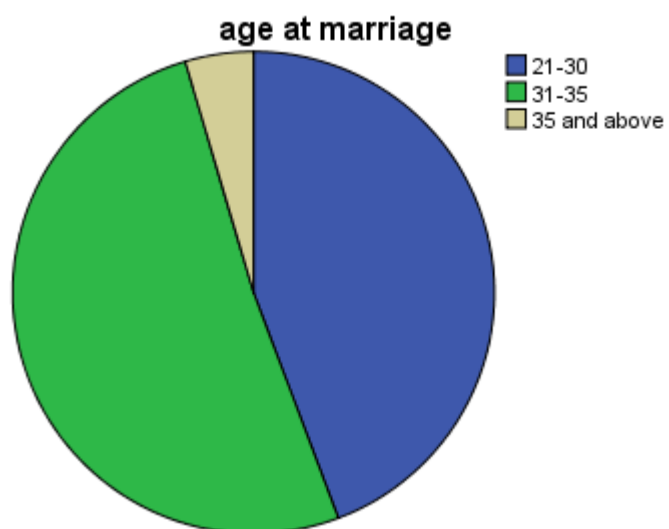


Figure 4.age at marriage of women enrolled in the study at SPHMMC

Table 3. Gynecologic factors among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

variables	Categorical variable	frequency	percentag
Duration of infertility	1-2 years	50	12.7%
	2-5 years	237	60.3%
	More than 5 years	106	26.7%
Menstrual blood flow	Less than 3 days	48	12.2%
	3-8 days	329	83.7%
	more than 8 days	16	4 %
Irregular Menstrual pattern	Every 15 days	6	1.5 %
	15-21 days	16	4 %
	Greater than 35 days	47	12 %
Menstrual cycle regular	Yes	329	82.4%
	No	64	17.6%

variables	Categorical variable	frequency	Percentage
previous operation	myomectomy	50	12.7%
	salpingectomy	22	5.5 %
	others	33	8.3 %
Number of abortions	1	51	13%
	2 and more	29	7.4%
pain during menses	Yes	44	11.2%
	No	349	88.8%
pain during sexual intercourse	Yes	40	10.2%
	No	353	89.8%

Table 4. Sexual history among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

variables	Categorical variable	Frequency	Percentage
Number of sexual intercourse per week	Once	14	3.6%
	Two-three times	355	90.3%
	More than three	24	6.1%
Treatment for STI/TB	STI	106	26.7%
	TB	31	7.9%
Knowledge about fertility periods	Yes	31	7.9 %
	No	362	92.1 %
Number of sexual partner	One	200	50.9%
	More than one	193	40.1%

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Table 5. Substance use, lifestyle, and medical history among women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

variables	Categorical variable	Frequency	percentage
Medical disorders	Thyroid	6	1.5%
	DM	16	4%
	Others	14	3.4 %
Alcohol users	Past	17	4.3%
	Current	2	0.5 %
Chat chewing /smoking cigarette	Chat chewing	5	1.2 %
	smoking cigarette	4	1%
Past/current medical disorders	Yes	36	9.2%
	No	357	90.8%

5.7 Factors associated with female factor infertility

To identify the factors associated with female factor infertility among women enrolled in the study, first, bivariate regression analysis was performed and there was association between history of STI, history of TB treatment, history of abdominopelvic surgery, previous history of gynecologic disorder, pain during sex, duration of marriage, age of the women, age at marriage and knowledge about fertility periods in the menstrual cycle. At this level, variables with a *p* value < 0.25 were included for multiple logistic regression analyses. Accordingly, the results of multiple regression analysis showed that covariates such as age of the patient, age at marriage, pain during sexual intercourse and history of abdominopelvic surgery were significantly associated with female factor infertility (Table 6).

Table 6 Bivariate and multivariate logistic regression analysis of factors associated with female factor infertility in women enrolled in the study at SPHMMC, Addis Ababa, Ethiopia from October 1, 2023 G.C –September 30 2024G.C

Variables	COR(95% CI)	AOR(95% CI)	P value
Age of the patient (31-40 years)	0.658(0.476,0.911)	0.381(0.220,0.658)	.001
Age at marriage (31-35 years)	1.321(0.980,1.88)	2.844(1.572,5.145)	.001
Pain during sexual intercourse	0.58(0.286,1.178)	0.382(0.167,0.874)	.023
Abdominal pelvic surgery	3.746(2.356,5.956)	5.199(2.827,9.5620)	0.001

6. DISCUSSION

In this institutional based cross-sectional study 393 participants were enrolled from SPHMMC, CFRM (Center for Reproductive medicine). Higher rates of secondary infertility are seen in developing countries, reflecting the high prevalence of tubal disease from sexually transmitted, post-abortion and puerperal infections in these countries [11]. The prevalence of female factor infertility among the participants was 58.8 %. Of this, 59 % had primary infertility and 41 % had secondary infertility. The finding of this study is consistent with Systematic review conducted from 15 cross sectional studies on prevalence of primary and secondary infertility in Pakistan (n= 6400) showed that 56.25% had primary infertility and 43.2% had secondary infertility [32]. This degree of prevalence is also consistent with study done from an institutional based cross-sectional study done in Bayelsa State, South-South Nigeria to assess pattern of infertility among infertile couples (n= 1,027) ,prevalence of female factor infertility was 54.0% [34].

