ASRAT WOLDEYES HEALTH SCIENCE CAMPUS SCHOOL OF PUBLIC HEALTH DEPARTMENT OF PUBLIC HEALTH

PREVALENCE OF ABNORMAL SEMEN ANALYSIS AND ASSOCIATED FACTORS AMONG MALE PARTNER OF COUPLES WHO CAME FOR INFERTILITY SCREENING IN SELECTED INFERTILITY CENTER IN ADDIS ABEBA, ETHIOPIA, 2023

NAME OF INVESTIGATOR: HANA GETACHEW

THESIS REPORT TO BE SUBMITTED TO DEBRE BERHAN UNIVERSITY, DEPARTMENT OF PUBLIC HEALTH, FOR THE PARTIAL FULFILLMENT OF MASTER OF PUBLIC HEALTH IN EPIDEMOLOGY

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PRINCIPAL INVESTIGATOR; - HANA GETACHEW (BSc)

APPROVE BY THE EXAMINING BORD

ADVISORS NAME	SIGNITURE	DATE
1, AWRARIS HAILU BILCHU	_____	_____
2, SEWNET GETAYE	_____	_____
EXAMINERS NAME	SIGNITURE	DATE
_____	_____	_____
_____	_____	_____

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Abstract

Background: The simplest assessment of male infertility is Semen Analysis (SA). Because of cultural disparities, socioeconomic problems, and patriarchy that preclude reliable sampling and analysis, male infertility rates may be understated. It can also make males feel anxious about being associated with hegemonic masculinity. Therefore, this study aimed to assess the pattern of semen analysis and associated factors among male partner of infertile couples in the last twelve months in Addis Ababa, Ethiopia.

Objectives: The objective of this thesis assessed the prevalence of abnormal semen analysis and associated factors among male partner of couple who came for infertility screening in selected infertility centers in Addis Ababa, Ethiopia, 2023

Methodology: A facility based cross-sectional study was carried out among who visit for semen analysis procedure in Addis Ababa from April 1 to 15, 2022. The multi-stage sampling technique used to select samples for the study. Data was collected using semi structured questionnaire by trained data collectors, checked by supervisors on site. Data was entered in to google form and exported to SPSS version 26. Descriptive data was analyzed by frequency for categorical and standard deviation for continuous variable. In order to investigate the association of independent variable with dependent variable both bi variable and multivariable analysis were used the relation of each independent variable with dependent variable if $p< 0.25$, those variable computed for multivariable. Then multivariable $p< 0.05$ with 95% Confidence Interval was declare that statistical significance.

Result: In this study the prevalence of semen analysis among male partner of infertile couple who attend at infertility centers was 68.2% [63.2, 73.5, 95%CI]. From the overall health facilities in the study area, social/ drug exposure who had history of smoking cigarette [AOR=0.175, 95%, CI: 0.06, 0.5] Whereas for urological variables the study indicated that history of Sexual Transmission Infection, those who had history of gonorrhea had [AOR=0.08, 95%, CI: 0, 0.016] and history of Urinary Tract Infection AOR=0.47, 95%, CI: 0.25,0.88, respectively.

Conclusion: The study was conducted to assess the prevalence and associated factors of pattern of semen analysis and associated factors among male partner of infertile couples in the last six months at Addis Ababa city infertility centers. Accordingly, the prevalence of pattern of semen analysis was 68.2%.

Key words: Infertility, Semen Analysis, and Addis Ababa

Table of Contents

List of Figures

List of Table

Acronyms

WHO – World Health Organization

SA – Semen Analysis

A.A – Addis Ababa

MCH – Maternal and Child Health

STI- Sexual Transmission Infection

UTI- Urinary Tract Infection

SPSS- Statistical Package for the Social Sciences

BMI- Body Mass Index

1. Introduction

1.1 Background

Infertility is defined as not being able to get pregnant (conceive) after one year (or longer) of unprotected sex (CDC). While primary infertility is higher in other regions of the world, secondary infertility is more common in Africa, and secondary infertility rates are very complicated to determine. Male infertility includes three subtypes of etiology: pre-testicular, testicular, and post-testicular. Over the world, different populations report the etiology of male infertility in different ways. After urogenital infections (5%-12%), immunological causes (5%-11%), cryptorchidism (3%-17%), and sexual dysfunctions (2%-5%) (1). Millions of people in the world who are of reproductive age struggle with infertility, which also has an effect on their families and communities (2). Understanding the biological factors that influence male fertility and semen parameters will assist illuminate the underlying causes of male fertility and provide light on the significance of male infertility as a general health indicator (3). The simplest assessment of male infertility is semen analysis (SA). The World Health Organization's laboratory manual for the testing and processing of human semen serves as the current foundation for evaluating semen parameters (WHO) (4). Semen quality is a crucial indicator of the health of a man's reproductive system. Semen analysis allows for both qualitative and quantitative parameter evaluation. Low semen quality has been hypothesized to play a role in both declining fertility rates and an increase in the number of children born following the use of assisted reproductive technology. (5). By 2020 The WHO manual, Sixth Edition, is a standard manual for individuals who process and study semen to define its parameters for clinical usage or research purposes, as well as for those who are new to semen analysis (6).Therefore undergoing this study, a crucial for early diagnosis and infertility treatment.

