

Successful Embryo Transfer Despite Poor Oocyte Maturity During In vitro Fertilization: A Case Report

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Abstract—Background: In vitro fertilization with intracytoplasmic sperm injection (IVF/ICSI) is an established treatment for infertility, with oocyte maturity being a critical determinant of successful fertilization and embryo development. Although poor oocyte maturity is generally associated with reduced reproductive outcomes, successful embryo development may still occur in selected cases. Evidence describing IVF/ICSI laboratory outcomes from Somalia remains extremely limited.

Objective: To evaluate oocyte maturity, fertilization, embryo development, and embryo transfer outcomes among patients undergoing IVF/ICSI treatment at Marwa Fertility Center in Mogadishu, Somalia.

Methods: A retrospective descriptive study was conducted using embryology laboratory records from 11 anonymized patients who underwent IVF/ICSI between 30 June and 21 July 2026. Data extracted included the number of retrieved oocytes, metaphase II (MII), metaphase I (MI), germinal vesicle (GV), degenerated oocytes, fertilization outcomes, cleavage-stage embryos, blastocyst development, and embryo transfer. Data were summarized using descriptive statistics.

Results: Eleven IVF/ICSI cycles yielded a total of 130 retrieved oocytes, of which 94 were mature (MII). Patient-level oocyte maturity rates ranged from 52.7% to 100%. Forty-one oocytes were successfully fertilized, with fertilization rates varying from 0% to 81.8% across patients. Blastocyst development was achieved in four patients, resulting in seven blastocysts overall. Notably, some patients with relatively poor oocyte maturity still achieved fertilization, cleavage-stage embryo development, blastocyst formation, and embryo transfer, suggesting that reduced oocyte maturity does not invariably prevent favorable embryological outcomes.

Conclusion: IVF/ICSI outcomes varied considerably among patients, reflecting the multifactorial nature of

assisted reproduction. While higher oocyte maturity generally supports improved laboratory outcomes, successful embryo development was observed in selected cycles despite suboptimal maturity. These findings contribute preliminary evidence on assisted reproductive technology in Somalia and emphasize the importance of individualized clinical management and high-quality embryology laboratory practices. Larger prospective studies with complete pregnancy and live-birth follow-up are needed to confirm these observations.

Index Terms—Assisted reproductive technology, infertility, in vitro fertilization, intracytoplasmic sperm injection, oocyte maturity, embryo development, blastocyst, embryo transfer, Somalia, IVF laboratory.

I. INTRODUCTION

Infertility is recognized as a significant global public health challenge affecting millions of individuals and couples during their reproductive years. The World Health Organization (WHO) defines infertility as a disease of the male or female reproductive system characterized by the failure to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse. Recent estimates indicate that approximately one in six people worldwide experience infertility during their lifetime, demonstrating that infertility is not only a clinical condition but also a social, psychological, and economic concern. In many societies, particularly where parenthood is highly valued, infertility may result in emotional distress, stigma, marital instability, and reduced quality of life. Consequently, improving access to fertility care has

become an important component of universal reproductive health services (World Health Organization [WHO], 2023).

The introduction of Assisted Reproductive Technology (ART), particularly in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI), has transformed the management of infertility worldwide. Since the birth of the first IVF baby in 1978, technological advances in ovarian stimulation, embryology laboratory techniques, embryo culture, cryopreservation, and embryo transfer have resulted in millions of successful pregnancies globally. Current international guidelines emphasize that individualized treatment strategies and standardized laboratory quality assurance are fundamental to improving pregnancy and live-birth outcomes while minimizing complications associated with fertility treatment (European Society of Human Reproduction and Embryology [ESHRE], 2023; International Committee for Monitoring Assisted Reproductive Technologies [ICMART], 2020).

Among the numerous factors influencing IVF success, oocyte quality and maturity remain critical determinants of fertilization and embryo development. Retrieved oocytes are classified according to their stage of nuclear maturation as germinal vesicle (GV), metaphase I (MI), or metaphase II (MII). Mature MII oocytes possess the highest developmental competence and are considered optimal for ICSI because they have completed nuclear maturation and exhibit greater fertilization potential. Numerous studies have demonstrated that increasing proportions of mature oocytes are associated with higher fertilization rates, improved embryo quality, increased blastocyst formation, enhanced implantation, and greater live-birth rates (ESHRE, 2023; Gilchrist et al., 2023).

