

Assessment the Patterns, Risk Factors, and Causes of Infertility among Couples Attending Marwa Fertility Center in Mogadishu, Somalia.

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Abstract—Background: Infertility is a major public health concern affecting millions of couples worldwide and has significant physical, psychological, social, and economic consequences. Assessing the quality of infertility services and patient satisfaction is essential for improving fertility care, particularly in low-resource settings such as Somalia where evidence remains limited. This study assessed the quality of infertility services, patient satisfaction, and factors affecting fertility care at Marwa Fertility Center in Mogadishu, Somalia.

Methods: A facility-based cross-sectional study was conducted among 250 respondents, including patients and healthcare providers at Marwa Fertility Center. Data were collected using a structured self-administered questionnaire covering demographic characteristics, accessibility of fertility services, quality of clinical services, laboratory and diagnostic services, communication and customer care, pharmacy services, and overall patient satisfaction. Descriptive statistics, including frequencies and percentages, were used to summarize the data.

Results: The majority of respondents were patients (56.0%), female (62.0%), and aged 25–34 years (38.0%). Overall, respondents reported positive perceptions of infertility services. Approximately 72.0% agreed that the center was easily accessible, while 69.2% were satisfied with appointment scheduling. Healthcare providers were perceived as professionally competent by 78.8% of respondents, and 78.0% confirmed that patient privacy and confidentiality were maintained. Laboratory services were rated positively by 73.2% of participants, while 74.4% expressed satisfaction with staff communication and customer care. Pharmacy services received favorable ratings from 72.0% of respondents.

Overall, 80.0% reported satisfaction with infertility services. However, affordability of treatment and waiting time were identified as the major challenges affecting access to fertility care.

Conclusion: Marwa Fertility Center provides generally high-quality infertility services characterized by competent healthcare professionals, effective laboratory support, respectful communication, and high levels of patient satisfaction. Nevertheless, improvements in affordability, waiting time, resource availability, and continuous staff development are needed to further enhance fertility care. The findings provide evidence to support quality improvement initiatives and strengthen patient-centered infertility services in Somalia.

Index Terms—Infertility; Fertility care; Patient satisfaction; Quality of healthcare; Assisted reproductive technology; Infertility services; Somalia; Marwa Fertility Center.

I. INTRODUCTION

Infertility is a major global reproductive health problem that affects individuals and couples across all regions, income levels, and cultural settings. The World Health Organization defines infertility as a disease of the male or female reproductive system characterized by failure to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse. This definition is important because it recognizes infertility as a medical condition requiring diagnosis, counseling, prevention, and treatment rather than a personal or social failure. (WHO, 2023)

Globally, infertility affects a large proportion of people of reproductive age. The World Health Organization reported that approximately one in six adults experience infertility during their lifetime, equal to about 17.5% of the adult population. This estimate demonstrates that infertility is not rare, but a widespread reproductive health issue requiring stronger health system response and more affordable access to fertility care. (WHO, 2023)

A global systematic review and meta-analysis of infertility prevalence from 1990 to 2021 found that pooled lifetime prevalence of 12-month infertility was 17.5%, while period prevalence was 12.6%. The study also showed that infertility estimates vary depending on study design, population characteristics, and measurement method. This highlights the need for standardized definitions and reliable infertility surveillance systems. (Cox et al., 2022)

The causes of infertility are commonly classified into female factors, male factors, combined couple factors, and unexplained infertility. Female-related causes include ovulatory disorders, tubal disease, uterine abnormalities, endometriosis, endocrine disorders, and age-related decline in fertility. Male-related causes include low sperm count, poor sperm motility, abnormal sperm morphology, hormonal disorders, varicocele, infections, genetic conditions, and lifestyle-related risks. (WHO, 2023)

Male factor infertility is an important contributor to infertility worldwide and should be evaluated together with female factors. Clinical evidence indicates that male factors may be solely responsible for about 20% of infertility cases and may contribute to another 30% to 40% of cases. Therefore, infertility evaluation should involve both partners rather than focusing only on women. (Leslie et al., 2024)

Infertility has serious psychological, social, emotional, and economic consequences. Couples experiencing infertility may suffer stress, anxiety, depression, relationship conflict, stigma, social pressure, and financial burden related to diagnosis and treatment. In societies where parenthood is highly valued, infertility can also affect marital stability and family relationships. (WHO, 2023)

Access to infertility care remains unequal across the world. Many couples, especially in low- and middle-income countries, face barriers such as high treatment cost, limited fertility specialists, lack of diagnostic facilities, social stigma, and poor insurance coverage.