1.2 Statement of the problem

As a medical condition that affects a couple rather than just one person, infertility is distinct from other medical conditions(7). Male infertility is the inability of a guy to successfully carry a pregnancy in a fertile female (8) .

Around 10–15% of couples worldwide experience infertility; up to 50% of these cases are brought on by male factors (9). Similar, studies indicate that a prevalent rate of 15–45% has been observed in several studies for sub-Saharan Africa (10)

Male infertility, sometimes known as subfertility, can be either total or partial. The majority of cases of infertility are brought about by an inherent testicular disease (11). It could be caused by intrinsic factors, including cancer and genetic or congenital problems. Semen quality in advance can also be impacted by modifiable lifestyle choices, such as food, exercise, comorbidities, environmental factors, and job traits (12). The possibility that Human Papilloma Virus infection could impair fertility by affecting seminal parameters is a hotly contested issue in the science of human reproduction (13).

An in-depth analysis of the semen parameters may reveal the root causes of male infertility, allowing for additional research and the right kind of treatment that addresses the underlying problems

A cross-sectional study on the pattern of semen analysis in male infertile couples at Gembi Adventist Hospital in western Ethiopia has been conducted. There are no enough studies on this subject that have been done in Ethiopia and Addis Ababa yet. To assess the factors affecting infertility as well as ensure greater generalizability, this study was conducted at chosen infertility clinics. The objective of this study is to determine the pattern of semen analysis and the associated factors that affect it. Therefore, this study tries to address gaps related to the early identification of infertility among male partners of infertile couples in Addis Ababa, Ethiopia.

1.3 Significant of the Study

Since most men with abnormal finding is treatable the study might reduce social stigma from community by identifying the real cause for infertility after semen analysis results. It helps to gain a better understand of our own fertility with sperm parameters matrices and overall health of community. It is also important for physicians move to the next steps of infertility assessment process which is to evaluate the genital tract for any abnormality.

Due to the standardization and improvement of the diagnosis and treatment of male infertility, this study may be relevant to people who are infertile and to determine whether a problem with sperm or semen quality may be the cause of infertility. Knowing the pattern of their semen analysis and associated factors can leads to early diagnosis and treatment for infertility which is achievable goal. Therefore, the current study was conducted in the aim of assessing their pattern of semen analysis. This study might use to determine prevalence of abnormal semen analysis and association among men coming for semen analysis at infertility center.

Finally, this study was also serve as a bassline for further future research direction which may provide an essential information for other study. Although there is no sufficient study on semen analysis in our country when compare to the scope of problem. This study identified the associated factors like sociodemographic, anthropometry, past urologic/ surgical factors, and one of the limitation of previous study which sample size will be calculate. Furthermore, this study was helped us to guide with baseline information for other study and contribute as a source of knowledge about infertility service.

2. Literature Review

2.1 Prevalence of Infertility

Males make about 25–30% of all cases of infertility problems (14). One crucial method for evaluating male fertility is semen quality analysis, which also serves as the main experimental foundation for the identification and management of male infertility (7). The macroscopic (volume, pH, and color) and microscopic (motility, concentration, viability, and morphology) examinations are both a part of the traditional semen analysis. It indirectly reflects the secretory activity of the accessory sex glands, epididymis, and testes (8). When there are no sperm in the ejaculate (azoospermia), sperm in a urine sample signifies retrograde ejaculation (11).

The findings of many studies indicated that 10 to 15% of couples worldwide experience infertility (10). Apparently, young males in two Nordic nations—Denmark and Finland—have inferior semen quality, with rates of 34.6% and 25%, respectively (15). A study of 23,936 potential sperm donors from China's Henan Human Sperm Bank reveals that semen quality has decreased during the previous 11 years (16). The prevalence of secondary infertility was found to be 83.7%, while the prevalence of primary infertility was 16.3%. Men from developing countries have higher rates of infertility than men from developed countries (17). Further, studies conducted in African countries such as Eritrea and Ethiopia reported that the prevalence of infertility ranged between 42 and 84% (18, 19)

2.2 Determinants of Infertility

Poor semen quality is an unknown etiology, but as spermatogenesis is a delicate physiological process, environmental variables may be important (20).

Socio-demographic (age) causes a substantial drop in semen properties like motility, shape, and vitality. Seminal quality clearly shown a considerable inclination to deteriorate with patient aging, and the percentage of oligo-astheno-teratozoospermia tended to rise with age (11). However, there is no evidence linking sperm motility and morphology to research participants' ages (9).

Genetic disorders are connected to reduced semen quality which reported that 8% of infertile males had sexual dysfunction, among 193 participants in a study carried out in and around Oakland, California, had a birth weight/gestational analysis was positively correlated with sperm concentration (12).

Additionally, those who were overweight or obese in their 20s had a higher probability of fulfilling two or three WHO subfertility criteria (13).