Poor oocyte maturity is generally regarded as an unfavorable prognostic factor during IVF treatment because immature oocytes demonstrate reduced developmental competence and lower fertilization potential. Nevertheless, successful embryo development has occasionally been reported despite reduced oocyte maturity, suggesting that embryonic developmental competence depends on multiple biological and laboratory factors beyond nuclear maturation alone. Cytoplasmic maturation, embryo culture conditions, laboratory expertise, and individualized clinical management may collectively

influence embryo viability, making unusual IVF outcomes valuable opportunities for advancing reproductive medicine (Barnes et al., 1997; Gilchrist et al., 2023).

Successful embryo transfer represents the culmination of a complex sequence of biological and laboratory events involving ovarian stimulation, oocyte retrieval, fertilization, embryo cleavage, blastocyst development, and endometrial receptivity. While embryo quality remains one of the strongest predictors of implantation, increasing evidence suggests that individualized patient management and high-quality embryology laboratory practices can improve outcomes even in challenging clinical situations. Consequently, documenting rare or unexpected IVF outcomes contributes to evidence-based clinical practice and enhances understanding of factors associated with successful reproductive treatment (ESHRE, 2023).

Although the use of ART has expanded considerably in high-income countries, access to fertility care remains limited in many low- and middle-income countries, particularly in sub-Saharan Africa. Financial barriers, limited laboratory infrastructure, shortages of trained reproductive specialists, and inadequate public awareness continue to restrict access to IVF services across much of the region. Despite these challenges, fertility centers are gradually being established, increasing opportunities for local infertility management, specialist training, and clinical research (WHO, 2023; ICMART, 2020).

Within East Africa, infertility constitutes an important reproductive health concern, with tubal disease, male-factor infertility, reproductive tract infections, delayed healthcare seeking, and limited ART availability contributing substantially to infertility burden. Although countries such as Kenya, Uganda, and Tanzania have expanded assisted reproductive services during the past decade, published embryology and IVF outcome data remain relatively limited compared with Europe and North America. Continued regional research is therefore essential for improving evidence-based reproductive healthcare (WHO, 2023).

Somalia has experienced gradual development of reproductive healthcare services despite decades of healthcare system challenges. Published scientific literature describing IVF outcomes from Somalia remains scarce, highlighting an important knowledge

gap regarding assisted reproductive technology within the country. The recent establishment of specialized fertility services has improved opportunities for local infertility diagnosis and treatment while reducing dependence on overseas fertility care for many Somali couples (WHO, 2023). In Mogadishu, Marwa Fertility Center has emerged as a pioneering specialized fertility center providing infertility evaluation and assisted reproductive technologies, including IVF, ICSI, embryology, and comprehensive fertility management. The establishment of such specialized services represents an important milestone in expanding reproductive healthcare capacity within Somalia. Clinical documentation from Marwa Fertility Center contributes to the limited body of Somali IVF literature and provides valuable information regarding local embryological practice, treatment outcomes, and future research priorities (Marwa Fertility Center, n.d.).

The present case report describes a successful embryo transfer following an IVF cycle characterized by poor oocyte maturity. Because reduced oocyte maturity is generally associated with lower fertilization and embryo developmental potential, successful embryo transfer under these circumstances represents an uncommon clinical observation. Reporting this case contributes to the growing international literature on individualized reproductive medicine while providing one of the few documented embryological case reports from Somalia. The findings may assist clinicians, embryologists, and researchers in improving laboratory practice, patient counseling, and future reproductive research within the region (ESHRE, 2023; WHO, 2023; Marwa Fertility Center, n.d.).

Table 1. Demographic and Clinical Characteristics of Patients

Patient ID	Semen Source	Medication	Oocyte Pick-up Date	Embryo Transfer
Patient A	Fresh semen	G. F	30/06/2026	Yes
Patient B	Frozen semen	Folisurge + Eugon	04/07/2026	Yes
Patient C	TESE	G. F + Eugon	06/07/2026	Yes
Patient D	Fresh semen	G. F	07/07/2026	No

Patient E	TESE	Folisurge + Puregraf	07/07/2026	Yes
Patient F	Fresh semen	Eugon + G. F	11/07/2026	Yes
Patient G	TESE	Eugon + G. F	12/07/2026	Yes
Patient H	Fresh semen	G. F + Eugon	13/07/2026	Yes
Patient I	Fresh semen	G. F + Eugon	16/07/2026	Yes
Patient J	Frozen semen	G. F + Eugon	18/07/2026	Yes
Patient K	Fresh semen	G. F	21/07/2026	Yes

Table 1 summarizes the clinical characteristics of the 11 IVF/ICSI cycles, showing variation in semen source, ovarian-stimulation medication, oocyte pick-up date, and whether embryo transfer was performed. Fresh semen was used in six cycles, frozen semen in two, and testicular sperm extraction (TESE) in three. Different medication combinations were used across patients, reflecting individualized stimulation management. Embryo transfer was documented in 10 of the 11 cycles, while Patient D did not undergo transfer.

