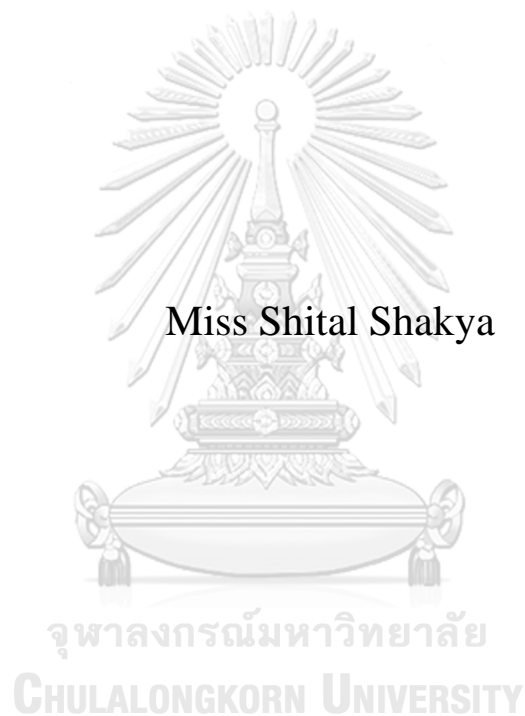


Predictors of Fertility Quality of Life in infertile patients visiting
infertility center in Kathmandu, Nepal: A cross-sectional study.



A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Public Health in Public Health
COLLEGE OF PUBLIC HEALTH SCIENCES
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ปัจจัยทำนาคคุณภาพชีวิตการเจริญพันธุ์ของผู้ป่วยที่มีบุตรยากที่เข้ารับการรักษาในศูนย์รักษาผู้มี
บุตรยาก เมืองการุณมาณฑุ ประเทศเนปาล: การศึกษาภาคตัดขวาง



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ชิตา ทศกษา : บัณฑิตทำนาคคุณภาพชีวิตการเจริญพันธุ์ของผู้ป่วยที่มีบุตรยากที่เข้ารับการรักษาในศูนย์รักษาผู้มีบุตรยาก เมืองกาฐมาณฑุ ประเทศเนปาล: การศึกษากว้างขวาง. (Predictors of Fertility Quality of Life in infertile patients visiting infertility center in Kathmandu, Nepal: A cross-sectional study.) อ.ที่ปรึกษาหลัก : อรสนธิ โอ พันธุ์

ในประเทศเนปาล เกิดภาวะมีบุตรยากเพิ่มขึ้น ซึ่งก่อให้เกิดปัญหาด้านการเจริญพันธุ์ โดยมีอัตราความชุกประมาณ 15 % ซึ่งได้มีการศึกษาเกี่ยวกับคุณภาพชีวิตของผู้หญิงที่มีบุตรยากในอัตราที่น้อยมาก ถึงแม้ว่าภาวะมีบุตรยากจะส่งผลกระทบต่อคู่สมรส แต่ก็ไม่ได้มีการศึกษาเกี่ยวกับคุณภาพชีวิตของผู้ชายและผู้หญิงที่มีบุตรยาก วัตถุประสงค์ของการศึกษา เพื่ออธิบายลักษณะต่างๆของผู้ป่วยที่มีภาวะมีบุตรยาก และค้นหาความสัมพันธ์ระหว่างตัวทำนายเหล่านี้กับคุณภาพชีวิต การศึกษาวิจัยแบบตัดขวาง (cross - sectional study) โดยใช้แบบสอบถาม FertiQoL โดยสำรวจชายและหญิงที่มีบุตรยากจำนวน 409 คน ที่ต้องการการรักษาภาวะมีบุตรยากในศูนย์ดูแลผู้มีบุตรยากในเขต Kathmandu โดยใช้เทคนิคการสุ่มตัวอย่างแบบหลายขั้นตอน เจริญ และสะดวก ความถี่และร้อยละ (%) ถูกนำมาใช้เพื่ออธิบายตัวแปรการทำนายทางสังคมและประชากร เศรษฐกิจสังคม ความสัมพันธ์คู่ คู่สมรสที่เกี่ยวข้องกับการเจริญพันธุ์ และประวัติทางการแพทย์ ผู้ตอบแบบสอบถามเกือบทั้งหมดรู้สึกว่าการมีลูกเป็นสิ่งสำคัญมากสำหรับตนเอง และคู่สมรสสนับสนุนตลอดการรักษาภาวะมีบุตรยาก 60% ของผู้ตอบแบบสอบถามประสบภาวะมีบุตรยากเบื้องต้น และ 53% มีประวัติความล้มเหลวของเทคโนโลยีที่ช่วยเรื่องการเจริญพันธุ์ (ART) ผู้ตอบแบบสอบถามร้อยละ 47 และร้อยละ 19 ได้รับการรักษาด้วยยาต้านไวรัสโดยใช้เซลล์สืบพันธุ์ในตัวเองและผู้บริจาคตามลำดับ ผู้ตอบแบบสอบถามร้อยละ 80 ต้องการความช่วยเหลือด้านจิตใจจากผู้เชี่ยวชาญเฉพาะทาง หลังได้รับการรักษาด้วย ART 48% ของผู้ตอบแบบสอบถามมีคุณภาพชีวิตที่ไม่ดี ความสัมพันธ์ของปัจจัยทำนาย กับคุณภาพชีวิต ได้มีการทดสอบเพื่อหาปัจจัยสำคัญโดยการวิเคราะห์แบบสองตัวแปรและหลายตัวแปร วิเคราะห์ความสัมพันธ์ระหว่างตัวแปรทำนายและตัวแปรผลลัพธ์โดยใช้การทดสอบไคสแควร์ ผลแสดงความสัมพันธ์ทางสถิติที่ p -value 0.001 ได้แก่ การเดินทางไกลเพื่อรับบริการ ความต้องการความช่วยเหลือด้านจิตใจจากผู้เชี่ยวชาญ ระยะเวลาของการมีบุตรยาก ประวัติการรักษาด้วย ART และการรักษาภาวะมีบุตรยากในปัจจุบัน ในทำนองเดียวกัน พบความสัมพันธ์ที่มีนัยสำคัญทางสถิติที่ค่า p -value 0.05 สำหรับตัวแปรต่อไปนี้: เพศ ชั่วโมงทำงาน มีวันหยุดจากการทำงาน การรับรู้ถึงความต้องการมีบุตร ระยะเวลาของการมีบุตรยาก และประวัติการผ่าตัดระบบสืบพันธุ์ ตัวแปรอื่นทั้งหมดไม่มีนัยสำคัญ แบบจำลองการถดถอยโลจิสติกหลายตัวแปรป้อนตัวแปรต่อไปนี้ทั้งหมดจากการวิเคราะห์สองตัวแปร ทั้งหมดที่ระบุข้างต้นที่มีค่า p -value 0.05 ที่มีค่า p -value 0.2; อายุ, เชื้อชาติ, ประเภทครอบครัว, ระดับรายได้, การสนับสนุนของกลุ่มสมรส, การเข้าถึงศูนย์มีบุตร, สาเหตุของภาวะมีบุตรยาก, การเจ็บป่วยเรื้อรัง, การรับประทานยา และสุดท้าย ตัวแปรการศึกษาและประเภทของภาวะมีบุตรยากซึ่งมีนัยสำคัญในเอกสาร ผลการวิเคราะห์หลายตัวแปรโดยการถดถอยโลจิสติกสหคูณได้แสดงความสัมพันธ์ที่มีนัยสำคัญทางสถิติสำหรับตัวแปรต่อไปนี้ เพศหญิง (AOR=1.81, 95% CI=0.32-0.80, p -value 0.004), เข้าถึงเวลาเลิกงานได้ง่าย (AOR=1.96, 95% CI=1.24-3.09, p -value 0.004), เดินทางไกล ระหว่างในการรักษาภาวะมีบุตรยาก (AOR=0.50, 95% CI=1.15-2.86, p -value 0.011), ระยะเวลาสมรสมากกว่า 10 ปี (AOR= 1.68, 95% CI = 1.04-2.71, p -value 0.032) อยู่ระหว่าง ART โดยใช้ self-gametes (AOR=1.71, 95% CI=1.05-2.8, p -value 0.030), อยู่ระหว่างบริจาค ART cycles (AOR=1.99, 95% CI=1.07-3.71, p -value 0.030) และความปรารถนาที่จะ การสนับสนุนทางจิตวิทยาจากผู้เชี่ยวชาญ (AOR=2.21, 95% CI=1.26-3.89, p -value 0.006) เพื่อเป็นการยกระดับคุณภาพชีวิตของผู้ป่วยที่มีบุตรยาก ขอเสนอแนะได้แก่การให้การสนับสนุนด้านจิตใจและอารมณ์แก่ผู้ป่วยที่เข้ารับการรักษาภาวะมีบุตรยาก ควรมีการศึกษาเชิงคุณภาพเพื่อทำความเข้าใจว่าคุณภาพชีวิตได้รับอิทธิพลจากความสามารถในการรับมือและพฤติกรรมของคู่สมรสอย่างไร

สาขาวิชา สาธารณสุขศาสตร์
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Shital Shakya : Predictors of Fertility Quality of Life in infertile patients visiting infertility center in Kathmandu, Nepal: A cross-sectional study.. Advisor: ALESSIO PANZA, M.D.