Although behavioral factors like quitting smoking increased sperm concentration, sperm morphology did not alter noticeably (21). Alcohol use negatively affected sperm motility and count, followed by nuclear maturity and functional integrity (22).

Multiple HPV infections were linked to hypocupremia, aberrant seminal viscosity, and negative impacts on seminal parameters in HPV-positive semen samples (23).

We found that there is a strong negative correlation between the semen volume and the practice of storing food in plastic containers (14). However, there was no correlation with morphology between urine BPA and sperm concentration and count, according to researchers. In India, an examination of papers showed difficulties that have included, To investigate any potential links between exposure to organophosphate (OP) pesticides and changes in semen parameters, the majority of research were conducted on high-risk groups (16).

Unusual sperm parameters may be caused by the high temperature alone or in combination with other risk factors, which might result in infertility (24). Low semen quality has also been connected to an increased risk of common chronic disorders (11).

2.3 Conceptual Framework

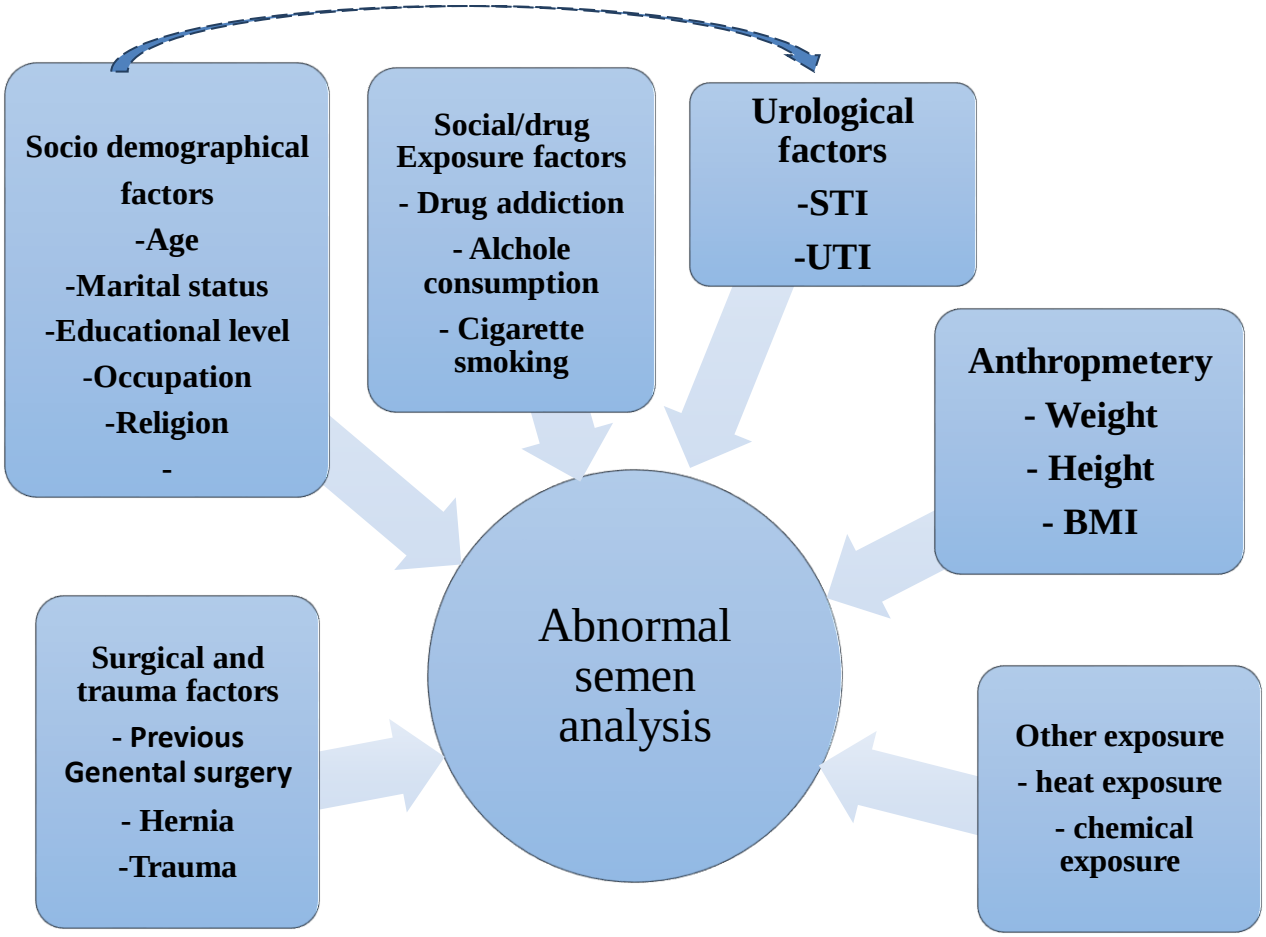

Figure 1; Conceptual frame work on determinants factors of Pattern of Semen Analysis in to infertility MCH (15, 20)

3. Objectives

3.1 General Objective

- ✓ To assess the prevalence of abnormal semen analysis and associated factors among male partner of couples who came for infertility screening in selected infertility center in Addis Ababa, Ethiopia, 2023

3.2 Specific Objective

- ✓ To determine the prevalence of abnormal semen analysis among male partner of couples who came for infertility screening in Addis Ababa, Ethiopia
- ✓ To identify associated factors among male partner of couples who came for infertility screening in Addis Ababa, Ethiopia.