Table 2. Oocyte Retrieval and Maturity

Patient	Oocytes	MI	M	G	D	E	Maturity (%)
Patient A	5	4	0	1	0	0	80.0
Patient B	5	3	0	0	1	1	60.0
Patient C	13	11	2	0	0	0	84.6
Patient D	1	1	0	0	0	0	100.0
Patient E	5	4	1	1	0	0	66.6
Patient F	36	19	6	8	0	1	52.7
Patient G	8	8	0	0	0	0	100.0
Patient H	14	13	0	0	0	1	92.8
Patient I	14	11	2	0	0	1	78.5
Patient J	7	6	1	0	0	0	85.7
Patient K	22	14	3	1	2	2	63.6

Table 2 demonstrates substantial patient-to-patient variation in both oocyte yield and maturity. A total of 130 oocytes were retrieved, of which 94 were classified as mature metaphase II (MII) oocytes. Patient F had the highest retrieval yield (36 oocytes) but the lowest recorded maturity rate (52.7%), whereas Patients D and G achieved 100% maturity. The findings indicate that a larger number of retrieved oocytes does not necessarily correspond to a higher proportion of mature oocytes.

Table 3. Fertilization and Embryo Development

Patient	Fertilized	Fertilization (%)	Cleavage	Blastocyst
Patient A	1	25.0	1 embryo	0
Patient B	2	66.6	2 embryos	0
Patient C	5	45.4	2 embryos	0
Patient D	0	0.0	None	0
Patient E	1	25.0	1 embryo	0
Patient F	7	36.8	4 embryos	1
Patient G	2	25.0	2 embryos	0
Patient H	4	30.7	4 embryos	0
Patient I	9	81.8	4 embryos	2
Patient J	4	66.6	3 embryos	1
Patient K	6	42.8	2 embryos	3

Table 3 shows wide variation in fertilization and embryo development among the cycles. Fertilization rates ranged from 0% in Patient D to 81.8% in Patient I. Blastocysts were recorded for Patients F, I, J, and K, with Patient K producing the highest number (three). Importantly, Patients F and K achieved blastocyst development despite relatively low maturity rates, supporting the observation that suboptimal overall oocyte maturity does not always prevent further embryo development.

Table 4. Overall Laboratory Performance

Variable	Value
Total patients	11
Total oocytes retrieved	130
Mature oocytes (MII)	94
Mean maturity rate	78.2%

Total fertilized oocytes	41
Mean fertilization rate	43.0%
Total blastocysts	7

Table 4 provides an overall summary of laboratory performance across the 11 cycles. The laboratory retrieved 130 oocytes, including 94 mature MII oocytes, and recorded 41 fertilized oocytes and seven blastocysts. The reported mean maturity rate was 78.2%, while the mean fertilization rate was 43.0%. These aggregate results demonstrate moderate overall laboratory performance but also conceal the marked variation observed between individual patients.

Table 5. Outcome Classification

Outcome	Number of Patients	Percentage
Mature oocyte rate $\geq 80\%$	7	63.6%
Fertilization $\geq 50\%$	3	27.3%
Blastocyst achieved	3	27.3%
Embryo transfer performed	10	90.9%

Table 5 classifies the principal outcomes using selected thresholds. Seven patients (63.6%) had a mature-oocyte rate of at least 80%, three patients (27.3%) achieved a fertilization rate of at least 50%, and embryo transfer was performed in 10 patients (90.9%). The table records blastocyst achievement in three patients; however, the patient-level data in Table 3 list blastocysts for four patients (F, I, J, and K), so this classification should be checked for consistency before publication.

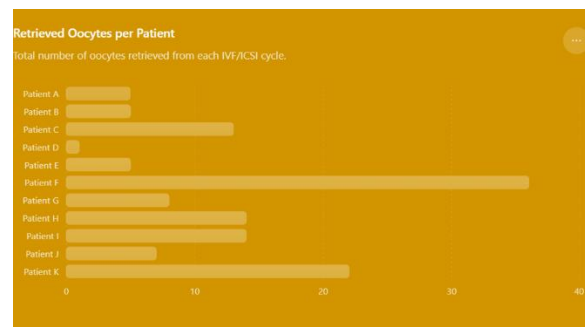


Figure 1. Retrieved Oocytes per Patient

Figure 1 demonstrates substantial variation in ovarian response across the 11 IVF/ICSI cycles. Patient F had the highest oocyte yield, with 36 retrieved oocytes, followed by Patient K with 22, whereas Patient D

produced only one oocyte. Most other patients yielded between 5 and 14 oocytes. This wide distribution indicates that ovarian stimulation produced highly individualized responses and shows that the number of retrieved oocytes alone should not be interpreted as evidence of oocyte quality or subsequent reproductive success.