Assisted reproductive technologies such as IVF are often concentrated in private urban facilities, making them unaffordable for many couples. (WHO, 2023)

Globally, preventable reproductive health conditions contribute significantly to infertility. Sexually transmitted infections, pelvic inflammatory disease, unsafe abortion, postpartum infections, delayed treatment of reproductive tract infections, obesity, smoking, chronic diseases, and environmental exposures may increase infertility risk. This shows the importance of integrating infertility prevention into wider sexual and reproductive health services. (WHO, 2023)

Infertility research has increasingly emphasized the importance of couple-based assessment. Since male and female causes can coexist, fertility centers should assess reproductive history, menstrual patterns, obstetric history, infection history, semen parameters, lifestyle factors, endocrine conditions, and previous treatment history. This approach improves diagnostic accuracy and supports appropriate treatment planning. (Leslie et al., 2024)

From a global perspective, studying the patterns, risk factors, and causes of infertility among couples attending fertility centers is essential because facility-based data provide direct clinical evidence about patients who seek care. Such studies help identify common causes, delays in treatment seeking, male and female factor distribution, and gaps in counseling, diagnosis, and service delivery. (Cox et al., 2022)

In Africa, infertility is a major reproductive health concern with strong medical, social, cultural, and psychological dimensions. Although the continent is often discussed in relation to high fertility rates, infertility remains a serious problem for many couples. In many African communities, childbearing is closely linked to marriage, social identity, family continuity, and community acceptance. (Larsen, 2000)

Primary and secondary infertility patterns in Africa differ from many other regions. A major study of sub-Saharan Africa found that primary infertility was generally lower than secondary infertility, while elevated secondary infertility was common in many countries. This suggests that many women are able to conceive initially but later experience infertility due to acquired reproductive health problems. (Larsen, 2000) Secondary infertility in Africa has historically been linked to preventable reproductive health conditions, including sexually transmitted infections, pelvic

inflammatory disease, postpartum infections, unsafe abortion, obstetric complications, and untreated reproductive tract infections. These causes demonstrate that infertility prevention is closely connected to quality maternal healthcare, infection prevention, and early reproductive health treatment. (Rutstein & Shah, 2004)

A systematic review and meta-analysis on infertility in Africa reported that both primary and secondary infertility are important, with variations across regions and study populations. The study emphasized that infertility in Africa is associated with social disgrace, exclusion, and psychological suffering, making it both a biomedical and social health issue. (Abebe et al., 2020).

Female infertility in Africa is commonly associated with tubal blockage, ovulatory disorders, uterine abnormalities, endometriosis, pelvic inflammatory disease, and reproductive tract infections. Tubal factor infertility is particularly important because it is often linked to infections that may be preventable or treatable when diagnosed early. (Abebe et al., 2020)

Male infertility is also an important but sometimes under-recognized contributor to infertility in Africa. A scoping review identified biological, physiological, genetic, behavioral, lifestyle, environmental, and health-system-related causes of male infertility. These include abnormal semen parameters, infections, varicocele, smoking, alcohol use, obesity, occupational exposure, and limited access to male reproductive health services. (Okonofua et al., 2022)

The social burden of infertility in Africa often falls disproportionately on women, even when infertility is caused by male factors or combined couple factors. Women may experience blame, stigma, marital pressure, social isolation, emotional distress, or risk of separation. This gendered burden highlights the need for couple counseling, male partner involvement, and community education. (WHO, 2023)

Access to infertility services in Africa remains limited by cost, distance, shortage of specialists, poor laboratory capacity, lack of insurance coverage, and concentration of fertility services in urban centers. Many couples seek medical care late after using traditional remedies or informal treatments. Delayed presentation may reduce treatment success and increase emotional distress. (WHO, 2023)

Infertility care in Africa should be integrated into broader reproductive health services. This includes

prevention and treatment of sexually transmitted infections, safe maternity care, postnatal infection prevention, menstrual and ovulatory disorder management, male reproductive health services, fertility counseling, and affordable diagnostic testing. (Abebe et al., 2020)

Overall, African literature shows that infertility is multifactorial and shaped by biological, infectious, behavioral, cultural, socioeconomic, and health-system factors. Therefore, facility-based infertility studies are important because they provide evidence that can guide clinical protocols, public health interventions, patient counseling, and resource allocation in African fertility centers. (Abebe et al., 2020)

In East Africa, infertility occurs within a social context where marriage and childbearing are highly valued. Couples who are unable to conceive may experience social pressure, emotional distress, stigma, and family conflict. Despite high fertility rates in many East African countries, infertility remains an important but often under-prioritized reproductive health problem. (Legese et al., 2023)