4. Methodology

4.1 Study Area

This study conducted in Addis Ababa, which is the Capital city of Ethiopia. The city has divided in to 11 sub city (and 116 Woreda. Currently greater than 5.4 million people are living in Addis Ababa. The city has seven functional infertility centers from which one hospital is owned by government. This infertility services for population in the city and the surrounding districts. There are around 8,400 clients yearly in infertility centers of all the sub cities.

4.2 Study design and period

A facility based cross-sectional study was carried out among who visit for semen analysis procedure from April 1 to 15, 2023.

4.3 Source population

- ✓ All men who attending semen analysis in Addis Ababa at infertility center

4.4 Study population

- ✓ All men who attended semen analysis in randomly selected infertility center in A.A

4.5 Study unit

- ✓ Randomly selected clients who was recorded for semen analysis in selected infertility centers

4.6 Inclusion and Exclusion Criteria

4.6.1 Inclusion criteria

- ✓ Men who were complete registered at the selected infertility clinics in A.A infertility center

4.6.2 Exclusion criteria

- ✓ Incomplete registered document.

4.7 Sample size determination

- ✓ Sample size is calculated using single population proportion estimation formula with 95% confidence level & 5% marginal error (d).

$$n = \frac{[(Z\alpha/2)^2 \times P \times (1-P)]}{d^2}$$

$$n = \frac{[(1.96)^2 \times 0.84 \times (1-0.84]}{(0.05)^2 =}$$

n= 208

n= 208 A design effect of 1.5 was added and by adding 10% non-respondent rate.

The final sample size for this study will be = 343.

Where: n= the required sample size

Z= the standard normal variable corresponding to 95% CI, and it is equal to 1.96

P= 0.84 of abnormal semen analysis taken from previous study done at Wellega Adventist hospital

d^2 = level of precision (margin of error)

Table 1: Sample size for associated factors of semen analysis patterns

Factors	Proportion	Power	CL	Ratio	OR	Sample size	Reference
Alcohol consumption/ smoking habit	P1:1% P2:1 %	80%	95%	1:1	19	74	(20)
HPV infection	P1:1% P2:1%	80%	95%	1:1	0.199	148	(17)

The maximum sample size obtained from the second objectives is 148. This sample is smaller than the sample size from the first objectives which is 343. Therefore, the final sample used for this study was the sample size of the first objective, which is 343.

4.8 Sampling technique and Sampling Procedures

In Addis Ababa there are seven infertility centers which are performing semen analysis. Multi stage sampling was used for selection of infertility centers. Among them three of randomly selected infertility centers which is 30% was the study population. By using simple random lottery method selected centers participant's medical folder examined for medical and laboratory results. Finally, the allocated sample proportionally was reached at each infertility centers. Eventually, a total 344 of men was participated in this study.