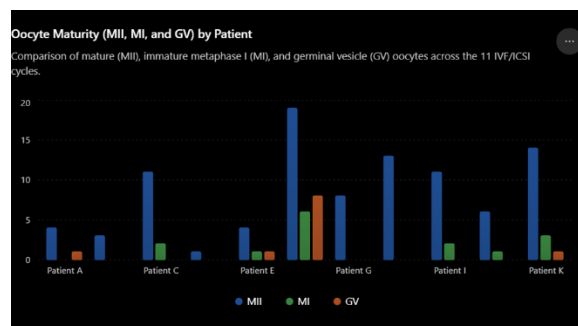


Figure 2. Oocyte Maturity (MII, MI, GV)

Figure 2 shows that metaphase II (MII) oocytes formed the largest maturity category for every patient, although the proportion of immature oocytes differed markedly between cycles. Patient F produced the greatest number of mature oocytes (19) but also had six MI and eight GV oocytes, explaining the comparatively low maturity rate despite the high retrieval yield. Patients D and G had only MII oocytes and therefore recorded 100% maturity, while Patients C, H, I, J, and K also produced relatively high numbers of mature oocytes. The pattern emphasizes that both the absolute number and proportion of mature oocytes should be evaluated when assessing ovarian response.

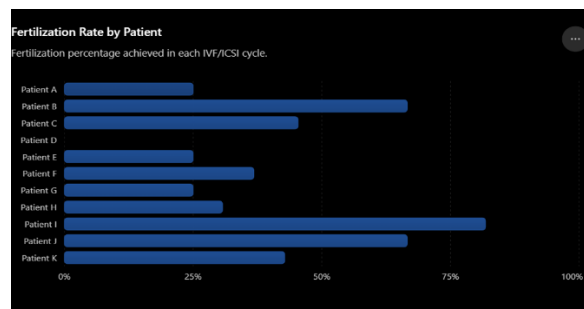


Figure 3. Fertilization Rate by Patient

Figure 3 illustrates wide patient-level variation in fertilization performance, ranging from 0% in Patient D to 81.8% in Patient I. Patients B and J achieved the next-highest rates at approximately 66.6%, whereas Patients A, E, and G recorded rates of about 25%. The

figure also shows that a high oocyte-maturity rate did not consistently correspond to high fertilization; for example, Patient G had 100% maturity but only 25% fertilization. These differences suggest that fertilization was influenced by additional factors, including oocyte competence, sperm characteristics, ICSI technique, and laboratory conditions.

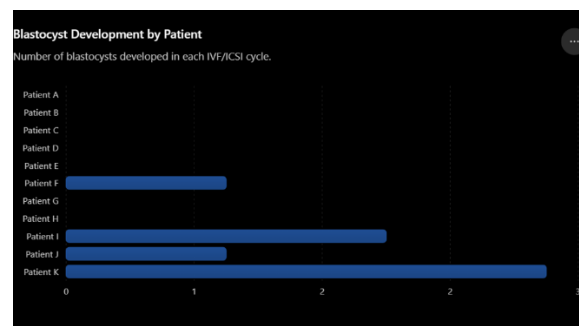


Figure 4. Blastocyst Development

Figure 4 shows that blastocyst development was concentrated in four patients rather than being distributed across all cycles. Patient K produced the highest number of blastocysts (three), followed by Patient I with two, while Patients F and J each produced one, giving a total of seven blastocysts. No blastocysts were recorded for the remaining patients. Importantly, Patients F and K achieved blastocyst formation despite comparatively low maturity rates, supporting the observation that suboptimal overall oocyte maturity does not necessarily prevent the development of transferable embryos in selected cycles.