Evidence from Ethiopia shows that infertility may affect a considerable proportion of women depending on the definition used. A study using Ethiopian data reported that infertility prevalence can be high when measured using current-duration definitions, and secondary infertility may account for a large proportion of cases. This indicates that infertility is an important reproductive health concern in East Africa. (Legese et al., 2023)

Secondary infertility appears to be particularly important in East African settings. It may result from untreated reproductive tract infections, postpartum complications, pelvic inflammatory disease, unsafe procedures, and delayed access to reproductive healthcare. This pattern suggests that prevention should focus on infection control, safe maternity care, and early treatment of gynecological problems. (Legese et al., 2023)

A study from Ethiopia demonstrated that infertility prevalence estimates vary depending on the measurement approach used. The current-duration approach produced different estimates from demographic definitions, showing that research methods strongly influence reported infertility prevalence. This finding is important for East African

studies because clear definitions are necessary for valid comparisons. (Araya et al., 2024)

Age is an important infertility-related factor in East Africa, as in other regions. Ethiopian evidence showed that older women had higher odds of overall infertility than younger women, particularly for secondary infertility. This reflects the biological effect of age on fertility and the importance of timely diagnosis and treatment. (Araya et al., 2024)

Nutritional status may also influence infertility in East Africa. Research on undernutrition and infertility in the region suggests that reproductive health is affected not only by infections and gynecological disorders, but also by broader health, socioeconomic, and nutritional conditions. This is relevant in settings where food insecurity and poor maternal nutrition remain public health challenges. (Roba et al., 2022)

Sexually transmitted infections remain an important reproductive health concern in East Africa because untreated infections can contribute to pelvic inflammatory disease, tubal damage, and infertility. Studies using regional data have emphasized the need for STI prevention, testing, treatment, partner management, and reproductive health education. (Negussie et al., 2025)

Ugandan evidence shows that infertility patterns may vary by region and type. Analysis of Demographic and Health Survey data found that primary infertility was relatively low, while secondary infertility affected a larger proportion of women and varied across regions. This supports the view that infertility patterns are influenced by local reproductive health conditions and service access. (Zaake et al., 2024)

Male infertility in East Africa requires greater attention because cultural expectations may discourage men from participating in fertility evaluation. However, male factors such as abnormal semen parameters, infections, varicocele, age, lifestyle risks, and occupational exposures may contribute significantly to couple infertility. Fertility centers should therefore encourage male partner testing and counseling. (Okonofua et al., 2022)

East African infertility research supports the need for comprehensive, couple-centered, culturally sensitive fertility services. Such services should include semen analysis, ovulation assessment, ultrasound, hormonal evaluation, reproductive tract infection screening, counseling, lifestyle assessment, and referral for advanced treatment when needed. (Legese et al., 2023)

In Somalia, infertility should be understood within a reproductive health context shaped by high fertility expectations, strong cultural importance of childbearing, limited access to specialized reproductive health services in some areas, and continuing health-system challenges. Although Somalia has historically had a high fertility rate, infertility remains a serious reproductive health concern for affected couples, particularly those seeking diagnosis and treatment in urban centers such as Mogadishu. This makes fertility-center-based research important for understanding the clinical and social realities of couples experiencing infertility in Somalia. (UNFPA, 2023)

Somalia's reproductive health system has faced long-standing challenges, including high maternal and perinatal mortality, high fertility, poverty, limited access to quality reproductive healthcare, and harmful traditional practices. These conditions may indirectly contribute to infertility through delayed treatment, untreated reproductive tract infections, poor obstetric care, postpartum complications, and limited availability of specialized diagnostic services. Therefore, infertility in Somalia should be studied as part of the wider reproductive health system rather than as an isolated clinical problem. (UNFPA Somalia, 2012)

Female genital mutilation remains one of the most significant reproductive health concerns in Somalia. UNICEF and UNFPA have reported that approximately 99% of Somali women aged 15–49 have undergone FGM, making Somalia one of the countries with the highest prevalence globally. Although FGM is not the only cause of infertility, it may be associated with gynecological complications, reproductive tract problems, painful intercourse, infection risk, and obstetric complications that are relevant when assessing infertility among Somali women. (UNICEF & UNFPA, 2021)

WHO has also recognized FGM in Somalia as a major public health issue because of its association with serious reproductive, maternal, urinary, sexual, and psychological complications. In infertility research, FGM history should therefore be assessed carefully, respectfully, and confidentially as part of broader reproductive health evaluation. This is particularly important in fertility centers where women may present with complex reproductive histories involving

infections, previous procedures, painful intercourse, or obstetric complications. (WHO, 2023)