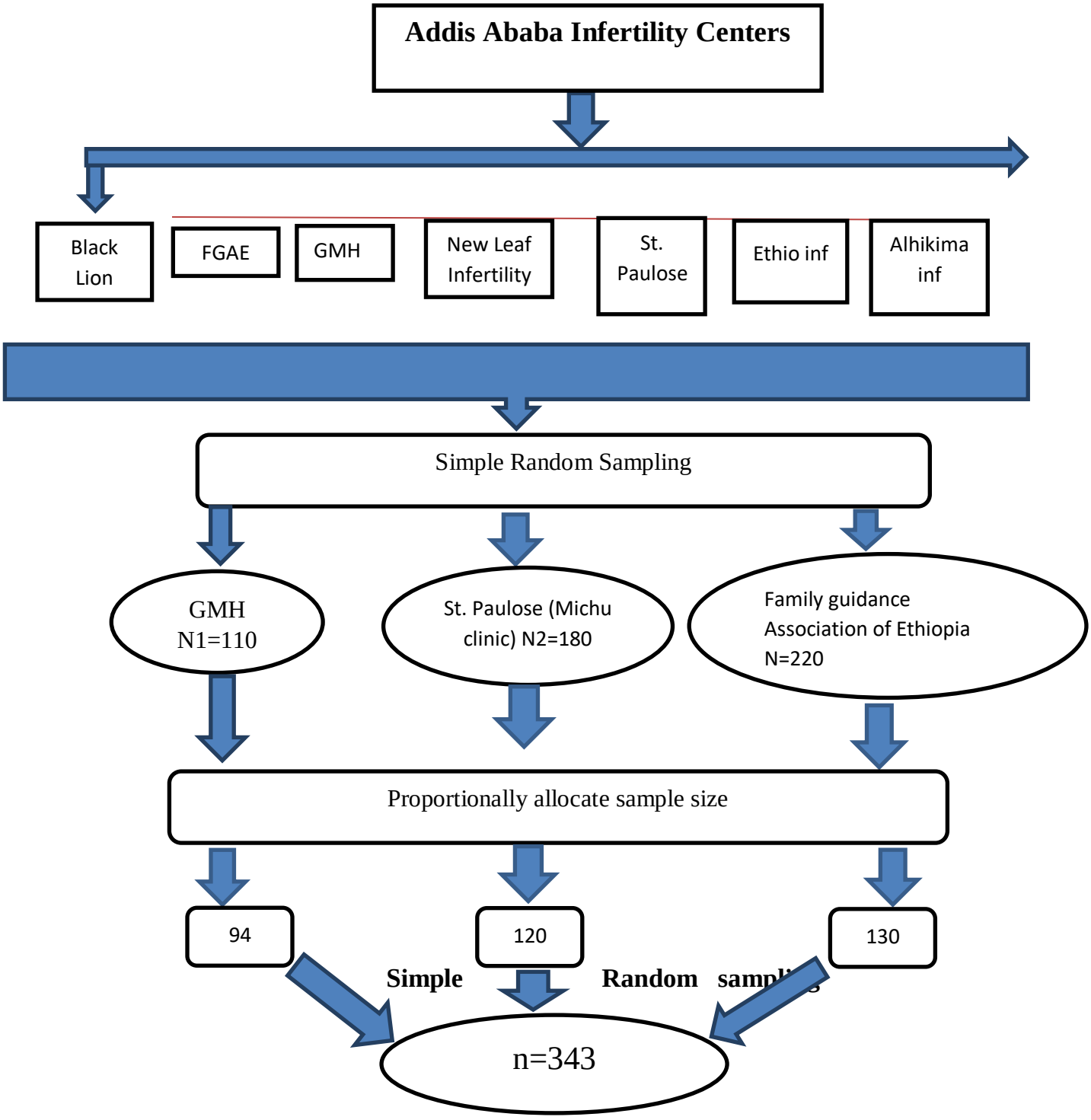

Figure 2. Schematic presentation of sampling procedure and technique of infertility centers, A.A, Ethiopia

4.9 Data collection tool and procedures

Data was collected using structured check list adapted from different literatures (18,20). Socio-demographic characteristics (age, marital status, occupation, educational status, residence, and ethnicity), past Surgical, trauma and urological history (STI, UTI, hernia, surgical and trauma history), anthropometry measurement, and Social/Drug and heat/ chemical exposures (a history of Alcohol/ drug consumption and heat and chemical exposure). The questionnaire was prepared in English version. Two well-experienced BSc Laboratory and Nurse Professionals, was recruited to supervise the data collection process. Timely supervision was under taken by the principal investigator during the data collection period. Patient card was assessed for fulfillments of questionnaire. A total of 30 semen analysis and associated factors questions were used and study participants was assessed the associated factors that affect semen analysis.

4.10 Study variable

4.10.1 Dependent variable

- ✓ Abnormal Semen analysis

4.10.2 Independent variable

- ✓ Socio-demographic characteristic (age, educational level, marital status and occupational status)
- ✓ Surgical and trauma
- ✓ Urological history (STI, UTI, surgical history and hernia)
- ✓ Social/Drug exposures (Alcohol and drug consumption)
- ✓ Anthropometry (BMI, weight and height)
- ✓ Chemical and heat exposure
- ✓ Chronic disease

4.11 Operational Definition

SA: measurements of semen volume, sperm survival rate, forward motility rate, concentration (density), morphology.

Abnormal Semen Analysis is when one of this is fulfill (25)

- ✓ Sperm motility is below 38 spermatozoa per ml -Motility
- ✓ Sperm concentration below is 1.5 spermatozoa per ml -Volume
- ✓ Total sperm number less than 15 × 106 spermatozoa per ejaculate – Sperm Count
- ✓ Abnormal form is greater than 40% - Sperm morphology

BMI: normal range if BMI > 18 Kg/m2 and <25 kg/m2, Obese if BMI ≥30 kg/m2, overweight if BMI ≥ 25 and <30 kg/m2 and underweight if BMI < 18 Kg/m2

Normospermia: sperm count of 15 million per milliliter and above.

Oligospermia: sperm count of below 1.5 million per milliliter.

Azoospermia: absence of spermatozoa in the ejaculate.

Asthenospermia: reduced sperm motility - <38%.

Oligo-astheno-teratozoospermia (OAT): all variables are abnormal

Teratozoospermia: reduced sperm morphology- <40 %.

- ✓ It is interesting to note that men who had scores at least one of the abnormal finding, was labeled as abnormal semen analysis.

4.12 Data processing and analysis

Data was entered in to google forms and exported to SPSS version 26. Most of the responses to the structured questionnaire was analyzed descriptively, as table, chart, and graphs. Descriptive data was analyzed by frequency for categorical and standard deviation for continuous variable. Binary logistic regression analysis was performed on the independent variable and the dependent variable. In order to investigate the association of independent variable with dependent variable both bi variable and multivariable analysis were used. The relation of each independent variable with dependent variable if $p< 0.25$, I was considered as multivariable.