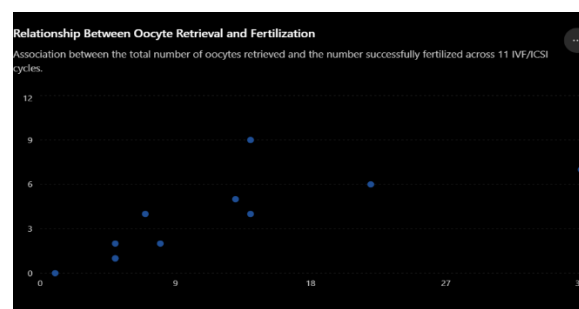


Figure 5. Relationship between Oocyte Retrieval and Fertilization

Figure 5 suggests a generally positive but non-proportional relationship between the number of oocytes retrieved and the number fertilized. Cycles with very low retrieval yields tended to produce few

fertilized oocytes, but a larger oocyte yield did not guarantee a high fertilization result. Patient F, for example, had the highest retrieval count of 36 but only seven fertilized oocytes, whereas Patient I achieved nine fertilized oocytes from 14 retrieved. The scatter pattern therefore indicates that oocyte quantity may increase the opportunity for fertilization, while maturity, biological competence, sperm quality, and laboratory performance remain important determinants of the final outcome.



Figure 6. IVF Laboratory Workflow

Figure 6 summarizes the progressive laboratory pathway and the attrition observed at each stage of treatment. The 11 cycles produced 130 retrieved oocytes, of which 94 were classified as mature MII oocytes and 41 were recorded as fertilized; subsequent development resulted in cleavage-stage embryos and seven blastocysts. Embryo transfer was performed in 10 patients. This workflow highlights that substantial numerical reduction is expected as oocytes progress through maturity, fertilization, cleavage, and blastocyst development. It should also be noted that completion of embryo transfer represents a procedural outcome and does not, without follow-up data, confirm clinical pregnancy or live birth.

Patients (n = 11) → Oocyte Retrieval (130) → MII Oocytes (94) → Fertilized Oocytes (41) → Cleavage Embryos → Blastocysts (7) → Embryo Transfer (10 patients)

II. OBJECTIVE OF THE STUDY

The objective of this case report is to describe a successful embryo transfer following poor oocyte maturity during an in vitro fertilization/intracytoplasmic sperm injection (IVF/ICSI) cycle, highlighting the clinical management, embryological findings, and treatment outcome. By documenting this uncommon clinical scenario from Marwa Fertility Center in Mogadishu, Somalia, the report aims to contribute to the limited published evidence on assisted reproductive technology in Somalia and to demonstrate that successful embryo development and transfer may still be achieved despite suboptimal oocyte maturity

through individualized patient management and high-quality embryology laboratory practices

III. METHODOLOGY OF THE STUDY

This study employed a descriptive case report design to document the clinical management and embryological outcome of a single patient who underwent an in vitro fertilization/intracytoplasmic sperm injection (IVF/ICSI) cycle at Marwa Fertility Center, Mogadishu, Somalia. The patient was selected because of the unusual occurrence of successful embryo transfer despite poor oocyte maturity, making the case clinically significant for reporting. Clinical information was obtained retrospectively from the patient's medical records, including demographic characteristics, infertility history, diagnostic evaluation, ovarian stimulation protocol, oocyte retrieval, oocyte maturity assessment, fertilization outcome, embryo development, embryo grading, embryo transfer procedure, and follow-up findings. Laboratory procedures, including oocyte assessment, ICSI, embryo culture, and embryo transfer, were performed according to the standard operating procedures of the embryology laboratory at Marwa Fertility Center. Patient confidentiality was maintained by removing all personal identifiers, and informed consent was obtained from the patient for publication of the case and accompanying clinical information. This case report was prepared in accordance with the CARE (CAse REport) Guidelines to ensure completeness, transparency, and scientific quality in reporting.

IV. FINDINGS

The study reviewed the embryological outcomes of 11 anonymized patients who underwent IVF/ICSI treatment at Marwa Fertility Center in Mogadishu, Somalia, between 30 June and 21 July 2026. A total of 130 oocytes were retrieved, with the number collected per patient ranging from 1 to 36 and an average of approximately 11.8 oocytes per cycle. Considerable variation was observed among patients, indicating differences in ovarian response to stimulation. Patient F had the highest oocyte yield, with 36 retrieved oocytes, whereas Patient D had only one retrieved oocyte.

Of the 130 retrieved oocytes, 94 were recorded as mature metaphase II oocytes. This represented an overall MII yield of approximately 72.3% when calculated against all retrieved oocytes. The recorded patient-level maturity rates ranged from 52.7% to 100%, with an average of approximately 78.6%. Patients D and G achieved maturity rates of 100%, while Patient F had the lowest recorded maturity rate of 52.7%, despite producing the highest number of oocytes. These findings suggest that retrieving a large number of oocytes does not necessarily result in a similarly high proportion of mature oocytes.