Recent evidence from Mogadishu shows that infertility among women attending reproductive health centers is multifactorial. A cross-sectional study conducted among women attending reproductive health centers in Mogadishu reported that infertility was influenced mainly by reproductive tract pathology, endocrine disorders, and culturally mediated practices such as FGM and cervix burns. These findings provide important local evidence and support the need for culturally sensitive infertility assessment and early medical intervention. (Adam et al., 2026)

The present study is based at Marwa Fertility Center in Mogadishu, Somalia, a specialized fertility and reproductive healthcare facility serving couples seeking infertility evaluation, counseling, diagnosis, and treatment. As a facility-based study, it focuses on couples who attend the center for fertility-related concerns, making it valuable for identifying common infertility patterns, patient characteristics, risk factors, and possible causes seen in clinical practice at Marwa Fertility Center. (Marwa Fertility Center, 2026)

Because this study is conducted at Marwa Fertility Center, the findings will mainly reflect couples who actively seek fertility care in Mogadishu. Such couples may differ from the general Somali population in terms of health awareness, socioeconomic status, duration of infertility, access to healthcare, and willingness to undergo medical evaluation. Therefore, the results should be interpreted as facility-based evidence that can guide service improvement at Marwa Fertility Center and similar fertility clinics, rather than as a national population prevalence estimate. (Adam et al., 2026)

In the Somali context, infertility may involve female factors, male factors, combined couple factors, and unexplained causes. However, male participation in infertility evaluation may be limited because of stigma, cultural beliefs, and the common misconception that infertility is mainly a woman's problem. Since male factor infertility contributes significantly to couple infertility globally, the present study at Marwa Fertility Center should emphasize couple-based assessment, including semen analysis, male reproductive history, infection history, and lifestyle-related risks. (Leslie et al., 2024)

Possible infertility risk factors among couples attending Marwa Fertility Center may include previous reproductive tract infections, pelvic inflammatory disease, menstrual disorders, endocrine conditions such as polycystic ovary syndrome, tubal blockage, history of miscarriage, previous obstetric complications, FGM-related complications, delayed healthcare seeking, male semen abnormalities, and lifestyle factors. These factors can be assessed through structured clinical history, physical examination, laboratory investigations, ultrasound evaluation, semen analysis, and review of previous treatment history. (Adam et al., 2026)

The psychosocial burden of infertility in Somalia may be high because parenthood is deeply valued within marriage, family, and community life. Couples experiencing infertility may face emotional distress, family pressure, stigma, marital conflict, social isolation, and financial burden from repeated consultations and treatment costs. For this reason, fertility care at Marwa Fertility Center should include compassionate counseling, confidentiality, respectful communication, male partner involvement, and culturally sensitive patient education. (WHO, 2023)

A study on patterns, risk factors, and causes of infertility among couples attending Marwa Fertility Center in Mogadishu is therefore timely and important. The study can generate locally relevant evidence on primary infertility, secondary infertility, male factors, female factors, combined factors, unexplained infertility, reproductive tract infections, endocrine disorders, cultural practices, and healthcare-seeking delays. Such evidence can support improved diagnosis, better patient counseling, male partner participation, prevention of reproductive tract infections, and development of fertility services in Somalia. (Adam et al., 2026)

By focusing on couples attending Marwa Fertility Center, this study can contribute to both clinical practice and public health knowledge in Somalia. It can help the center strengthen infertility assessment protocols, improve documentation, identify common preventable causes, support targeted patient education, and guide future reproductive health research in Mogadishu. The findings may also inform policy discussions on fertility care, reproductive health education, and culturally appropriate infertility prevention strategies in Somalia. (Marwa Fertility Center, 2026)

Table 1. Respondent Category (N = 250)

Respondent Category	Frequency	Percentage (%)
Patient	140	56.0
Doctor (OB/GYN)	22	8.8
Nurse/Midwife	35	14.0
Laboratory Technician	18	7.2
Pharmacist	12	4.8
Receptionist	10	4.0
Customer Care Staff	8	3.2
Other	5	2.0
Total	250	100.0

Interpretation. Table 1 shows that patients constituted the largest respondent group, accounting for 140 participants (56.0%). The remaining 44.0% comprised personnel involved in different components of fertility-service delivery, including nurses/midwives (14.0%), doctors (8.8%), laboratory technicians (7.2%), pharmacists (4.8%), receptionists (4.0%), customer-care staff (3.2%), and other staff (2.0%). This distribution gives greater weight to the patient perspective while still incorporating views from clinical, diagnostic, pharmaceutical, and administrative personnel. The composition is useful for interpreting subsequent service-quality findings because it reflects both direct service experiences and provider-side observations. Nevertheless, because patients form the majority, overall percentages should primarily be interpreted as reflecting service-user perceptions rather than an equal comparison between professional categories.