Then multivariable p<0.05 with 95% logistic regression model to control for potential confounders and to identify significant factors associated with outcome variable.

The candidate variables were entered into multivariable logistic regression model using Enter method to get significant and insignificant variables in the model. Variables causing multicollinearity problems will be removed until a simple model with main predictors was obtained. Adequacy of the model to fit the outcome variable with the predictors was checked using Hosmer and Leme show test for goodness of fit. Finally, adjusted odds ratio (AOR) along with 95% confidence interval was estimated to assess the strength of the association & a P-value < 0.05 was considered to declare the statistical significance in the multivariable analysis in this study.

4.13 Data quality control

Tools for data collection that are properly designed was created by adapt different literatures. Data collectors and the supervisor was each receive two days of training in order to preserve the quality of the data. Maintain the quality of the data, supervision was done daily for consistency and completeness by the supervisors and the primary investigator to verify.

4.14 Ethical consideration

The Debre Berhan University Research Ethics Review Committee was requested for ethical approval letter and was provided to the MCH center.

The MCH center was made aware of the study's goals, and permission were sought to access patient records and the laboratory register. All procedures carried out in compliance with the applicable rules and regulations.

4.15 Result Dissemination

The finding of the study will be presented to Debre berhan University, Asrat woldeyes health science campus, school of public health, department of public health. The findings of this will be shared to Addis Ababa Health Bureau and to other stakeholders who may need it, and attempts will be made to publish in a peer-reviewed scientific journal

5. Result

5.1 Socio-demographic characteristics

The response rate for this study was 99.1% (3 missed data omitted). The overall mean age of men who attended at health facilities was 38.2 ± 7.4 ranges from 20 to 60 years. Coming with all respondents who attended at health facilities, most of them 172(50.6%) were grouped under 30-40 age group. Regards with marital status of respondent's more than three fourth of men which is 316 (92.9%) are married. Regards with men BMI more than two third of the respondent 258(75.9%), were in normal range.

Table 2. Socio-demographic Characteristics among men who attained at infertility centers in Addis Ababa, 2022

Variable	**Categories**		
		frequency	***Percent (%)***
1. Age group of the participants			
	<30	57	16.8
	30-40	172	50.6
	41-60	111	32.6
2. Marital **S**tatus	✓ Married	316	92.9
3. Education status			
	✓ Unable to read and write	1	3
	✓ Read and write	17	5
	✓ Diploma	103	30.3
	✓ Degree	102	30
	✓ Masters	22	6.5
	PhD and above	94	27.6
4. Religion			
	✓ Orthodox	120	35.3
	✓ Muslim	138	40.6
	✓ Protestant	63	18.5
	✓ Catholic	8	2.4
	✓ Other	11	3.2
5. BMI	✓ 18-25	258	75.9
	✓ >25	82	24.1

5.2 Social/Drug Exposure factors among who attained at infertility centers in Addis Ababa, 2022

Regards with previous history of smoking cigarettes, among the respondents 51 (15%) of them had history. Among those who had previous history, the majority of participants 293(86.2%) were considered as non-smoker.

Regards with marijuana user, among participants of the study (n=343), most of them 336(98%) had no history of consumption of marijuana. Among those who had history, only 3(0.9%) were categorized as marijuana user.

Most participants of the study (n=343), 251(73.8%) had history of drinking alcohol beverage. From those above of them 251(73.8%) used to be non-alcoholic. And also related to chat chewing, most 274(80.6%) were not chewing history (n=343)

Table 3. Social/Drug Exposure factors among men who attained at infertility centers in Addis Ababa, 2022

Variable	Category	Frequency	Percent (%)
History of smoking	Yes	51	15
	NO	288	84.7
Number of packs/week?	non smoker	293	86.2
	Smoker	47	13.8
History of marijuana use?	Yes	3	0.9
	NO	336	98
How often and how recently?	User	3	0.9
	Non-user	337	99.3
History drink alcoholic beverage?	Yes	87	25.6
	No	251	73.8
Number of drinks (beers, glasses of wine, tumblers, etc.) per a week	Alcoholic	72	21.2
	Non alcoholic	268	78.8
History chat chewing?	Yes	62	18.2
	No	274	80.6

5.3 Surgical, trauma and urological factors

Considering with operation on urinary tract including the bladder and prostate were counted (n=340), 16 (4.7%). 41(12.1%) of Men were treated for sexually transmitted infection history. From the above treated sexual transmitted, majority of the cause were gonorrhea 22(52%).

The history of trauma which accounts 93(27.4%). Among total reviewed chart (n=340), 149(43.8%) had history of urinary tract infection.

Table 4. Surgical, trauma and urological factors of men who attained infertility centers in Addis Ababa health facilities 2022

Variable	Category	Frequency	Percent (%)
History of operations on the urinary tract, including the bladder or prostate?	Yes	16	4.7
	No	322	94.7
History of treated for a sexually transmitted infection?	Yes	41	12.1
	No	299	87.9
If yes, what infection	Gonorrhea	22	52
	Chlamydia	14	4.1
	Syphilis	4	1.2
History of trauma?	Yes	93	27.4
	No	245	72.1
History of UTI/Urinary Tract Infection	Yes	149	43.8
	No	190	55.9

5.4 Chemical and heat exposure

Moreover, the following table 4 describes the history of chemical and extensive heat exposure from total documents review were declare that 27(7.9%) and 16 (4.7%) had history respectively.