In Nepal, infertility is a rising reproductive health issue with an estimated prevalence of 15%. There are few studies on quality of life in infertile women, but none on quality of life in infertile men and women although infertility is a shared condition and has effects on couples. The study objective is to describe the various predictors of infertile patients seeking infertility treatment and find association between these predictors and the quality of life. A cross-sectional study using a self-administered disease specific FertiQoL questionnaire was conducted among 409 infertile men and women seeking infertility treatment in an infertility center in Kathmandu district. Multistage, purposive, convenience sampling technique was used. Frequency and percentages were used to describe the predictor variables socio-demographic, socio-economic, couple-related, fertility related characteristics and medical history. Almost all the respondents felt that having a child was very important to them and their partners were supportive throughout the infertility treatment. Almost 60% of respondents were experiencing primary infertility and 53% had a history of assisted reproductive technologies (ART) failure. Forty seven percent and 19% respondents were undergoing ART using self-gametes and donor respectively. Eighty percent of respondents desired professional psychological support following ART treatment. Forty eight percent of respondents had poor QoL. Their associations with the outcome variable poor Fertility Quality of Life were tested for significance by bivariate and multivariate analysis. The bivariate association between the predictor and outcome variables were analyzed by using a chi-square test. The results show highly significant statistical association at p-value 0.001 for independent variables; travel long distance for service, desire for professional psychological support, duration of infertility, history of ART treatment and current infertility treatment. Similarly, a statistically significant association at p-value 0.05 was found for the following variables: sex, work hours, access to day-off from work, cognition for need of children, duration of infertility and history of reproductive tract surgery. All other variables were not significant. The multivariate logistic regression model entered all the following variables from bivariate analysis; all those given above with significance p-value 0.05, those with p-value 0.2; age, ethnicity, family type, income level, partner's supportiveness, approach to fertility center, cause of infertility, presence for chronic illness, intake of medications and finally the variables education and type of infertility which were significant in the literature. The multivariate analysis results by multiple logistic regression have shown statistically significant association for the following variables; female gender (AOR=1.81, 95% CI=0.32-0.80, p-value 0.004), difficult access to get time off from work (AOR=1.96, 95% CI=1.24-3.09, p-value 0.004), long travel distance for fertility treatment (AOR=0.50, 95% CI=1.15-2.86, p-value 0.011), more than 10 years of marital duration (AOR= 1.68, 95% CI = 1.04-2.71, p-value 0.032), undergoing ART using self-gametes (AOR=1.71, 95% CI=1.05-2.8, p-value 0.030), undergoing donor ART cycles (AOR=1.99, 95% CI=1.07-3.71, p-value 0.030), and desire for professional psychological support (AOR=2.21, 95% CI=1.26-3.89, p-value 0.006). To further enhance the quality of life among infertile patients, it is recommended to provide psychological and emotional support to the patients undergoing infertility treatment. Qualitative studies are also recommended to understand how the quality of life is influenced by the coping capability and behavior of the partner.



Field of Study: Public Health

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Student's Signature

Advisor's Signature

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Shital Shakya

LIST OF ABBREVIATIONS

AE = Anejaculation
AMH = Anti-Mullerian Hormone
AOF = Acute Ovarian Failure
ART = Assisted Reproduction Technology
DE = Delayed Ejaculation
EDC = Endocrine Disrupting Chemicals
FertiQoL = Fertility Quality of Life
FSH = follicle stimulating hormone (FSH) and
HH = Hypogonadotropic Hypogonadism
HRT = Hormone Replacement Therapy
ICSI = Intra-Cytoplasmic Sperm Injection
IOC = Item-Object Congruence
IUI = Intra-Uterine Insemination
IVF = In-Vitro Fertilization
KS = Klinefilter's Syndrome
LH = Lutenizing Hormone (LH)
LMIC = Low Middle-Income Countries
PE = Premature Ejaculation
PID = Pelvic Inflammatory Disease
QoL = Quality of Life
RE = Retrograde ejaculation
ROS = Reactive Oxidative Species
TESA = Testicular Sperm Extraction

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CHAPTER I

INTRODUCTION

1.1 Problem Statement

Infertility is the disease of the male or female reproductive system defined by the failure to achieve a pregnancy after a year or more of having regular unprotected sexual intercourse. (Organization, 2021) It is categorized as primary and secondary infertility. Globally 15% of couples of reproductive ages are affected by infertility. Estimates show that one in every seven couples are infertile in developed countries whereas one in every four couples experience infertility in developing countries. (Boivin et al., 2007) Globally, 10-15% of couples experience primary infertility while 3-6% couples are affected with secondary infertility. (Inhorn & Patrizio, 2015).

About 14.4 million infertile couples are living in South Asia, thus contributing to the highest incidence of infertility in the world. (Mascarenhas et al., 2012) About 10-15% of reproductive age couples are affected by infertility in Indonesia. (Harzif et al., 2019) A study concluded 12% prevalence of infertility in Vietnam. (N. I. Kim et al., 2022) Similarly, Malaysia has an estimated infertility rate of 15-20%. (*Malaysia Fertility Rate 1950-2023*, n.d., pp. 1950–2023) In Nepal, the prevalence of infertility is estimated to be around 12% (Neupane et al., 2019) and an estimated 7.4% of women face infertility problem. (Khanal & Journals, 2020). A study conducted in Eastern Nepal found a 5.45% prevalence of infertility predominated by secondary infertility. (Subedi et al., 2016)

Infertility can be caused by male factor, female factor or both factors. Male factors constitute to 30-50% of the cases while female factor contribute to 30% of the infertility cases. About 20-30% of cases result as a combination of both male and female factors. (Agarwal et al., 2015) The prevalence of unexplained infertility or infertility due to unknown causes ranges from 8% to 37%. (Kamath & Deepti, 2016)

Semen disorder accounts to 50% of male infertility cases. (Jungwirth et al., 2012) Low sperm concentrations are major factor causing infertility among 8-18% of men. (Kamath & Deepti, 2016) Similarly, abnormal sperm morphology and low sperm motility accounts to 20-30% of male infertility cases. Testicular defects due to medical conditions like varicocele and acquired genital tract infections contribute to 15-20% (Baazeem et al., 2011) and 10-20% (Henkel et al., 2007) of the cases respectively. Similarly, testicular failure (Jarow et al., 1989), congenital defects in the testicles (Esteves et al., 2011), testicular cancer (Shefi & Turek, 2006) and genetic conditions like Klinefelter syndrome (KS) (Bojesen et al., 2003) affects sperm production leading to testicular failure, thus contributing to further cases of male infertility. About 40% of cases of testicular failure are classified as idiopathic. (A. Sharma et al., 2020)

Similarly, ejaculatory dysfunction is one of the causes for male factor infertility. About 1.2% of infertile men are affected by ejaculatory dysfunction (Esteves et al., 2011) which results in low

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volume of semen ejaculation. Furthermore, it can also result in hypogonadism which is a condition characterized by impairment of testicular function. It leads to low testosterone levels thus affecting production of sperm. (Yialamas & Hayes, 2003) Over 10% cases of male-factor infertility are due to hypogonadism. (Soran et al., 2022) Hypogonadism can either result from primary testicular disorder (hypergonadotropic) or secondary to hypothalamic pituitary function (hypogonadotropic). (Fraietta et al., 2013)

Certain medications like chemotherapeutic agents, calcium channel blockers, colchicine, sulphasalazine are associated with testicular failure. (Hendry, 1998) Antidepressant drugs are found to be associated with male factor infertility. (Brezina et al., 2012) Men can pregnant less than 1 out of 1000 woman following male sterilization. (Trussell, 2011) Around 12% of infertility cases remain idiopathic. (Esteves et al., 2011) Male reproductive function is vulnerable to various environmental exposure. (López-Botella et al., 2021) Lacking clinical evidences show that endocrine disrupting chemicals (EDC) like bisphenol A, phthalates, pesticides and other environmental chemicals affect fertility by disrupting development of gonads during fetal life. (Skakkebaek et al., 2016) Exposure to heavy metals like Zn, Cr, Cu, Fe, Pb and As negatively affect male fertility by lowering seminal quality. (Balabanič et al., 2011) Radioiodine therapy for thyroid disease can lead to testicular damage and abnormal spermatogenesis. (Sawka et al., 2008) Radiation from X-rays have harmful effects on sperm parameters and induce oxidative stress. (Kesari et al., 2018) Prolonged exposure to heat and high temperatures induce spermatid damage and reduction in sperm count and concentration. (Hamilton et al., 2016)

Health behaviors like excessive alcohol intake, smoking and use of recreational drugs pose as a risk for reduced fertility in men. (Li et al., 2011) Use of recreational drugs like cannabis, androgens and opioids is associated with reduction in sperm parameters. (Bracken et al., 1990) Men who are inactive and lead a sedentary lifestyle were found to have reduced sperm quality, especially in the presence of concomitant comorbidities like diabetes and obesity. (Vaamonde et al., 2012) Men with high or low BMI (less than 19 kg/m² or more than 30 kg/m²) are associated with decreased testicular volume and reduced sperm quality due to impairment in spermatogenesis. (Jensen et al., 2004) Exposure of pollutants, sauna, clothing, sleeping position, use of laptop, prolonged driving, welding are associated with scrotal hyperthermia and decreased sperm concentration and motility. (Krzastek et al., 2020) (Jurewicz et al., 2018).