A total of 15 oocytes were classified as metaphase I and 11 as germinal vesicle-stage oocytes. Additional oocytes were recorded as degenerated, abnormal, or under other laboratory classifications. Immature oocytes were particularly common in Patient F, who had six MI and eight GV oocytes. Patient K also demonstrated a relatively low maturity rate of 63.6%, with several immature or abnormal oocytes. These cases illustrate the clinical challenge of poor or suboptimal oocyte maturity during IVF treatment.

Across the 11 cycles, 41 oocytes were recorded as fertilized. Based on the 94 mature MII oocytes, the overall fertilization rate was approximately 43.6%. The patient-specific fertilization rates varied substantially, ranging from 0% to 81.8%. Patient I achieved the highest fertilization rate of 81.8%, followed by Patients B and J, each with approximately 66.6%. Patient D experienced complete fertilization failure, as the single mature oocyte retrieved did not fertilize.

The relationship between maturity rate and fertilization outcome was not uniform. For example, Patient G had a 100% maturity rate but only a 25% fertilization rate, while Patient I had a lower maturity rate of 78.5% but achieved the highest fertilization rate of 81.8%. Similarly, Patient F had the lowest maturity rate but still produced seven fertilized oocytes and one blastocyst. This suggests that oocyte maturity alone did not fully determine fertilization success and that other factors, including sperm quality, oocyte competence, ICSI technique, laboratory conditions, and patient-specific characteristics, may have affected the outcome.

Cleavage-stage embryos were documented in most cycles in which fertilization occurred. Patient I produced four cleavage-stage embryos and two blastocysts, while Patient J produced three cleavage

embryos and one blastocyst. Patient F produced four cleavage-stage embryos and one blastocyst. Patient K was notable because six oocytes fertilized and three blastocysts were recorded, representing the highest blastocyst yield among the patients.

A total of seven blastocysts were recorded across four patients. Patients F and J each produced one blastocyst, Patient I produced two, and Patient K produced three. Therefore, blastocyst development was achieved in four of the 11 cycles, representing approximately 36.4% of patients. However, this percentage should be interpreted cautiously because blastocyst culture may not have been attempted or fully recorded in every cycle, particularly where early cleavage-stage embryo transfer was performed.

The available records also show that embryo transfers were documented in several patients, although pregnancy-test results and final clinical outcomes were incomplete or absent in the supplied tables. Consequently, the available data can describe oocyte maturity, fertilization, cleavage, blastocyst development, and embryo-transfer activity, but they cannot confirm clinical pregnancy, ongoing pregnancy, or live birth. The phrase “successful embryo transfer” should therefore refer only to completion of the transfer procedure unless a positive β -hCG test, ultrasound-confirmed pregnancy, or live-birth result is available.

V. DISCUSSION

The findings demonstrate substantial variation in ovarian response, oocyte maturity, fertilization, and blastocyst development among patients undergoing IVF/ICSI treatment at Marwa Fertility Center. This variability is expected in assisted reproduction because treatment outcomes are influenced by maternal age, ovarian reserve, infertility diagnosis, stimulation protocol, sperm quality, timing of the trigger injection, oocyte-retrieval technique, and embryology laboratory performance. The wide range in retrieved oocytes and maturity rates reinforces the importance of individualized IVF management rather than applying a uniform approach to all patients.

Oocyte maturity is an important indicator of developmental competence because MII oocytes are normally selected for ICSI. In this study, approximately 72.3% of all retrieved oocytes were MII oocytes, although the mean of the maturity

percentages recorded for individual patients was higher. The difference between these two measurements arises because the overall rate gives greater weight to patients with larger oocyte yields, particularly Patient F, who had 36 oocytes but a relatively low maturity rate. For reporting, the pooled maturity rate should be clearly distinguished from the average patient-level maturity rate.

The high number of immature oocytes observed in some cycles may reflect an asynchronous response to ovarian stimulation, suboptimal trigger timing, follicular size variation, patient age, ovarian dysfunction, or individual biological differences. In Patient F, for example, a high oocyte yield was accompanied by the lowest maturity rate. This finding illustrates that aggressive ovarian response does not automatically produce a high number of developmentally competent oocytes. The clinical aim should therefore be to optimize both oocyte number and oocyte quality rather than maximizing retrieval alone.