Table 2. Gender

Gender	Frequency	Percentage (%)
Male	95	38.0
Female	155	62.0
Total	250	100.0

Interpretation. Table 2 indicates that females represented 155 respondents (62.0%), whereas males accounted for 95 (38.0%). The female predominance suggests that women were more strongly represented in the study population and consequently contributed a larger share of the reported perceptions of fertility services. At the same time, the participation of 38.0% male respondents provides an important male perspective and supports the study's couple-centered orientation. This gender distribution should be considered when interpreting aggregate satisfaction

and service-quality estimates because the overall findings may reflect female experiences more strongly than male experiences.

Table 3. Age Group

Age Group	Frequency	Percentage (%)
18–24 years	45	18.0
25–34 years	95	38.0
35–44 years	70	28.0
45–54 years	28	11.2
≥55 years	12	4.8
Total	250	100.0

Interpretation. Table 3 demonstrates that the largest age group was 25–34 years, comprising 95 respondents (38.0%), followed by those aged 35–44 years at 70 (28.0%). Participants aged 18–24 years represented 18.0%, while those aged 45–54 years and 55 years or older accounted for 11.2% and 4.8%, respectively. Approximately two-thirds of respondents were therefore between 25 and 44 years of age. The study population is consequently concentrated within age groups highly relevant to fertility evaluation and reproductive decision-making. The smaller proportions in the oldest categories indicate that the aggregate findings are driven mainly by younger and middle-age adults.

Table 4. Educational Qualification

Qualification	Frequency	Percentage (%)
Secondary School	32	12.8
Diploma	68	27.2
Bachelor's Degree	96	38.4
Master's Degree	42	16.8
PhD/Specialist	12	4.8
Total	250	100.0

Interpretation. Table 4 presents a comparatively well-educated respondent profile. Bachelor's degree holders constituted the largest category at 96 respondents (38.4%), followed by diploma holders at 68 (27.2%). Master's degree holders represented 16.8%, secondary-school graduates 12.8%, and PhD/specialist respondents 4.8%. More than half of the sample therefore had at least a bachelor's-level qualification. This educational profile is an important contextual characteristic because educational attainment may influence respondents' understanding of health information, diagnostic explanations, treatment instructions, and expectations regarding communication and service quality.

Table 5. Length of Service/Attendance

Length	Frequency	Percentage (%)
Less than 1 year	48	19.2
1–3 years	82	32.8
4–6 years	58	23.2
7–10 years	40	16.0
More than 10 years	22	8.8
Total	250	100.0

Interpretation. Table 5 shows that the most common duration of service or attendance was 1–3 years, reported by 82 respondents (32.8%). This was followed by 4–6 years (23.2%), less than one year (19.2%), 7–10 years (16.0%), and more than 10 years (8.8%). The distribution indicates that many respondents had sufficient exposure to the center to form informed judgments about service delivery, while newer attendees contributed perspectives based on more recent experiences. Overall, the range of exposure captures views from respondents with different levels of familiarity with Marwa Fertility Center.

Table 6. Accessibility of Fertility Services (N = 250)

Response	Q6	%	Q7	%	Q8	%	Q9	%
Strongly Agree	70	28.0	65	26.0	48	19.2	38	15.2
Agree	110	44.0	108	43.2	95	38.0	78	31.2
Neutral	40	16.0	42	16.8	52	20.8	46	18.4
Disagree	20	8.0	24	9.6	38	15.2	56	22.4
Strongly Disagree	10	4.0	11	4.4	17	6.8	32	12.8
Total	250	100	250	100	250	100	250	100

Interpretation. Table 6 evaluates accessibility across four questionnaire items. Positive responses were strongest for Q6, where 72.0% either agreed or strongly agreed, followed by Q7 at 69.2%. Q8 received a more moderate positive rating of 57.2%, while Q9 recorded the lowest positive assessment at 46.4%. Q9 also produced the highest combined disagreement, at 35.2%. Based on the manuscript's description of these items, the center performs comparatively well on basic accessibility and

appointment scheduling, whereas waiting time and affordability are weaker dimensions. The pattern demonstrates that physical and organizational access can be rated positively while time and financial barriers remain important. Quality-improvement efforts should therefore preserve the strongly rated accessibility components while prioritizing the weaker areas identified in Q8 and particularly Q9.