Male infertility can have a significant impact on couple's ability to conceive. Infertile men are found to experience higher levels of psychological distress compared to fertile men. (Dyer et al., 2009) Infertile men are likely to experience anxiety, depression and stress in their life which has negative impact on fertility. Additionally, the psychological effects also impact on infertility treatment and overall Quality of Life (QoL). (Maroufizadeh et al., 2018) Men may experience the feelings of anger, guilt, sadness, and disappointment. They may also struggle with feeling of failure. The diagnosis of male infertility can be difficult for men because the society has more expectations from men to fulfill the desire of a child. (Nieuwenhuis et al., 2009) Ejaculation difficulties may result due to emotional stress and physical demands following fertility treatment which can lead to distress and frustration in men. (Kondoh, 2011) It can contribute to decreased coital frequency resulting in lower sexual satisfaction and thus affecting sexual relationship of the couples which eventually affects the QoL. (Tao et al., 2012)

Medical treatment can help men experiencing infertility. Medications to increase sperm count and surgeries to correct varicocele and other physical abnormalities can aid to mitigate the

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fertility problems in men. (Dabaja & Schlegel, 2014) Assisted reproductive technologies such as In-vitro fertilization (IVF) and Intracytoplasmic Sperm Injection (ICSI) have helped many infertile men with low sperm count and other fertility issues to father a child. (Merchant et al., 2011) Lifestyle changes such as avoid smoking, decreased alcohol consumption and maintaining body weight can improve sperm parameters in men and hence increase the chances of conception. (Durairajanayagam, 2018) Stress can have a negative impact on the quality of sperm, hence practicing yoga, exercise and meditation is an important aspect to ensure stress management. (Sengupta et al., 2013) Men can seek emotional support from therapist or counselor or support groups to help them cope up with emotional and psychological effects of infertility. Couples should openly communicate and share their feelings throughout the process to conceive. (Fisher & Hammarberg, 2012) Adoption can be another option for couples who are not able to conceive a child.

WHO estimates that female factor is the main cause of infertility among 37% of infertile couples. (Duffy & Allen, 2009) Several causes of female infertility include anatomical abnormalities, ovulatory and menstrual disorders, endometriosis, certain drugs and medications and unexplained infertility. Ovulatory disorders accounts to a major cause of infertility. About 25% cases of female infertility is caused by ovulatory disorders. (Walker & Tobler, 2022) Polycystic Ovarian Syndrome (PCOS) is predominant cause of anovulatory infertility (a condition in which ovulation doesn't occur) thus affecting 7 to 15% of reproductive age women. (Collée et al., 2021) Other causes include premature ovarian failure, autoimmune diseases and thyroid dysfunction. (Szeliga et al., 2021) Premature ovarian failure accounts to 1.1% of global prevalence in female infertility. (Fauser & Van Heusden, 1997) Infertility prevalence of 2-4% was found among women with thyroid disorders. (Krassas, 2000)

Tubal factor infertility accounts to 25-30% of female infertility cases. (Ambildhuke et al., 2022) Tubal factor infertility may occur because of pelvic inflammatory disease (PID), sexually transmitted infection (STI), history of ectopic pregnancy and prior tubal surgery. (Kavanagh et al., 2013) Furthermore, endometriosis may lead to endocrine and ovulatory disorders thus affecting female fertility. (Ozkan et al., 2008) About 30 to 50% of women with endometriosis experience infertility. (Counseller, 1938) Prevalence of uterine fibroids is high at 2-3% among infertile women. (Freytag et al., 2021) Endometrial polyps are the commonly reported uterine abnormalities with incidence of 16.7% in patients with recurrent implantation failure after IVF. (Fatemi et al., 2010) Congenital abnormalities like uterine septum accounts to 8% of female infertility cases. (Chan et al., 2011) Problems in cervical mucus can prevent sperm from entering the uterus, thus affecting reproduction. However, this is a rare cause of infertility. (*Infertility Problems With Cervical Mucus - Women's Health Issues*, n.d.)

Use of recreational drugs like marijuana, cocaine, LSD creates slightly elevated risk of ovulatory abnormality. (Mueller et al., 1990) Cytotoxic drugs like cyclophosphamide, methotrexate and 5-fluorouracil used in the treatment of cancer are great stimulators for infertility. Studies show that the treatment resulted in loss of ovarian function among 30% of the patients. (Sonmezer & Oktay, 2006) Anticancer treatments like radiation, chemotherapy and surgery can severely damage ovarian function and lead to premature ovarian failure, thus affecting fertility. (Spears et al., 2019) About 10-17% of infertile women experience

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unexplained or idiopathic infertility.(Ehsani et al., 2019) Women who undergo sterilization are more than 99% infertile. (Female Sterilisation, 2017)

Age is one of the major risk factors for female infertility. Increase in age results in decline in the number of oocytes. Quality of existing oocytes and intercourse frequency is also decreased with age. (ESHRE Capri Workshop Group, 2005) Certain lifestyle factors like smoking, alcohol intake and obesity can decrease egg quality and ovulation rate, which can increase the risk of infertility in women. (R. Sharma et al., 2013) Increase in BMI impose an increased risk of ovulatory disorder in women. (Rich-Edwards et al., 2002) Excessive caffeine intake is found to be associated with increased risk of spontaneous abortion (Chen et al., 2014), reduced fecundity, and delayed conception. (Hassan & Killick, 2004) Substance abuse and use of recreational drugs (Monica Bari, 2011) Increased use of pesticides and insecticides, prolonged exposure to endocrine disrupting chemicals (EDCs) (Ding et al., 2016) and use of certain solvents used in paints, pharmaceuticals may negatively affect fertility. (Lipscomb et al., 1991) Certain medications like opioids, antidepressants and chemotherapy can reduce the egg quality and ovulation rate, hence increasing the risk of infertility. (Duffy & Allen, 2009) Exposure to environmental toxins like BPA, lead, cadmium, pesticides also pose a risk for decreased reproductive function in females. (Piazza & Urbanetz, 2019) Noise pollution can have impact on behavioral and physical well-being of individual. (Stansfeld & Matheson, 2003) Exposure to radiation like X-rays can prove to be detrimental to female reproductive function. (De Santis et al., 2007) Overnutrition and undernutrition can negatively affect fertility. (Pasquali et al., 2003) Having a history of medical conditions like diabetes and PCOS can be a risk factor for infertility. (Dennett & Simon, 2015)

Women who experience infertility can have significant effects on emotional and psychological well-being. (Hasanpoor-Azghdy et al., 2014) Infertile women are at high risk of developing depression, anxiety, stress, and relational difficulties. Comparatively, higher levels of anxiety and depression were found among infertile women. (Drosdzol & Skrzypulec, 2009) Infertile women were found to be more distressed than infertile men. (T. Y. Lee & Sun, 2000) The emotional effect can lead to decreased quality of life (QoL). (Rooney & Domar, 2018) Infertility has negative effect on sexual function, body image and self-esteem of women. Consequences of infertility can be seen as relationship difficulties such as decreased sexual and emotional intimacy and increased conflict. The effect of infertility is significantly higher in women compared to men due to physical hardships undergoing treatment and increased pressure of the society on the women for childbearing. It has negative impact on overall QoL in women. (J.-Y. Wang et al., 2022)

Intake of nutrient rich diet is associated with lower risk of ovulatory infertility in women. (Chavarro et al., 2007) Antioxidants can reduce the damage of reactive oxidative species from factors like smoking and drinking thus preventing damage to oocytes, which ultimately reduce its impact on fertility. (Showell et al., 2011) Fertility drugs like clomiphene citrate and gonadotropins are useful to stimulate ovulation in women. (M. Sharma & Balasundaram, 2022) Intrauterine insemination (IUI), In-Vitro Fertilization (IVF), Intracytoplasmic sperm injection (ICSI) are the advancements in assisted reproduction technologies (ART) which can assist the couples experiencing infertility.(Kol, 2014) Exercise can help to reduce stress related to infertility. (Goldman & Hatch, 1999) A reduced risk of ovulatory dysfunction was associated with 30 minutes of exercise per day. (Chavarro et al., 2007) Psychological counselling and support to the couples through the emotional journey of infertility can help them to cope up with the emotional and psychological challenges associated with infertility.(Rooney & Domar,

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2018) Adoption is the final option for couples who couldn't conceive a child naturally or through infertility treatments.