But the prevalence of female factor infertility in the current study is higher than reported in other populations such as A Cross-Sectional Study done Henan Province, China (n= 765) showed 6.54% had primary infertility and 18.04% had secondary infertility [33]. Cross-sectional was conducted infertility in a Mongolian population of 1919 participants showed with primary infertility at 2.76% and secondary infertility at 5.47% [25]. Systematic review and meta-analysis done from 20 studies on the prevalence of infertility in Sudan the prevalence of female factor infertility was 41% [24].

It is also higher than a study done on finding from a multicounty and demographic health surveys from 10 East African countries (n= 38,020) the prevalence of secondary female infertility was 16.32% [35]. Study done in three government Hospitals in Addis Ababa in 2021 showed 14.4% had primary infertility and 13.2% had secondary infertility [5].

The finding of this study is lower than the finding of a Cross-Sectional Study done Seoul, South Korea (n=2274) with a prevalence of 72.2% primary infertility [29]. This difference may be due to difference in study design, sample size across the studies, variation in study participants, socio-demographic variation.

Female fertility begins to decline after 30 years of age, drops quite rapidly after 35 years, and precipitously declines after 40 years, owing to a decline in both the quantity and quality of ovarian follicles [12, 13]. Majority of patients in this study (53.2%) are in the age group of 31-40 years. This study showed that female infertility highly associated with an increase in the age of the women (AOR=0.38; 95%CI; 0.220, 0.658) (as age of the women increases the women fertility will decrease by 62%). This result is in line with other studies done in a Mongolian population showed that one of the most significant risk factor for infertility was advanced age [25], southern region of Iran (n= 255) there was a significant association between female factor infertility and age of women ($P < 0.005$) [26], Henan Province, China (n= 765) [33], Seoul, South Korea (n=2274) age $\geq$ 35 years was significant risk factors for infertility ($p < 0.001$) [29], among Saudi women (n= 270) [31] and Bayelsa State, South-South Nigeria[34].

As observed in our study female infertility is significantly associated with age at marriage (AOR=2.844; 95%CI; 1.572, 5.145), women who married at old age were 2.9 times higher odds of having infertility than who married at young age. In this study, 51.1 % of women married at age 31 -35 years. This finding is in line with other studies done in Pakistan [32], southern region of Iran [26].

This study showed that female infertility is significantly associated with previous history of abdominopelvic surgery (AOR=5.199; 95%CI; 2.827, 9.5620). Women who had previous history of abdominopelvic surgery were 5.2 times higher odds of having infertility than who had no previous history of surgery. In this study, 27.2 % of women had previous operation, the highest being myomectomy. This finding is comparable with studies done in a Mongolian population [25], Henan Province, China [33], Ukraine [27].

Our study showed that female infertility is associated with pain during sexual intercourse (AOR=0.382; 95%CI; 0.167, 0.874) . Women who had pain during sexual intercourse had decrease in fertility. In this study, 10.2 % of women had pain during sexual intercourse. This may result in sexual dysfunction which will prevent pregnancy.

7. Strength and Limitation

The strength of the study is it is primary data and no significant attribution bias.

The limitations of the study are small sample size cross-sectional study, not multicenter and limited external validity, set strict criteria for the inclusion of participants, such as whether they were married and had been with their husbands for 12 months.

8. CONCLUSION

The prevalence of female factor infertility among women in couples seeking fertility care in SPHMMC is 58.8 %, was high compared to the WHO worldwide estimate, so emphasis should be given to it. Age of the patient, age at marriage, pain during sexual intercourse and history of abdominopelvic surgery were significantly associated with female factor infertility.

9. RECOMMENDATION

Public awareness creation regarding high prevalence of female factor infertility.

Women and their husbands should pay great attention to the possible factors that will lead to infertility.

Recommendation for future researchers: further large scale, multicenter study should be done in this area. This study can be used as reference for further research.

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11. ANNEXES

Annex I: Information sheet for patients

My name is Dr Yekoye Tadele. I am an obstetrics and gynecology resident at Saint Paul's Hospital Millennium Medical College. Currently I am conducting a research on the prevalence and associated factors of female factor infertility at Saint Paul's Hospital Millennium Medical College as requirement for partial fulfillment of specialty program in my field.