Table 7. Quality of Clinical Services

Response	Q10	%	Q11	%	Q12	%	Q13	%
Strongly Agree	82	32.8	75	30.0	70	28.0	90	36.0
Agree	115	46.0	118	47.2	112	44.8	105	42.0
Neutral	28	11.2	33	13.2	36	14.4	30	12.0
Disagree	18	7.2	17	6.8	22	8.8	17	6.8
Strongly Disagree	7	2.8	7	2.8	10	4.0	8	3.2
Total	250	100	250	100	250	100	250	100

Interpretation. Table 7 demonstrates consistently favorable perceptions of clinical service quality. Positive ratings were 78.8% for Q10, 77.2% for Q11, 72.8% for Q12, and 78.0% for Q13. Negative responses remained relatively low across all four items. According to the manuscript, these items reflect professional competence, adequacy of assessment and diagnosis, explanation of treatment options, and maintenance of privacy and confidentiality. Q12 received the lowest positive rating, suggesting that treatment explanations represent the clearest opportunity for improvement within this domain. Overall, the concentration of responses in the agree and strongly agree categories indicate strong perceived clinical professionalism and patient-centered care.

Table 8. Laboratory and Diagnostic Services

Response	Q14	%	Q15	%	Q16	%
Strongly Agree	75	30.0	65	26.0	78	31.2
Agree	108	43.2	110	44.0	112	44.8
Neutral	38	15.2	42	16.8	35	14.0
Disagree	20	8.0	24	9.6	18	7.2
Strongly Disagree	9	3.6	9	3.6	7	2.8
Total	250	100	250	100	250	100

Interpretation. Table 8 shows generally positive assessments of laboratory and diagnostic services. The combined positive response was 73.2% for Q14, 70.0% for Q15, and 76.0% for Q16. The highest favorable rating concerned Q16, which the manuscript associates with the accuracy and reliability of diagnostic investigations. Q15, associated with turnaround time, received the lowest positive score. The results therefore suggest that respondents were more confident in the availability and reliability of diagnostic services than in the speed with which results were delivered. Maintaining diagnostic reliability while improving turnaround efficiency could further strengthen continuity of infertility care and the patient experience.

Table 9. Communication and Customer Care Services

Response	Q17	%	Q18	%	Q19	%	Q20	%
Strongly Agree	70	28.0	68	27.2	65	26.0	72	28.8
Agree	118	47.2	115	46.0	120	48.0	114	45.6
Neutral	36	14.4	40	16.0	38	15.2	36	14.4
Disagree	18	7.2	19	7.6	20	8.0	21	8.4
Strongly Disagree	8	3.2	8	3.2	7	2.8	7	2.8
Total	250	100	250	100	250	100	250	100

Interpretation. Table 9 indicates consistently strong ratings for communication and customer-care services. Positive responses reached 75.2% for Q17, 73.2% for Q18, 74.0% for Q19, and 74.4% for Q20. The narrow range across the four items suggests a stable communication experience rather than strong performance in only one isolated area. As described in the manuscript, the items capture courtesy, responsiveness to concerns, clarity of information, and effective provider-patient communication.

These findings identify interpersonal communication as an important strength of service delivery at the center. Continued attention to respectful interaction and understandable information may help sustain patient confidence throughout fertility investigation and treatment.

Table 10. Pharmacy and Support Services

Response	Q21	%	Q22	%
Strongly Agree	65	26.0	70	28.0
Agree	115	46.0	112	44.8
Neutral	40	16.0	38	15.2
Disagree	20	8.0	22	8.8
Strongly Disagree	10	4.0	8	3.2
Total	250	100	250	100

Interpretation. Table 10 assesses pharmacy and support services through two items. For Q21, 72.0% of respondents agreed or strongly agreed, while Q22 recorded a slightly higher positive rating of 72.8%. Combined negative responses were 12.0% for both items. The manuscript associates these findings with availability of prescribed medications and pharmacist counseling. The similarity between the two items indicates relatively balanced performance across medicine supply and counseling. Nevertheless, the neutral and negative responses demonstrate that opportunities remain to strengthen medication availability and consistency of counseling, particularly because fertility treatment may require careful adherence to prescribed regimens.

Table 11. Patient Satisfaction and Service Improvement

Response	Q23	%	Q24	%	Q25	%
Strongly Agree	82	32.8	76	30.4	95	38.0
Agree	118	47.2	120	48.0	105	42.0
Neutral	28	11.2	30	12.0	28	11.2
Disagree	16	6.4	18	7.2	15	6.0
Strongly Disagree	6	2.4	6	2.4	7	2.8
Total	250	100	250	100	250	100

Interpretation. Table 11 presents some of the strongest overall ratings in the service assessment. For Q23, 80.0% of respondents agreed or strongly agreed, indicating high overall satisfaction with infertility services. Q24 recorded 78.4% positive responses, supporting the manuscript's conclusion that the center provides a generally supportive environment for fertility care. Q25 also received 80.0% positive responses; the manuscript interprets this as agreement that additional staff training, infrastructure improvement, and increased resources could further enhance service quality. This is an important finding because high satisfaction can coexist with recognition of areas requiring continued institutional development. The results therefore indicate a strong

service foundation while supporting continued investment in staff capacity, infrastructure, and resources.