Cost is a huge barrier for infertility treatment. (Mosalanejad et al., 2014) Insurance plans usually do not cover the cost of infertility treatments and since the treatment costs are very high, many infertile couple do not seek medical assistance. (Berger et al., 2013) Limited access to infertility care is another barrier for infertility treatment. Couples may need to travel long distances frequently once they enroll in the treatment, thus imposing a financial and logistic burden among the couples. (Blakemore et al., 2020) Alternatively, treatment options including ART may not be available in all areas. Lack of awareness about the available treatment options can also be a barrier among the couples seeking for infertility treatment. (Domar et al., 2021) Increasing age is another barrier for seeking medical treatment. As the age increases among the couples, it becomes more difficult to conceive and treatments may also have lower success rates. (Mosalanejad et al., 2014)

The multiple embryos transferred in the uterus during the IVF cycle increases the chances of multiple pregnancy. ('In Vitro Fertilization and Multiple Pregnancies', 2006) About 30% of pregnancies from IVF treatments result in multiple gestations. Similarly, the incidence of ectopic pregnancy is about 1-2% among women who undergo IVF treatments which is comparatively higher than the risk in fertile population. (Patil, 2012) These complications can be a barrier as they increase the risk associated with pregnancy and childbirth. Apart from that, it can lead to emotional and financial burden among the couples. (Hasanpoor-Azghdy et al., 2014) Many couples hesitate to seek infertility treatment because of the emotional barriers. They may feel ashamed or embarrassed to talk about the infertility issue and hence may be reluctant to access the treatment option. (Domar et al., 2012) Couples may be reluctant to seek for help because of the religious and cultural beliefs present in the society regarding infertility. These beliefs and values may discourage or prohibit the use of certain treatments. (van Balen & Bos, 2009)

Hence, infertility is one of the greatest stressors leading to diminished quality of life. Infertility and its treatment negatively impact on couple's marital relationship, sexual life, psychological state and interpersonal relationships. (Shi et al., 2022) A poor psychological state can have adverse effects on pregnancy rate of ART treatment as well as on pregnancy outcome. (Cooper et al., 2007) Identified factors influencing quality of life include young age, female gender, lower educational level, primary infertility, longer duration of infertility, higher will to have a child, diminished psychological status, altered marital relationship and previous history of assisted pregnancy. (Ni et al., 2021)

1.2 Research Gap

Using the keywords "Infertility" or "infertile" or "childless" AND "Quality of Life", a search was conducted on online databases Medline Ovid and Google Scholar. The search was restricted between 2000-2023. The language used for the search was English. A total of 268 studies were obtained: 164 from Medline Ovid and 57 from Google Scholar. On reviewing the titles of the studies, 133 studies from Medline Ovid were found to be relevant to our study. However, some discrepancies were observed during the search in Google Scholar, hence it was discarded. Only one study out of 133 was conducted in Nepal. However, the study assessed the quality of life among infertile women attending an infertility center using a SF-36

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questionnaire. (Pradhan Shrestha et al., 2020) Since the study was conducted only in infertile women and used a different measurement tool, it was discarded. Out of remaining 132 relevant studies, 20 were discarded because they didn't use FertiQoL as the measurement tool. Hence, we were left with 103 studies which were conducted using FertiQoL questionnaire. Among them, 86 studies were discarded because the papers studied QoL among either male or female only. Hence, we retrieved only 17 studies related to assessment of QoL among couples. On reading the abstract of the 17 studies, 15 studies were discarded because the studies were not relevant to Low Middle-Income Country (LMIC). Hence, only two relevant studies conducted in LMIC and among infertile couples were obtained.

Additionally, a search was done on Nepal Journals Online (NepJoL) using the keywords "Infertility" or "Infertile" or "Childless" and "Quality of Life" in English and Nepali language which resulted in one study and was a duplication of study retrieved from Medline Ovid. This study was discarded due to assessment only in infertile women and use of a different measurement tool.

However, on accessing the available grey literature in libraries and universities, a thesis abstract was retrieved from the Faculty of Graduate studies, Mahidol University, Thailand. The study was conducted in an infertility center in Kathmandu, Nepal which identified factors associated with QoL among infertile women using FertiQoL as a measurement tool. However, the study doesn't analyze poor QoL and its association with predictor variables. Additionally, the study is conducted only among infertile women. (Pradhan et al., 2013)

The first research gap identified is that only two studies were identified from the search on QoL among infertile patients in LMICs. The second research gap is that based on the search, the principal researcher couldn't find studies on QoL conducted among infertile patients with special attention to infertile couples in Nepal. Third research gap is that only one study has been identified from the search which was conducted in Nepal using disease specific "FertiQoL" questionnaire. Furthermore, no studies were identified from the search which assessed association between patients' characteristics and QoL among patients who individually or as couples seek infertility treatment in Kathmandu, Nepal.

The research aims to study QoL among infertile patients individually or in couples as patients often approach individually to the infertility centers. Additionally, the study will assess association between characteristics of infertile patients and QoL using the standard and valid FertiQoL questionnaire as a measurement tool.

Hence, if the study achieves its objectives, the findings will provide information needed to develop appropriate supportive interventions to serve the needs of infertile patients in Nepal. Additionally, the study will pave a path for future research in Nepal that can easily adopt a validated tool which specifically focuses on accessing the impact of infertility on QoL of infertile patients.

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1.3 Research Hypothesis

1.3.1 Null Hypothesis

There is no significant association between quality of life and characteristics of infertile men and women visiting infertility center in Kathmandu, Nepal.

1.3.2 Alternative Hypothesis

There is significant association between quality of life and characteristics of infertile men and women visiting infertility center in Kathmandu, Nepal.

1.4 Research Questions

1. Is there any association on quality of life due to sociodemographic characteristics on infertile men and women visiting infertility center?
2. Are there any association on quality of life of infertile men and women visiting infertility center based on their socioeconomic status?
3. Is there any association of couple-related characteristics on quality of life of infertile men and women visiting infertility center?
4. Is there any association of fertility-related characteristics on quality of life of infertile men and women visiting infertility center?
5. Are there any association of quality of life based on their medical history of infertile men and women visiting infertility center?

1.5 Research Objectives

General Objective

To describe the characteristics of infertile men and women and to evaluate association between these characteristics and quality of life among men and women visiting infertility center in Kathmandu, Nepal.

Specific Objectives

1. To describe socio-demographic, socio-economic, couple-related, fertility related characteristics and medical history of infertile men and women visiting infertility center in Kathmandu, Nepal.
2. To determine association of socio-demographic factors on QoL of infertile men and women visiting infertility center in Kathmandu, Nepal.
3. To assess the association between socio-economic status and QoL of infertile men and women visiting infertility center in Kathmandu, Nepal.
4. To evaluate association between couple-related characteristics and QoL of infertile patients visiting infertility center in Kathmandu, Nepal.
5. To assess the association between fertility-related characteristics and QoL of infertile patients visiting infertility center in Kathmandu, Nepal.
6. To find association between medical history and QoL of infertile patients visiting infertility center in Kathmandu, Nepal.