The overall fertilization rate was modest, and marked differences were observed between patients. Importantly, patients with high maturity rates did not always achieve high fertilization rates. This was evident in Patient G, where all retrieved oocytes were recorded as mature but only two fertilized. Fertilization depends not only on nuclear maturity but also on cytoplasmic maturity, sperm competence, activation of the oocyte, technical performance of ICSI, and post-injection culture conditions. Thus, the MII appearance of an oocyte does not guarantee normal fertilization.

The successful formation of blastocysts in patients with suboptimal maturity rates is clinically relevant to the proposed study topic. Patient F had a maturity rate of only 52.7% but still produced seven fertilized oocytes, four cleavage-stage embryos, and one blastocyst. Patient K had a maturity rate of 63.6% and produced three blastocysts, the largest number in the dataset. These observations support the view that poor overall oocyte maturity does not necessarily eliminate the possibility of obtaining viable embryos for transfer.

Nevertheless, the data should not be interpreted as proof that poor maturity has no effect on IVF outcomes. The sample was small, the cycles were clinically heterogeneous, and several important variables were not available. These included patient

age, anti-Müllerian hormone level, antral follicle count, infertility duration, stimulation dose, trigger type, sperm concentration, embryo grades, endometrial thickness, and pregnancy outcomes. Without these factors, it is not possible to determine why certain patients achieved better fertilization or blastocyst development than others.

The different semen sources may also have influenced fertilization and embryo-development outcomes. Fresh semen, frozen semen, and surgically retrieved sperm through testicular sperm extraction were used across the cycles. Sperm obtained from these sources may differ in motility, maturity, DNA integrity, and fertilizing capacity. However, because the study included only a few patients in each semen category, no reliable comparison can be made between fresh, frozen, and TESE-derived sperm.

The study also highlights the importance of accurate and standardized laboratory documentation. Several classifications, including DG, EZ, and Ab, appear in the data tables, but their definitions should be stated in the manuscript. The denominator used to calculate fertilization rate should also be standardized. Fertilization rate is commonly calculated using the number of normally fertilized oocytes divided by the number of mature injected oocytes. Using different denominators can produce inconsistent percentages and make comparison with other centers difficult.

Although embryo transfer was performed in several cycles, the absence of complete outcome data limits the clinical interpretation. Embryo transfer itself is a procedure rather than proof of reproductive success. A successful clinical outcome should be supported by a positive serum β -hCG result, ultrasonographic confirmation of an intrauterine gestational sac, ongoing pregnancy, or live birth. The title of the paper should therefore be revised if no confirmed pregnancy outcome is available. A more accurate title might be “Embryo Development and Transfer Following Poor Oocyte Maturity in IVF/ICSI Cycles at a Fertility Center in Mogadishu, Somalia.”

Overall, the findings provide useful preliminary information about IVF/ICSI laboratory outcomes in a setting where published assisted-reproduction data are limited. The observation that fertilization and blastocyst development occurred despite poor maturity in selected cycles may be valuable for patient counseling and laboratory quality improvement. However, larger prospective studies with standardized

definitions, complete clinical information, pregnancy follow-up, and live-birth outcomes are required before firm conclusions can be drawn about the predictors of IVF success at Marwa Fertility Center.

VI. CONCLUSION

This study found considerable variation in oocyte retrieval, maturity, fertilization, cleavage, and blastocyst development among the 11 IVF/ICSI cycles conducted at Marwa Fertility Center in Mogadishu, Somalia. Although poor oocyte maturity was generally associated with less favorable laboratory outcomes, selected patients with relatively low maturity rates still achieved fertilization, cleavage-stage embryo development, and blastocyst formation. These findings indicate that suboptimal oocyte maturity does not necessarily prevent the production of embryos suitable for transfer, because IVF outcomes are influenced by several interacting clinical, biological, sperm-related, and laboratory factors. However, the absence of complete pregnancy and live-birth follow-up limits conclusions regarding the final clinical success of the cycles. The results should therefore be considered preliminary and interpreted within the context of the small sample size, incomplete patient characteristics, and short study period.

VII. RECOMMENDATIONS

Marwa Fertility Center should strengthen standardized clinical and embryology documentation by consistently recording patient age, infertility diagnosis, ovarian-reserve findings, stimulation and trigger protocols, number of injected MII oocytes, normal fertilization results, embryo grades, endometrial thickness, embryo-transfer details, serum β -hCG results, clinical pregnancy, ongoing pregnancy, and live-birth outcomes. Standard definitions and denominators should be used when calculating maturity, fertilization, cleavage, blastocyst, implantation, and pregnancy rates so that results can be reliably monitored and compared with international benchmarks. The center should also continue laboratory quality-control activities, including equipment monitoring, culture-condition assessment, staff competency evaluation, and regular review of unsuccessful or unexpectedly poor cycles.