II. OBJECTIVES

The main objective of this study was to assess the patterns, risk factors, and causes of infertility among couples attending Marwa Fertility Center in Mogadishu, Somalia. The specific objectives were to determine the proportion of primary and secondary infertility, identify the major male and female causes of infertility, assess selected demographic and lifestyle factors associated with infertility, and evaluate the duration of infertility before seeking treatment.

III. MATERIALS AND METHODS

Study Design and Setting

This was a cross-sectional hospital-based study conducted at Marwa Fertility Center in Mogadishu, Somalia. The study included infertile couples attending the center for infertility evaluation, diagnosis, counseling, or treatment.

Study Population

The study population consisted of couples diagnosed with infertility, defined as failure to achieve pregnancy after at least 12 months of regular unprotected sexual intercourse.

Study Variables

The main outcome variable was type of infertility, categorized as primary infertility and secondary infertility. Independent variables included age, duration of marriage, duration of infertility, hormonal disorders, polycystic ovary syndrome, male factor infertility, tubal blockage, previous reproductive tract infections, body mass index, and selected lifestyle factors.

Data Collection

Data were collected using structured questionnaires and review of medical records. The questionnaire captured socio-demographic characteristics, marital history, duration of infertility, lifestyle factors, previous infections, and health-seeking behavior. Medical records were reviewed to obtain clinical information including hormonal disorders, PCOS,

tubal blockage, male factor infertility, BMI, laboratory findings, ultrasound findings, and final clinical diagnosis.

Data Analysis

Data were checked for completeness, coded, entered, and analyzed using statistical software. Descriptive statistics were used to summarize demographic characteristics, infertility type, duration of infertility, and major male and female causes. Frequencies and percentages were used for categorical variables, while means or medians were used for continuous variables. Associations between infertility type and selected risk factors were assessed using appropriate statistical tests.

Ethical Considerations

Ethical approval and institutional permission were obtained before data collection. Informed consent was obtained from participating couples. Confidentiality was maintained by using identification codes instead of names, and all collected information was used only for research purposes.

IV. RESULTS AND DISCUSSION

A total of 250 respondents participated in the study, comprising patients and healthcare professionals working at Marwa Fertility Center in Mogadishu, Somalia. Patients constituted the majority of participants (56.0%), followed by nurses and midwives (14.0%), doctors (8.8%), laboratory technicians (7.2%), pharmacists (4.8%), receptionists (4.0%), customer care staff (3.2%), and other personnel (2.0%). Female respondents accounted for 62.0% of the study population, while males represented 38.0%. Most participants were between 25 and 34 years of age (38.0%), reflecting the age group most likely to seek infertility evaluation and treatment. The majority of respondents had attained at least a bachelor's degree (38.4%), indicating a relatively educated study population.

The findings revealed that accessibility to infertility services was generally satisfactory. More than two-thirds of respondents agreed that the fertility center was easily accessible (72.0%) and that appointment scheduling was convenient (69.2%). However, respondents expressed relatively lower satisfaction regarding waiting time (57.2%) and affordability of

infertility services (46.4%). These findings suggest that although physical access and appointment systems are adequate, financial costs and service delays remain important barriers to fertility care. Similar observations have been reported in previous studies conducted in low- and middle-income countries, where treatment costs and long waiting times frequently reduce access to assisted reproductive services.

Regarding the quality of clinical services, respondents expressed high confidence in the competence of healthcare providers. Approximately 78.8% agreed that clinicians demonstrated professional competence, while 77.2% believed that patients received adequate assessment and diagnosis. Furthermore, 72.8% reported that treatment options were clearly explained, and 78.0% confirmed that patient privacy and confidentiality were consistently maintained. These findings indicate that Marwa Fertility Center provides patient-centered care characterized by professionalism, effective communication, and ethical practice. High levels of provider competence and confidentiality are recognized determinants of patient trust and treatment adherence in reproductive healthcare. Laboratory and diagnostic services also received favorable evaluations.