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1.6 Conceptual Framework

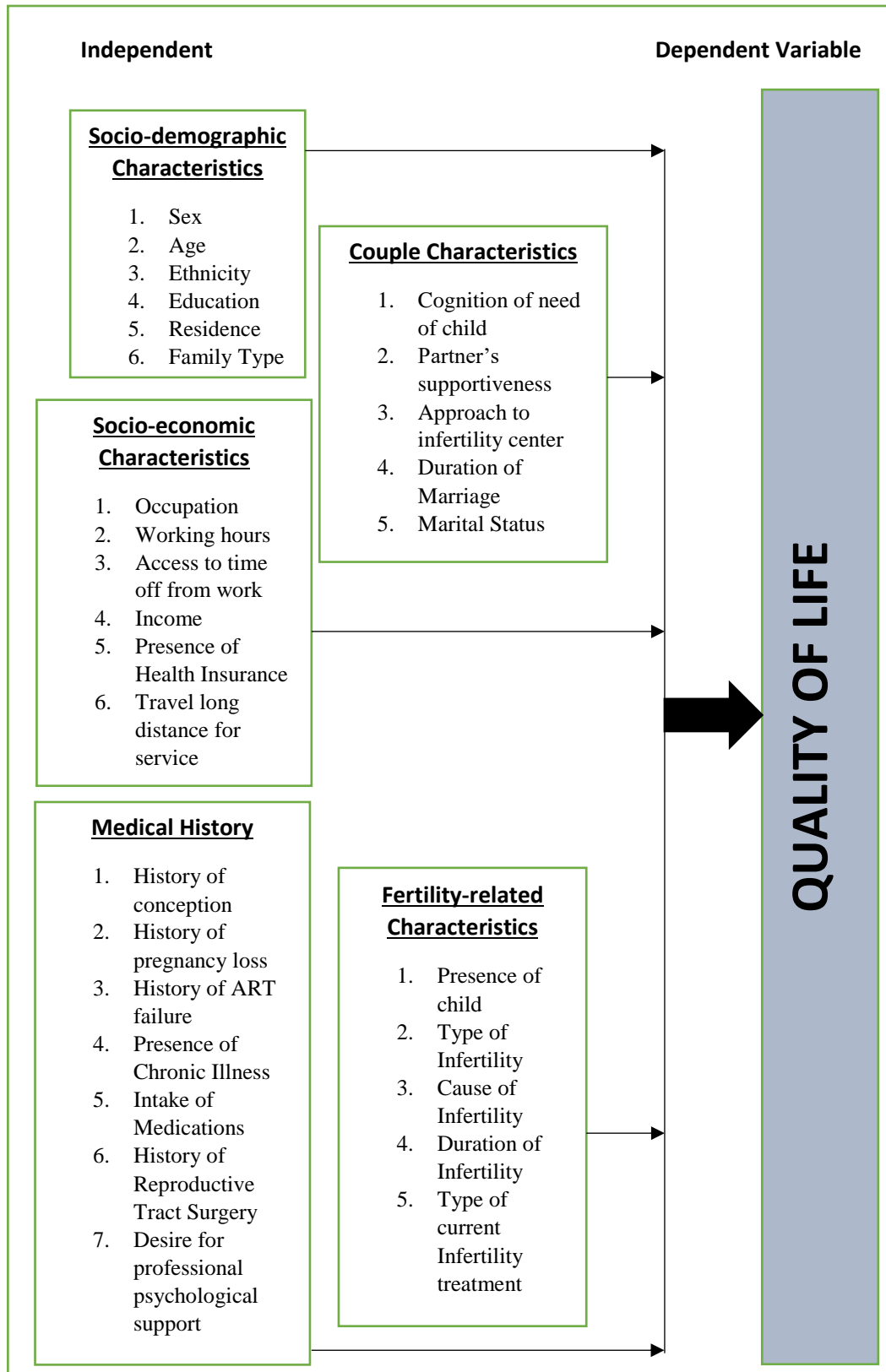


Figure 1 Conceptual Framework

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1.7 Operational Definitions

Independent Variables

1.7.1 Sociodemographic Variables

- 1.1 Age (in years)** : refers to the self-reported completed age at the last birthday of the participant at the time of the interview.
- 1.2 Sex**: refers to the self-reported biological sex of the respondent.
- 1.3 Ethnicity**: refers to the self-reported ethnicity of the respondent. It was classified according to Nepal DHS survey as Brahmin, Chhetri, Newar, Janajati and Others.
- 1.4 Education level** : refers to the self-reported highest level of education that the participant had attained at the time of the interview. It was classified according to sociodemographic studies as not literate (never went to school but can read and write in Nepali), primary education (grade 1-8), secondary education (grade 9-12), Bachelors, and Masters and above.
- 1.5 Residential area**: refers to the self-reported area of current and permanent residence. It was classified as urban and rural. According to Nepal DHS survey, urban area and rural area is represented by the presence of urban municipality (Nagarpalika) and rural municipality/ Village Development Committee (Gaupalika) respectively in the area of residence.
Metropolitan, Sub-Metropolitan and Urban Municipality (Nagarpalika) are considered as urban area.
Rural Municipality and Village Development Committee (Gaupalika) are considered as rural area.
- 1.6 Family type**: refers to the self-reported type of family the participants are living in. It was classified according to Nepal DHS survey as nuclear and extended family.
Nuclear family = consists of husband, wife, and children without any other relative living in the same house.
Extended family = consists of husband, wife, and children with other relative living in the same house.

1.7.2 Socioeconomic variables

- 1.7 Occupation**: refers to the self-reported type of work in which the respondents were involved in at the time of interview. It was classified as Laborer, Service-oriented, Self-employed, and Unemployed.
Laborer represents manual laborer who work on the basis of daily wages.
Service-oriented represents private and/or public service-oriented work.
Self-employed represents freelance, business or entrepreneur.
- 1.8 Access to time off from work**: refers to the self-reported access granted by the workplace to take time-off for frequent visit to the infertility center for treatment. It was classified as: Very Easy, Easy, Neither Easy nor Hard, Hard, Very Hard. It was later categorized as Easy, Neutral and Hard.
- 1.9 Working hours** : refers to the self-reported daily hours of work related to the respondent's occupation. Those who responded as unemployed mentioned zero

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working hours. It was open-ended which was classified as zero hours, 1-8 hours and ≥ 9 hours.

1.10 Income level: refers to the self-reported monthly individual income of the couple in Nepali Rupees. The categorization of income level was done as such; less than NRs. 20,000, between NRs. 20,000-50,000, between NRs. 50,000-100,000 and above NRs. 100,000 .

1.11 Travel long distance for service: refers to self-reported answer to whether the respondents had travelled to Kathmandu valley specifically for fertility treatment. It was classified as yes and no.

1.12 Presence of health insurance: Refers to the self-reported presence or absence of any health insurance which covers the infertility treatment cost. It was classified as yes and no.

1.7.2 Couple-related variables

1.13 Marital status: Refers to the self-reported number of marital partners that the respondent had by the time of interview. It was classified into first marriage and second marriage.

1.14 Duration of marriage: Refers to the self-reported duration (in years) of marriage with the current partner.

1.15 Presence of biological child: Refers to the self-reported number of living biological child/children the respondent has at the time of interview. It was dichotomized as no children and one or more children.

1.16 Cognition for need of children: Refers to the self-reported perception on the cognition for need of a child for the respondent at the time of interview. It was classified as very important and not very important.

1.17 Supportiveness of partner: Refers to the self-reported support of partner throughout the fertility treatment. It was classified under Likert Scale as not supportive at all, not so supportive, neither supportive nor non supportive, supportive, and very supportive.

1.18 Approaching infertility center: Refers to whether the respondent visited the clinic for treatment alone or with the partner at the time of interview. It was reported by the investigator. It was classified as Individually and With Partner.

1.7.3 Fertility-related variables

1.19 Type of Infertility: Refers to the type of infertility the patients are experiencing. It was assessed through medical records and reported by the investigator. It was classified as Primary Infertility and Secondary Infertility.

1.20 Cause of Infertility: Refers to the factor associated for infertility as diagnosed by the obstetrician/ gynecologist. It was reported by the investigator by referring to the medical record of the patient. It was classified as male factor, female factor, combined factor and unexplained (unknown).

1.21 Duration of infertility: Refers to the duration (in years) which the patients have spent trying to conceive which includes with and without medical help. It was reported by the researcher by reviewing the medical history.

1.22 Type of current infertility treatment: Refers to the type of infertility treatment the patients are undergoing at the time of survey. It was reported by the investigator by

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referring to the medical record of the patient. It was classified as timed intercourse (TI), Intrauterine insemination (IUI) with husband sperm, IUI with donor sperm, IVF/ ICSI using self gametes (sperm and egg), IVF/ICSI with donor sperm, egg donation and embryo donation. It was later categorized as TI, ART (self) which included IUI(H) and IVF/ICSI (H), and ART(donor) which included IUI(D) IVF/ICSI(D), egg donation and embryo donation.

Timed Intercourse = “A simple treatment option for infertility which involves monitoring of ovarian cycle via ultrasound and hormone testing and then having sexual intercourse around the time of ovulation.”

Ovarian stimulation = “Pharmacological treatment in which ovaries are stimulated with gonadotropins and/or other pharmacological compound with the intention of inducing the development of ovarian follicles.”

Intrauterine Insemination (IUI) = “A procedure in which laboratory processed sperm are placed in the uterus to attempt a pregnancy.” It can be done using the sperm from a husband or a donor which is called IUI(H) or IUI(D) respectively.

In-vitro fertilization (IVF) = “A sequence of procedures that involves extracorporeal fertilization of gametes. It includes conventional invitro insemination and ICSI.”

Intracytoplasmic Sperm Injection (ICSI) = “A procedure in which a single spermatozoon is injected into the oocyte cytoplasm.”

Testicular Sperm Aspiration (TESA) = “A surgical procedure involving one or more testicular biopsies or needle aspirations to obtain sperm for use in IVF and/or ICSI”

The definitions are obtained from “The International Glossary on Infertility and Fertility Care 2017”.

1.7.5 Medical History

1.23 Presence of chronic illness: Refers to the presence of any comorbid conditions at the time of data collection. It was reported by the investigator by referring to the medical record of the patient. It was categorized as yes and no. In case of presence of chronic illness, it was specified by the investigator.

1.24 Intake of medicines: refers to the medications except fertility drugs which the respondents were taking at the time of interview. It was reported by the investigator by referring to the medical record of the patient. It was dichotomized as yes and no. In case of taking any medications, it was specified by the investigator.

1.25 History of pregnancy loss: Refers to the history of pregnancy loss by the time of survey. It was reported by the investigator by referring to the medical record of the patient. It was classified as no history of pregnancy loss, missed abortion, spontaneous abortion, and induced abortion.

Spontaneous abortion= Spontaneous demise of a pregnancy, which has been confirmed by at least two positive b-hCGs in the serum or urine. (ESHRE)

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Induced abortion= Termination of pregnancy using drugs or surgical intervention after implantation and before the embryo or fetus has become independently viable.

1.26 History of ART failure: Refers to the history of failing ART treatment in the past. It included history of IUI failure and history of IVF/ICSI failure. It was reported by the investigator by referring to the medical record of the patient. It was classified as yes and no. If presence of history of ART failure, the number of failures was specified by the investigator.