Table 5. Chemical and heat exposure among men who attained at infertility centers in Addis Ababa, 2022

Variable	Category	Frequency	Percent (%)
History of chemical exposure	Yes	27	7.9
	No	308	90.6
History of an extensive heat exposure	Yes	16	4.7
	No	321	94.4

5.5 Chronic disease history

This stated that among 340 reviewed data, 28 (8.2%) result had known chronic disease and from those 21(6.2%) were hypertensive clients. While 7 (2.1%) were had history of diabetes mellitus.

Table 6. Chronic disease history among who attained at infertility centers in Addis Ababa, 2022

Variable	Category	Frequency	Percent (%)
History of chronic disease?	Yes	28	8.2
	No	311	91.5
If yes, mention what disease?	Diabetes mellitus	7	2.1
	Hypertension	21	6.2

5.16 patterns of semen analysis among men who attained at infertility centers in Addis Ababa, 2022

Among men who attended at infertility center, 340 respondents, 191(56.2%) and 147(43.2%) were grouped under azoospermia and theratozospermia, respectively. Whereas others, 75(22.1%) and 149 (43.8%) grouped under oligozospermia and asthenozospermia.

Table 7. Pattern of semen analysis among men who attained at infertility centers in Addis Ababa, 2022

Category	Frequency	Percent (%)
Oligozospermia	75	22.1
Asthenospermia	149	43.8
Theratozospermia	147	43.2
Azoospermia	191	56.2

- ✓ From the above abnormalities multiple responses are considered here

5.7 Prevalence of Pattern of semen analysis among men who attained at infertility centers in Addis Ababa, 2022

The prevalence of abnormal pattern of semen analysis among men who comes for semen analysis their last 6 months in health facilities were 68%, CI [63.2- 73.5].

Table 8. Prevalence of pattern of semen analysis among male partners of infertile couple who attained at health facilities in Addis Ababa, Ethiopia 2022

Prevalence of semen analysis	Total men attended at health facilities (n=343)u	
	F	***%***
Normal	108	31.8
Abnormal	232	68.2
Total	340	100

5.8 Factors Associated with abnormal semen analysis among Men partners of couples who attend at infertility centers

On the final model, which is described below in table 9, variables with p-values of less than 0.25 in the bi variable logistic regression analysis were included to control for potential confounders.

Variable	Abnormal	Normal	Category	Crude OR	Adjusted OR
1. Age group					
	✓ 32	✓ 25	✓ <30	1	1
	✓ 117	✓ 55	✓ 30-40	1.6(0.9,3)*	2(0.6,6.7)
	✓ 83	✓ 28	✓ 41-60	2.4(1.2,4.7)*	1.2(0.3,3.8)
2. Educational status					
	✓ 87	✓ 37	✓ Unable to read and write	1	1
	✓ 42	✓ 31	✓ Read and write	2.1(0.8, 4.9)*	2(0.6,6.7)
	✓ 1	✓ 0	✓ Diploma	1.9(0.8, 4.9)	0.7(0.2, 2.5)
	✓ 70	✓ 24	✓ Degree	1.7(0.5, 6.2)*	0.8(0.17)
	✓ 11	✓ 6	✓ Masters	0.7(0.3, 2.2)	0.5(0.19, 0.6)
	✓ 20	✓ 10	✓ PhD and above	1.1(0.4, 2.7)	1.18(0.3, 4.1)
3. BMI					
	✓ 166	✓ 92	✓ 18-25	1	1
	✓ 66	✓ 16	✓ >25	0.43(0.23,0.79)*	0.3, 1.06
4. History of smoking cigarette					
	✓ 185	✓ 103	✓ No	1	1
	✓ 46	✓ 5	✓ Yes	0.19(0.75,0.51)*	0.8(0.09, 7.5)
5. How many packs/ week					
	✓ 43	✓ 4	✓ Smoker	1	1
	✓ 189	✓ 104	✓ Non-Smoker	0.16(0.59, 0.48)*	0.175(0.06, 0.5)*
6. History of alcohol drinking					
	✓ 155	✓ 10	✓ No	1	1
	✓ 77	✓ 77	✓ Yes	2.1(0.11, 0.43)*	0.2(0.5, 1.1)
7. How many?					