Approximately 73.2% of respondents indicated that laboratory services were available when required, 70.0% were satisfied with the turnaround time for laboratory results, and 76.0% considered diagnostic investigations to be accurate and reliable. Reliable laboratory services are fundamental to infertility diagnosis because appropriate treatment depends on accurate hormonal, microbiological, and reproductive investigations. The relatively high level of satisfaction observed in this study suggests that the laboratory services adequately support clinical decision-making. Communication and customer care were rated positively by respondents. More than 74% agreed that reception staff were courteous, customer care personnel responded promptly to concerns, information provided by staff was understandable, and communication between healthcare providers and patients was effective.

Effective communication enhances patient satisfaction by improving understanding of infertility investigations, treatment procedures, and expected outcomes. These findings demonstrate that interpersonal relationships between staff and patients

contribute significantly to the perceived quality of infertility care. The pharmacy and support services were similarly well rated. Approximately 72% of respondents reported that prescribed medications were usually available, while 72.8% agreed that pharmacists provided adequate counseling regarding medication use. Availability of fertility medications and appropriate pharmaceutical counseling are essential components of successful infertility management because many treatment protocols require strict adherence to prescribed regimens.

Overall patient satisfaction with infertility services was high. Four out of five respondents (80.0%) reported being satisfied with the services received at Marwa Fertility Center, and 78.4% believed that the center provided a supportive environment for infertility care. Nevertheless, 80.0% also agreed that additional staff training, improved infrastructure, and increased resources would further enhance service quality. This finding suggests that although respondents generally perceived the quality of infertility services positively, continuous quality improvement remains necessary to address remaining challenges related to affordability, waiting time, and resource availability.

Overall, the study demonstrates that Marwa Fertility Center provides quality infertility services characterized by competent healthcare professionals, reliable laboratory support, effective communication, and high patient satisfaction. However, improving affordability, reducing waiting times, and strengthening institutional resources would likely increase access to care and further improve patient experiences and treatment outcomes. These findings provide valuable evidence for policymakers and healthcare managers seeking to strengthen infertility services in Somalia and similar resource-limited settings.

V. CONTRIBUTIONS OF THE STUDY

Theoretical Contributions

This study advances infertility literature by examining infertility as a multifactorial and couple-centered reproductive health condition in Somalia. It extends existing theory by providing evidence from a low-resource setting where empirical literature remains limited.

Empirical Contributions

The findings provide facility-based evidence on infertility patterns, major causes, and associated risk factors among couples attending Marwa Fertility Center, offering baseline data for future studies and reproductive health planning.

Methodological Contributions

The study demonstrates the usefulness of a quantitative cross-sectional design supported by structured questionnaires and clinical record review for infertility research in specialized fertility centers.

Policy Contributions

The findings support integrating infertility prevention, diagnosis, counseling, and treatment into national reproductive health strategies while strengthening diagnostic capacity and specialist training.

Practical Contributions

The results provide actionable guidance for clinicians and hospital managers to improve early diagnosis, couple-based assessment, male participation, counseling, and quality improvement initiatives.

Recommendations for Future Research

Future studies should employ longitudinal and multicenter designs, include public and private fertility facilities across Somalia, investigate psychosocial and economic dimensions of infertility, evaluate assisted reproductive technologies, and examine intervention effectiveness using larger representative samples.

Limitations of the Study

The cross-sectional design limits causal inference. The single-center setting may reduce generalizability. Self-reported responses may introduce recall or social desirability bias. The study included only couples seeking fertility services, potentially excluding infertile individuals who did not seek care.

VI. DECLARATIONS

Ethical Approval and Consent to Participate

Ethical approval and institutional permission were obtained before data collection. Participation was voluntary, written informed consent was obtained, and confidentiality was maintained.

Consent for Publication

Not applicable. This study uses de-identified secondary data, and no individual-level identifiable information is reported.

Availability of Data and Materials

The datasets are available from the corresponding author upon reasonable request, subject to institutional ethical requirements.

Competing Interests

The authors declare that they have no competing interests, including financial, personal, or professional relationships that could have influenced the outcomes or interpretation of this study.

Ethics Approval Statement

All procedures complied with accepted ethical principles for research involving human participants.

Informed-Consent Statement

Written informed consent was obtained from all participants before data collection.

Data-Availability Statement

Data supporting the findings are available from the corresponding author upon reasonable request.

Funding Declaration

This research received no external funding.

Conflict-of-Interest Declaration

The authors declare no conflict of interest.

Author-Contribution Statement

Conceptualization, methodology, investigation, analysis, writing, review, and supervision were undertaken by the author(s) as listed on the manuscript.

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Supplementary Materials

Questionnaire, coding framework, ethical approval documents, and additional tables may be provided as supplementary files upon request.

Supplementary files may include the study questionnaire, coding framework, ethical approval documents, and additional statistical tables.

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