1.27 History of reproductive tract surgery: Refers to the history of surgeries related to the reproductive tract including tubal ligation, vasectomy, etc. It was reported by the investigator by referring to the medical record of the patient. It was classified as yes and no. In case of any history of reproductive tract surgery, it was specified by the investigator.

1.28 Professional psychological support: Refers to the self-reported desire for psychological support from the provider following infertility and infertility treatment. It was dichotomized as yes and no.

Dependent Variable

Quality of life

Quality of Life (QoL) refers to infertile patient's or couple's perception of their life in relation to their physical/mental state, relational state, emotional state, social relationships, treatment environment and treatment tolerability. The FertiQoL questionnaire was used to assess the quality of life in infertile patients. The mean total scores obtained from the self-reported FertiQoL questionnaire was used as cut-off point to categorize FertiQoL as good and poor which was used to measure the quality of life.

The values lower than the mean total score indicated poor Quality of Life.

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CHAPTER II

LITERATURE REVIEW

2.1 Problem Statement

WHO defines infertility as a disability, “an impairment which is a problem in body function or structure”. According to WHO, “Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse.” (Organization, 2021) It is classified as primary infertility and secondary infertility. Primary infertility is the condition when a woman has never conceived after regular unprotected sexual intercourse for 12 months or more. Secondary infertility is the condition with at least one successful conception in the past but the incapability to conceive at present despite unprotected sexual intercourse for 12 months or more.

Globally, infertility affects 8-12% of couples of reproductive age. (Ombelet et al., 2008) Prevalence of infertility ranges between 3% and 25% (Dohle et al., 2005). The prevalence of infertility ranges from 6.9% to 9.3% in developing countries. (Boivin et al., 2007) A study concluded that 56% of couples in developed countries and 51% of couples in developing countries were seeking for medical assistance. (Ledger, 2009)

Low middle income countries of South Asia and sub-Saharan regions have higher infertility prevalence rates from 22% to 29% which accounts to about 14.4 million and 10 million couples respectively. (Mascarenhas et al., 2012) A systematic review of national health surveys reported that out of 186 million infertile couples, around 18 million experienced primary infertility and 168 million suffer from secondary infertility which accounts to 2.5% and 25% of the couples respectively. (Sun et al., 2019) By 2010, Sub-Saharan Africa and South Asia had the fourth and second highest prevalence of primary infertility respectively. (Mascarenhas et al., 2012) A prevalence of 25% cases of infertility was reported in China. (Zhou et al., 2018)

Nepal has observed a steady decline in total fertility rate (TFR) from 4.8 births per women in 1996 to 2.1 births per woman in 2022. National Demographic and Health Survey conducted in 2022 estimates that 13-15% of couples are living with infertility in Nepal based on the TFR. (Nepal Demographic and Health Survey 2022 - Key Indicators (English), n.d.) A survey conducted in eight districts of Nepal concluded that 7.4% of reproductive aged woman had infertility problem. (Adhikari et al. - *Infertility, Childlessness, and Healthcare Seeking.Pdf*, n.d.) A study conducted by Pradhan Shrestha et al. in an infertility center of Kathmandu found higher prevalence of primary infertility at 63.38% compared to 24.93% prevalence of secondary infertility. (Pradhan Shrestha et al., 2020) A hospital based study in Nepal found that 65.8% and 34.2% infertile women had primary and secondary infertility respectively. (Subedi et al., 2016) A retrospective study conducted in a hospital from 2008-2018 found that 74.7% of the cases were primary and the remaining 26.5% were secondary infertility. (Tamrakar & Bastakoti, 2019)

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Both men and female contribute more or less equally to the infertility problem. Incidence for male infertility is between 30-50% and female infertility accounts to 50% of the cases. Similarly, 20-30% of cases are due to the combination of both male and female factors. (Agarwal et al., 2015) One in eight women and one in ten men aged 15-49 years have experienced infertility. (Datta et al., 2016)

2.2 Male Infertility

Around 40-50% of infertility cases are caused by male-factor infertility. (Speroff & Fritz, 2005) The prevalence of infertility in age-standardized to 15-49 years among men increased by around 8% in 2017. (Sun et al., 2019) Approximately 7% men faced fertility problems during their reproductive life. (Nieschlag & Behre, 2001) A study done by Liang et. al found that male infertility contributed to 13.91% of the cases and prevalence of unexplained factor infertility was 23.48%. (Liang et al., 2021) Male infertility is caused by various medical and environmental factors.

2.2.1 Causes of Male Infertility

1. Medical Factors

1.1 Sperm disorders

Sperm Disorders refer to problems in the sperm resulting in low sperm count, abnormal sperm morphology or low motility. Semen disorder contribute to 50% of male infertility cases. (Jungwirth et al., 2012) Globally, it is predicted that low sperm concentrations are the major factor causing infertility among 8-18% of men. (WHO Laboratory Manual for the Examination and Processing of Human Semen, n.d.) Similarly, abnormal sperm morphology and low sperm motility accounts to 20-30% of male infertility cases.

Men having sperm parameters below WHO normal range (refer to Table 2) are termed as infertile. (Plachot, Belaisch-Allart et al. 2002) Low sperm count is defined by the count less than 15 million sperm per milliliter per ejaculate. (Low Sperm Count, 2017) Abnormal sperm morphology refers to the abnormality in the shape and size of the sperm. Low sperm motility is the condition where only 40% or fewer sperm can efficiently move through the reproductive tract to reach an egg. About 90% of male infertility problems arise due to abnormality in sperm count and significant association have been studied between abnormal semen parameters and sperm count. (Sabra and Al-Harbi 2014)

Table 1 WHO reference range of semen analysis and related abnormalities

Semen Parameter	Reference Range	Abnormality	Description
Semen volume	$\geq 1.5\text{ml}$		

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Sperm concentration	≥15 million	Azoospermia	Absence of sperm in the ejaculate.
		Aspermia	Absence of seminal fluid on ejaculation.
		Oligospermia	<15million spermatozoa/ml
Total sperm count	≥39 million sperm/ ejaculate		
Total sperm motility	≥40% motile sperm	Asthenozoospermia	<40% total motile spermatozoa or <32% progressive motile spermatozoa
Sperm Morphology	≥4% morphologically normal sperm	Teratozoospermia	<4% normal form/ morphology

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Studies showed significant decline in semen quality, sperm count, motility, and morphology in relation to age. (Molina, Martini et al. 2010)(Mukhopadhyay et al., 2010) A study concludes that there has been a steady decline of sperm count among

healthy men by 1% per year and sperm density has decreased by 50% for over past 50-60 years. (Carlsen et al., 1992) A 10-year comparison study conducted in India on sperm quality and quantity showed that ejaculate volume decreased from 15% to 3% and sperm morphology was reduced by 7%. (Sengupta 2012) The decline in sperm quality has increased due to increasing incidence of male genital tract abnormalities like testicular cancer and cryptorchidism. (Bussen et al., 2004)(Giwerzman & Skakkebaek, 1992)

1.2 Testicular Dysfunction

Defects in testicles is characterized by any structural or functional abnormality in one or both testicles thus affecting men's ability to produce or release healthy sperm. A study found 12% prevalence of testicular defects in infertile men seeking treatment. Testicular dysfunction may be due to acquired causes like infections, varicoceles, testicular trauma or torsion or

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malignancy; congenital causes like Klinefelter's syndrome (KS) or due to idiopathic causes. (A. Sharma et al., 2020)

Varicocele is a common condition leading to male infertility due to the poor development of testicles. The condition is characterized by enlargement of veins within the skin that holds the testicles (scrotum). (Varicocele - Symptoms and Causes, n.d.) It is one of the major causes for testicular dysfunction leading to semen disorders with a prevalence of around 15-20%. (Baazeem et al., 2011) Some studies has also found an incidence between 35% to 40%. (Rotker & Sigman, 2016) WHO conducted a multicenter study among infertile couples of different geographical regions and found that the prevalence of varicocele ranged from 6% to 47%. (World Health Organization, 1992) A study conducted among infertile males in Pakistan concluded that 22.8% of the cases accounted to varicocele. Additionally, varicocele prevalence was 26% among Chinese male and 42.7% among Indian men. (Karimpour Malekshah et al., 2011) (Zhang et al., 2017)

Infertility due to acquired genital tract infection varies between 10-20%. (Henkel et al., 2007) Infections in male infertility present as urethritis, prostatitis, orchitis or epididymitis and are curable causes of male infertility. The infection prevalence is more common in developing countries. (A. Sharma et al., 2020) Infection leads to inflammation of epididymis which can affect fertility through sperm tract obstruction. (Stojanov et al., 2018) Increased risk and incidence of infertility has been studies among men with Hepatitis B and Hepatitis C infections. (A. Sharma et al., 2020) Some of the viral infections like HSV or HIV-1 are found to be associated with poor semen and sperm quality. (Kapranos et al., 2003)(Umopathy et al., 2001) Viruses like Human Papilloma virus (HPV) has been found in the semen of men experiencing male infertility. (Lyu et al., 2017)