This information form is prepared to explain the purpose, risks and benefits of this research in order to get your consent to take part in the study. If you are willing to participate, you will sign the consent form. Then you will be requested to give your response by the data collectors.

There is no risk associated with this study. You will not get incentive or payment for participating in the study. But the result is expected to help the physicians and other responsible bodies to provide quality care and develop health education guidelines in the future. The information you provide will be kept confidential. Your right not to participate or to withdraw from this study at any time is respected. The care provided to you will not be affected whether you participate in the study or not.

Annex II: Consent Form for the head of the hospital

As I mentioned above, I am working a thesis proposal on the prevalence and associated factors female factor infertility to be submitted to SPHMMC department of obstetrics and gynecology. I believe that the findings of this study will be important to know the magnitude of the problem and used as an evidence for decision making and reviewing for designing standard guideline and to improve quality of care. So that information necessary for the study will be taken from review from medical registration card and patient interview. It will not harm the participant as well as confidentiality will be kept. No name and other identification will be written in the checklist.

Annex III: Data collection checklist

Code _____

Date_____

1.Questioner to assess Socio-demographic Background

1.	Sex	Female
2.	Age in year	A.18-30 B.31-40 C. 41-49
3	Marital Status	A. cohabited B. Married
4	If married are u living together	A. yes B. No
5	Age at marriage in years	A. less than 20

		B.21-30 C. 31- 35 D. greater than 35 years
6	Duration of marriage	A. less than 12 months B.12months-60 months C. more than 60 months

2. Questioner to assess the Obstetric factors

1	Are you pregnant before	A. Yes B. No
2	If yes to number 1,outcome of pregnancy	A. Abortion B. still birth C. Alive D.ectopic
3	How many times have you been pregnant	A.1 B.2 C 3 and more
4	Age at first pregnancy	A. 16-20 B. 21-30 C.30 years and above
5	For how long you had sexual intercourse before the pregnancy with your husband	A. 3- 6 months B. 6-12 months C.12-24 months
6	Are you breast feeding	A. Yes B. No
7	For long did you breast feed	A. Less than 6 months B.6 -12 months C. 12-24 months
8	How many children do you have	A.1

		B.2 C 3 and more
3. Questioner to assess the Gynecologic factors		
1	For how long did you try to be pregnant	A.1- 2 years B. 2-5 years C. more than 5 years
2	Is your menstrual cycle regular	A. Yes B. No
3	If irregular ,what is the pattern	A. every 15 days B.every15-21 days C.Greater than 35 days
4	Duration of menstrual flow	A,less than 3 days B.3-8 days C.more than 8 days
5	Age at menarche	A,12-15 yrs. B.15-18yrs C.18 yrs.' and above
6	Did you have pain during menses	A. Yes B. No
7.	Do you have pain during intercourse	A. Yes B. No
8	Did you under gone any abdominopelvic surgery before	A. Yes B. No
9	If yes what type of surgery	A.Myomectomy B.Polypectomy C.Salpingectomy D.others
10	Did you diagnosed with gynecologic disorders before	A. Yes B. No
11	Any evaluation or treatment for infertility previously	A. Yes B. No
12	If yes,what evaluation done	A.hormonal analysis B.semen analysis c.hysteroscopy D.HSG
13	If yes,what treatment done	A.IVF B.IUI C.Clomofine citrate D.ICSI
14	Did you have abortion	A. Yes

		B. No
15	If yes	A. Induced B. spontaneous
11	How many abortions did you have	A. 1 B. 2 and above
4. Questioner to assess Contraceptive and sexual history		
1	Did you use any form of contraceptive in the past 12 months	A. Yes B. No
2	How many sexual partners did you have	A. one B. more than one
3	Any history of STI treatment	A. Yes B. No
4.	Any history of TB treatment	A. Yes B. No
5	How many times per week you do sexual intercourse	A. Once B. Two to three C. More than three
6.	Do you know fertility periods in the menstrual cycle	A. Yes B. No
5. Questioner to assess Substance use, lifestyle, and medical history		
1	Did you use alcohol in the past	A. Yes B. No
2	Do you use alcohol recently	A. Yes B. No
3	Did you smoke	A. Yes B. No
4	Do you chew chat	A. Yes B. No
5	Are you using any medications currently	A. Yes B. No
6	Past or current history of medical disorders	A. DM B. Thyroid disorders c. Others

DECLARATION

I would like to declare that, this research proposal is my own work and it has not been presented to any institution either partially or in total for any academic award or for publication. The works here are original, where the works of others appropriately referenced. This research proposal is for partial fulfillment of my specialty program on department of obstetrics and gynecology, SPHMMC.

Investigator: Yekoye Tadele (MD, final year obstetrics and gynecology resident)

Signature _____ Date _____

Advisors:

Dr, Mustefa Negash (MD, assistant professor of obstetrics and gynecology, REI subspecialist)

Signature _____ Date _____