Further research should include larger prospective or retrospective cohorts covering longer periods and should examine the relationships between oocyte maturity and maternal age, ovarian reserve, stimulation protocol, trigger timing, semen source, sperm quality, fertilization, blastocyst development, pregnancy, and live birth. Future studies should separate fresh semen, frozen semen, and TESE cycles and use appropriate statistical analysis to identify predictors of successful IVF outcomes. Patient identifiers must remain anonymized, and ethical approval or institutional authorization and informed consent should be obtained where required. Complete follow-up is especially important before describing an embryo transfer as clinically successful, because transfer alone does not confirm pregnancy or live birth.

VIII. CONTRIBUTIONS OF THE STUDY

Theoretical Contributions: The study contributes to the theoretical understanding of IVF/ICSI outcomes by illustrating that oocyte maturity is an important but not exclusive determinant of fertilization and embryo development. The observed blastocyst formation in selected cycles with relatively low maturity rates supports a multifactorial model in which nuclear maturity, cytoplasmic competence, sperm-related factors, laboratory technique, culture conditions, and individualized clinical management interact to influence embryological outcomes.

Empirical Contributions: This study provides preliminary empirical evidence from 11 IVF/ICSI cycles conducted at Marwa Fertility Center in Mogadishu, a setting from which published assisted-reproduction data remain limited. It documents variation in oocyte retrieval, maturity, fertilization, cleavage, blastocyst development, and embryo-transfer activity, thereby adding locally generated data to the broader evidence base on assisted reproductive technology in Somalia.

Methodological Contributions: Methodologically, the study demonstrates the value of routinely collected embryology laboratory records for describing IVF/ICSI performance in resource-limited settings. It also highlights the importance of clearly distinguishing pooled rates from mean patient-level

rates, defining laboratory categories such as DG and EZ, and applying consistent denominators when calculating maturity, fertilization, cleavage, and blastocyst-development rates.

Policy Contributions: The findings support the need for reproductive-health policies in Somalia that recognize infertility care and assisted reproductive technology as important components of reproductive health services. They also point to the value of national or institutional standards for ART data collection, laboratory quality assurance, ethical oversight, patient confidentiality, and follow-up of pregnancy and live-birth outcomes.

Practical Contributions: For clinicians and embryologists, the study emphasizes individualized ovarian-stimulation management, careful timing of final oocyte maturation, standardized laboratory documentation, and continuous quality control. For patient counseling, the results suggest that poor overall oocyte maturity may reduce expected success but does not necessarily exclude fertilization, embryo development, or transfer in every cycle.

Recommendations for Future Research: Future studies should use larger prospective or retrospective cohorts covering longer periods and should collect complete information on maternal age, infertility diagnosis and duration, ovarian reserve, stimulation dose, trigger type and timing, sperm parameters and source, number of injected MII oocytes, normal fertilization, embryo grading, endometrial thickness, implantation, clinical pregnancy, ongoing pregnancy, and live birth. Comparative analyses should examine fresh, frozen, and TESE-derived sperm separately and use appropriate statistical methods to identify independent predictors of fertilization, blastocyst formation, pregnancy, and live birth.

Limitations of the Study: The study is limited by its small sample of 11 cycles, short observation period, retrospective descriptive design, and clinical heterogeneity. Important patient and treatment variables were unavailable, laboratory abbreviations were not fully defined, and some summary values appear inconsistent across tables. In addition, pregnancy-test, clinical-pregnancy, ongoing-pregnancy, and live-birth outcomes were incomplete

or absent; therefore, embryo transfer should not be interpreted as confirmed reproductive success.

IX. DECLARATIONS

Ethical Approval and Consent to Participate

This study used de-identified secondary clinical and embryology laboratory data. No individual-level identifiable information is reported. Formal ethical approval or institutional waiver was not documented in the source manuscript and should be confirmed with the responsible institutional authority before journal submission. Individual informed consent to participate was not applicable to the anonymized secondary-data analysis.

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 de-identified data supporting the findings of this study are held by Marwa Fertility Center. Access may be considered upon reasonable request to the corresponding author and subject to institutional approval, confidentiality requirements, and applicable ethical and data-protection restrictions.

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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.

Author Contributions

Abdirahman Moalim Hassan Ibrahim contributed to the conception of the study, data acquisition, interpretation of the findings, preparation of the manuscript, and approval of the final version. Any additional contributors should be listed according to their actual roles before submission.

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Supplementary Materials

No supplementary materials are included with this manuscript.

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