Testicular trauma is an acquired cause of male infertility. It can lead to testicular torsion, displacement of testes and epididymitis. Studies on testicular trauma leading to infertility is rare. (Kukadia et al., 1996) With a prevalence of 19% cases of azoospermia, it is one of the leading causes of male factor infertility. (Öztekin et al., 2019) About 50% of men with testicular cancer experience infertility (Shefi & Turek, 2006) and 22% of men with history of testicular cancer require assisted reproductive technology to fulfill the desire of having a child. (Brydøy et al., 2005) Approximately 1% of men with testicular failure are affected by azoospermia which is its severe manifestation. (Jarow et al., 1989)

Congenital conditions like KS, can affect the production of sperm. KS is a common genetic defect leading to testicular failure which affects 1/1000 to 1/500 males. (Bojesen et al., 2003) Around 95-99% people with KS are infertile. Congenital defect in one or both testicles can result in oligozoospermia or azoospermia. (Esteves et al., 2011) Congenital bilateral absence of vas deferens is a rare obstructive testicular defect which contributes to male infertility. The prevalence is approximately 1 in 1000. (Lin & Huang, 2020) Undescended testis (UDT) or cryptorchidism is the developmental defect in testicles leading to impaired spermatogenesis and testicular germ cell tumors, thus affecting male fertility. (Niedzielski et al., 2016) Men with cryptorchidism have poor sperm quality in terms of motility and morphology and lower sperm counts. The increased duration for testicles remaining undescended pose a greater risk for future fertility. (Leslie et al., 2022)

Underlying genetic conditions, exposure to certain environmental factors and adverse lifestyle behaviors contribute to testicular dysfunction. However, 40% of cases of testicular defects are classified as idiopathic. (A. Sharma et al., 2020)

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1.3 Ejaculatory dysfunction

Infertility due to ejaculatory dysfunction is a serious problem among young men. Ejaculatory dysfunction is the complete absence of ejaculation and is one of the most prevalent male sexual disorders. Retrograde Ejaculation (RE) and Anejaculation (AE) are the most common causes of ejaculatory dysfunction. About 1.2% of infertile men are affected by ejaculatory dysfunction. (Esteves et al., 2011) An desired ejaculate volume is required to transport male gametes into female reproductive tract, hence ejaculate volume is essential component to achieve fertility. (Roberts & Jarvi, 2009) It includes premature ejaculation, inhibited ejaculation, anejaculation, retrograde ejaculation, and anorgasmia.

Premature Ejaculation (PE) is “ejaculation that nearly or always occurs prior to or within about 1 min of vaginal penetration, an inability to delay ejaculation on all or nearly all vaginal penetrations.” Various epidemiological studies have concluded that 20-30% of men experience premature ejaculation. (Rowland et al., 2010). The onset of ejaculation might be sudden or gradual. Conditions like thyroid dysfunction, urological disorders, psychological factors or combination factors can lead to PE. (Kondoh, 2011) PE can lead to reduced semen quality. Retrograde ejaculation (RE) is the disorder in which seminal fluid propels from posterior urethra into the bladder instead of emerging through penis during orgasm. RE accounts to 0.3-2% of male infertility cases. (Yavetz et al., 1994) A study concluded the prevalence of retrograde ejaculation to be 3.2% among infertile men. (Juárez-Bengoia et al., 2011) RE can result due to structural or functional abnormalities. Peripheral neuropathy due to diabetes mellitus, surgery, trauma and unknown causes can be contributing factors for RE. (Kamischke & Nieschlag, 1999) Delayed Ejaculation (DE) or inhibited ejaculation is defined as “persistent or recurrent difficulty, delay in, or absence of attaining orgasm after sufficient sexual stimulation, which causes personal distress.” (McMahon et al., 2008) It is one of the least studied ejaculatory dysfunctions in men which results in reduced volume of semen and decreased sensation of ejaculation. Anorgasmia or perceived absence of orgasm experience is related to DE. (Kondoh, 2011) Anejaculation (AE) is the condition with complete absence of ejaculation. AE is rare cause of sexual dysfunction leading to infertility problems. (Stewart & Ohl, 1990) Sexual intercourse in the absence of ejaculate leads to complications for conception. Men with these conditions in their reproductive phase suffer from infertility. (Kondoh, 2011)

1.4 Hypogonadism

Male hypogonadism is a common endocrine disorder in which testicular function is impaired which ultimately affects spermatogenesis and testosterone synthesis. Primary hypogonadism also known as hypergonadotropic hypogonadism is a common form of hypogonadism seen in men. The exact prevalence of the disease is not known. (Fραιetta et al., 2013) A study reported an incidence of 12.3 cases per 1000 individuals per year. (Araujo et al., 2004) It is characterized by decreased production of testosterone and increased levels of follicle stimulating hormone (FSH) and Luteinizing hormone (LH). (Darby & Anawalt, 2005) Congenital conditions like KS results in primary hypogonadism among approximately one in 500 men. Acquired causes may be due to medicines, infections or use of abusive drugs or excessive alcohol. The prevalence is approximately 4.1% in men between age of 40-49 years. (Zitzmann & Nieschlag, 2000) Secondary hypogonadism is characterized by normal testicles but altered function due to

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problems with pituitary or hypothalamus. It may be caused due to pituitary disorders, inflammatory disease, medications, obesity and aging. (*Male Hypogonadism - Symptoms and Causes*, n.d.) The prevalence of secondary hypogonadism is not well-known. Approximately 2/3 and 1/3 cases of hypogonadotropic hypogonadism are caused by KS and idiopathic causes respectively. (Fraietta et al., 2013)

1.5 Cancer and Drugs

Infertility risk subsequently rises with patients and treatment factors. An increased risk of infertility and impairment in sperm production was evident among male cancer survivors who received alkylating chemotherapy to treat Hodgkin Lymphoma and other malignancies. (Green, Nolan, et al., 2014) About 25% patients developed azoospermia and 28% were oligospermic following treatment with alkylating chemotherapy. (Green, Liu, et al., 2014) Additionally, cisplatin, a DNA crosslinking agent, was found to be associated with reduction in male fertility. (Chow et al., 2016) Radiation exposure on testes have effect on spermatogenesis depending on the exposed dose and radiation. (Wallace et al., 2005) Treatment of bilateral testicular cancer leads to sterility in men. (M. Che et al., 2002) Retrograde ejaculation was observed among 10% of men with testicular cancer. (Brydøy et al., 2010)

Use of antidepressant medications are found to alter testosterone levels thus leading to male factor infertility. (Hendrick et al., 2000) DNA fragmentation was significantly higher in men using antidepressants compared to control. (Brezina et al., 2012) Decreased sperm motility and invitro spermicidal effect were observed with patients on antidepressants. (Relwani et al., 2011)(Kumar et al., 2006) Calcium channel blockers have dose-dependent effect on reduction of sperm motility. (Aaberg et al., 1989) Exposure to calcium channel blockers were also linked with disrupted sperm morphology and inhibition of sperm ability to bind to an egg. (Kanwar et al., 1993)(Benoff et al., 1994) Pregnancy rate per embryo transfer derived from men taking calcium channel blockers was found to be only 17.4%. (Katsoff & Check, 1997) Alpha-adrenergic blockers were found to be associated with ejaculatory disorders. About 30% of men taking these drugs experienced anejaculation. (Hellstrom & Sikka, 2006) Also, sperm concentration and motility were negatively affected with the intake of anti-adrenergic blocker medications. (Hellstrom & Sikka, 2009)

Effects of anti-epileptic drugs on male factor infertility are not well studied. A study found that men on highly active antiretroviral therapy demonstrated 60% reduction in sperm motility. (van Leeuwen et al., 2008) Similarly, decrease in ejaculate volume, disrupted sperm morphology and reduced sperm motility were observed following antiretroviral therapy. (Kehl et al., 2011) However, despite the abnormalities, men undergoing the therapy could highly achieve pregnancy. (Nicolopoulos et al., 2010) Patients treated with antibiotics like tetracyclines for testicular infection were found to have deleterious effect on semen quality. (Farombi et al., 2008) Anabolic steroids have been found to be associated with oligo or azoospermia. (Tan & Scally, 2009)

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1.6 Unexplained Infertility

Unexplained infertility is the infertility among men with normal semen values and absence of physical as well as endocrinal abnormalities. Approximately 15% of average incidence of unexplained male infertility has been assumed. Erectile problems, coital factors, certain immunological causes, and sperm dysfunction may contribute to unexplained infertility. Sperm DNA damage, high levels of seminal ROS and sperm dysfunction might be possible factors leading to unexplained infertility. (Hamada et al., 2012)

1.7 Sterilization

Male sterilization is done by cutting and sealing the tubes that carry sperm. (Vasectomy - Mayo Clinic, n.d.) Hence, it is irreversible. Less than 1 out of 1000 woman becomes pregnant after the male partner is sterilized. (Trussell, 2011)