	✓ 14	✓ 2	✓ Non-Alcoholic	1	1
	✓ 63	✓ 9	✓ Alcoholic	0.23(0.12, 0.48)*	0.8(0.13, 4.9)
8. Chat chewing history					
	✓ 181	✓ 93	✓ No	1	1
	✓ 48	✓ 14	✓ Yes	0.56(0.29, 1.08)*	1(0.4, 2.3)
9. Operation history					
	✓ 215	✓ 107	✓ No	1	
	✓ 15	✓ 1	✓ Yes	0.134(0.17, 1.02)*	0.2(0.03, 1.8)
10. If yes, what infection					
	✓ 10	✓ 330	✓ No infection	1	1
	✓ 4	✓	✓ Syphilis	8.1(0.7, 55)	5.9(0.02,2.4)
	✓ 22	✓	✓ Gonorrhea	6.5(0.67, 63)*	0.08(0.12, 0,16)*
	✓ 14	✓	✓ Chlamydia	7.5(0.59, 95)*	0.4(0.74, 2.5)
11. Have you had trauma history at groin area?					
	✓ 229	✓ 101	✓ No	1	1
	✓ 10	✓ 7	✓ Yes	0.49(0.28, 0.9)*	0.45(0.3.0.9)
12. Have you ever had UTI/Urinary Tract Infection					
	✓ 118	✓ 72	✓ No	1	1
	✓ 113	✓ 36	✓ Yes	0.52(0.324,0.84)*	0.47(0.25, 0.88)*

13. Have you had any chemical exposure					
	✓ 204	✓ 102	✓ No		
	✓ 23	✓ 6	✓ Yes	0.34(0.115,1.012)*	0.5(0.1, 1.9)

Table 8 depicted that the inferential statistics of the dependent variable semen analysis and socio-demographic, surgical, trauma and social support related variables on men who attend at infertility centers. From the total of 11 predictor variables, only 3 variables have significantly associated with the outcome variable at (95% CI, $p<0.05$). Among the socio-demographic variables, age, education level, and BMI were entered to the bi variable analysis with [95% CI]. Among those variables, ($p<0.25$) were used for multivariate logistic regression.

Binary logistic regression result revealed that, non-smokers 82% times less likely to have abnormal semen analysis result as compared to smoker one.

Table 9. Factors Associated with SA among Men who attend at infertility centers in Addis Ababa, 2022.

*significant at ($p<0.05$), **significant at ($p<=0.001$)

6. Discussion

6.1 Prevalence of pattern of Semen Analysis

The aim of this study was to assess the prevalence and associated factors of semen analysis among infertile men who attained in Addis Ababa city infertility centers. The overall prevalence of abnormal semen analysis among male partners at Addis Ababa city (n=343) was 68%.

The overall prevalence of abnormal semen analysis was lower compare with study conducted at Wellega, Gimbi town 84% (8). However, the reports of the current study were found to be higher compared to studies done in Gujarati (India) 46 %, Nigeria 38.2% (26), Eretria 43% (27). The difference prevalence might be due to life style difference between the countries and the cities.

6.1 Social/Drug Exposure factors

This study revealed that there were statistical significant association between cigarette smoking and abnormal semen analysis 340(13.8%) of participant felt that poor semen analysis finding. This strongly supported by study conducted in Turkey, Ankara which is stated that while the proportion of oligozoospermic patients decreased significantly from 70.8% to 54.2% (13). After smoking cession of the respondents. Possible justification may be in this study majority of the respondents were cession of smoking at the time of this study.

6.2 Surgical, trauma and urological factors

The statistical analysis result indicated that history of sexually transmitted infections were significantly associated with semen analysis (N=340, $p<0.05$). Among them, those who had history of gonorrhea infection were 0.08 times more likely to develop abnormal semen analysis. This finding was supported by the study conducted in Maringa, Brazil (9).

For the overall sample respondents (N=340) in the study included by the sampling procedure, the multivariate logistic regression result revealed that men with history of urinary tract infection had 0.47 times more likely to develop abnormal semen analysis, which supported by study in India (28).

7. Conclusion

The study was conducted to assess the prevalence and associated factors of pattern of semen analysis and associated factors among male partner of infertile couples in the last six months at Addis Ababa city infertility centers. Accordingly, the prevalence of pattern of semen analysis was 68.2%. There is a growing trend of infertility in Ethiopia. This refers to that abnormal semen analysis was prevalent in our country.

About behavioral factors of men those who had smoking history were significantly associated with abnormal semen analysis.

Whereas for urological factors for semen analysis, those who had history of urinary tract infection is significantly associated with abnormal semen analysis. Beside this, men who had history of sexual transmission infection were associated with abnormal semen analysis.

8. Recommendations

Based on the finding of the study, the following recommendations are listed below

- ✓ Addis Ababa and Sub city health bureau should give Public enlightenment on STI prevention and management
- ✓ Health facilities should be couple presentation for evaluation of STI.
- ✓ Other stack holders should strength youth centers SRH service providers by giving training and concern in male infertility
- ✓ prompt treatment of sexually transmitted infection
- ✓ social media should act on life style modification, adverse outcome of smoking habit
- ✓ Health facilities Early identification and treatment of UTI
- ✓ Government should concern in male infertility as public problem

9. STRENGTH AND LIMITATION

9.1. STRENGTH

- This study tries to address almost 50% of study area.
- This study used both qualitative and quantitative data collection method.

9.2. LIMITATION

- The study did not include other stakeholders within the health system including Addis Ababa Health bureau and sub city health bureau managers.

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