2. Environmental Causes

Male reproductive function is vulnerable to various environmental exposures, however only few have been studied. Endocrine disrupting chemicals (EDC) may induce hormonal changes or directly induce testicular toxicity, increase oxidative stress or sperm DNA damage. (Sidorkiewicz et al., 2017) Studies suggest that EDC like bisphenol A, phthalates, pesticides, and other environmental chemicals affect fertility by disrupting development of gonads during fetal life and lead to cryptorchidism, poor sperm quality and predisposition to testicular germ-cell cancers. (Skakkebaek et al., 2016) However, we lack clinical evidence. In-utero exposure to exogenous estrogenic compounds can alter neonatal development of testicles and reduce sperm production in adult men. (Sharpe, 1993)(Andolz et al., 1999) Exposure to heavy metals negatively affect male fertility by lowering seminal quality, thus leading to infertility. (Balabanič et al., 2011) A study showed that men residing in contaminated areas had higher concentrations of heavy metals like Zn, Cr and Cu and lower Fe concentrations in semen, decreased sperm motility and DNA damage was higher. (Bergamo et al., 2016) Similarly, heavy metals like Pb or As present in tobacco smoke adversely affect reproductive outcomes in male. (Hruska et al., 2000)

Male infertility can be caused due to the extreme exposure to heat and radiation and other hazardous substances. Radiation from X-rays have harmful effects on sperm parameters and induce oxidative stress. (Kesari et al., 2018) Prolonged exposure to heat causes testicular damage due to oxidative stress. High temperatures increase testicular metabolism and result in spermatid damage. (Hamilton et al., 2016) Also, prolonged cycling may increase the scrotal temperature which leads to sperm damage, reduced sperm count and concentration and elevation in sperm DNA fragmentation. (Jung et al., 2008)

2.2.2 Risk factors for Male Infertility

Age is an important risk factor for decline in semen quality in men. The presence of spermatids in the seminiferous tubules declined to 50% among men aged 40-50 years. (Sasano & Ichijo, 1969) A decline of 3-12% in sperm motility(Harris et al., 2011) and 4-18% in sperm morphology has been observed in relation to age. (Andolz et al., 1999)(Auger et al., 1995) Health behaviors like excessive alcohol intake, smoking and use of recreational drugs pose as

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a risk for reduced fertility in men. (Li et al., 2011) A study showed negative association between smoking and semen parameters. (R. Sharma et al., 2016) Smoking is associated with low sperm motility and concentration. (Mitra et al., 2012) Clinically, it leads to poorer outcomes of assisted reproduction technologies ART. (Waylen et al., 2009) Alcohol exposure in high levels is negatively associated with sperm quality and fertilization ability. (Anderson et al., 1983) Heavy alcohol intake leads to decrease in semen volume and affect sperm morphology. (Ricci, Al Beitawi, et al., 2017) Men with high or low BMI (less than 19 kg/m² or more than 30 kg/m²) are associated with decreased testicular volume and reduction in sperm quality due to impairment in spermatogenesis. (Jensen et al., 2004) Men who are inactive and lead a sedentary lifestyle were found to have reduced sperm quality, especially in the presence of concomitant comorbidities like diabetes and obesity. (Vaamonde et al., 2012) Men with type 2 diabetes are found to have low testosterone level (Dandona & Dhindsa, 2011) and sleep apnea is also associated with decreased testosterone level and erectile function (Luboshitzky et al., 2005) which impose a risk factor to male infertility.

Use of recreational drugs like cannabis, androgens and opioids is associated with reduction in sperm parameters. (Bracken et al., 1990) Opioids may have direct effect on testicles due to the presence of endogenous opioid receptors. (Subirán et al., 2011) Long term use of opioids lead to decrease in sperm motility, hypogonadism and increase in prolactin levels. (Farag et al., 2018) Use of certain medications like anti-depressants, alpha blockers and antiretrovirals (Brezina et al., 2012) are found to affect testicular tissue, impair ejaculation and affect fertility in men. (Drobnis et al., 2017) Exposure of pollutants is associated with increased sperm DNA fragmentation and decreased sperm motility. (Jurewicz et al., 2018) Sauna, clothing, sleeping position, use of laptop, prolonged driving, welding are associated with scrotal hyperthermia. (Krzastek et al., 2020) Hyperthermia leads to impaired testicular function and decreased sperm concentration and motility. (Mieusset & Bujan, 1995) (Rao et al., 2015) Caffeine consumption has been found to be associated with increased sperm aneuploidy and DNA breaks. (Ricci, Viganò, et al., 2017) Certain history of past infection, presence of chronic medical condition, trauma in testicles, surgery, vasectomy, undescended testicles, further impose a risk to male fertility. (Male Infertility - Symptoms and Causes, n.d.)

2.3 Female Infertility

WHO estimates that female factor is the main cause among 37% of infertile couples. (Duffy & Allen, 2009) One third of infertility cases is due to female factor (Female Infertility - an Overview | ScienceDirect Topics, n.d.) which accounts to about 9% of women worldwide experiencing infertility. (Boivin et al., 2007) Several causes of female infertility include anatomical abnormalities, ovulatory and menstrual disorders, endometriosis, certain drugs and medications and unexplained infertility.

2.3.1 Causes for Female Infertility

1. Medical Causes

1.1 Ovulatory Disorders

Ovulatory disorders accounts to a major cause of infertility. About 25% cases of female infertility is caused by ovulatory disorders. (Walker & Tobler, 2022) Polycystic Ovarian Syndrome (PCOS) is predominant cause of anovulatory infertility which affects 7 to 15% of

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reproductive age women. (Collée et al., 2021) PCOS is associated with dysfunction in developing a mature follicle hence leading to anovulation and infertility. (Fauser & Van Heusden, 1997)

Premature ovarian failure is the loss of ovarian activity under the age of 40 years which severely affects female fertility. It has a global prevalence of approximately 1.1%. (Fauser & Van Heusden, 1997) A study in 2004 showed that 2.8% of Chinese women are affected by premature ovarian failure. (Wu et al., 2014) About 20% of premature ovarian cases result due to autoimmune diseases. (Szeliga et al., 2021) Gene mutation in women can result in elevated depletion of ovarian reserve leading to early menopause, hence affecting fertility. (Finch et al., 2013) Thyroid dysfunction is a common cause of infertility. Hypothyroidism in reproductive age women has been the cause of infertility with a prevalence of 2-4%. (Lincoln et al., 1999)(Krassas, 2000) It can lead to anovulatory cycles, defects in luteal phase, hyperprolactinemia and sex hormone imbalance leading to infertility. Hypothyroid infertile women are also associated with hyperprolactinemia or high prolactin. A prevalence of 18.3% cases of hyperprolactinemia was found among infertile women. (Verma et al., 2012) It affects by impairing release of GnRH and thereby affecting ovarian function.(Poppe & Velkeniers, 2003)

1.2 Tubal Infertility

Tubal factor infertility is a common cause of infertility. The incidence of tubal factor infertility ranges between 25-30%. (Ambildhuke et al., 2022) Factors that contribute to development of tubal factor infertility include pelvic inflammatory disease, previous history of ectopic pregnancy and prior tubal surgery. Sexually Transmitted Infection (STI) is associated with tubal factor infertility. (Kavanagh et al., 2013) The risk of tubal infertility is between 0.1-6% after chlamydial infection. (Land et al., 2010) Pelvic Inflammatory Disease (PID) is the most common cause of acquired infertility among women resulting from infection. One in 10 women with pelvic inflammatory disease becomes infertile. (Pelvic Inflammatory Disease (PID), n.d.) A study found that tubal occlusion due to PID led to infertility among 10.8% women. (Westrom, 1995) History of pelvic surgery pose a significantly higher risk for tubal infertility. (Ramos et al., 2008) Past history with pelvic operations increase the risk for ectopic pregnancy by 9-folds. (Michalas et al., 1992) Incidence of ectopic pregnancy is increasing with increased incidence of PIDs. (Weström et al., 1981) A pregnancy is considered ectopic when embryo implants in the fallopian tube or outside the uterine cavity. (Xue et al., 2022) Ectopic pregnancy can result in infertility and about 35% women with this condition have difficulty getting pregnant. (Ectopic Pregnancy, n.d.)

1.3 Endometriosis

Endometriosis is the condition characterized by presence of tissue like lining of the womb outside the uterus that distort the anatomy of pelvis in women. (Kennedy et al., 2005) The prevalence of endometriosis is estimated to be approximately 6-8%. (Hummelshoj et al., 2006) About 25%-50% of infertile women have endometriosis and 30 to 50% of women with endometriosis experience infertility. (Counsellor, 1938) Infertile women are 6 to 8 times more likely to develop endometriosis. (Verkauf, 1987) Endometriosis may lead to endocrine and ovulatory disorders. (Ozkan et al., 2008) Uterine fibroids are common tumor occurring in women. The prevalence of uterine fibroids is high at 2-3% among women experiencing

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infertility. Fibroids can cause recurrent pregnancy loss and infertility depending on its location on the uterus. (Freytag et al., 2021) Endometrial polyps are the commonly reported uterine abnormalities with incidence of 16.7% in patients with recurrent implantation failure

after IVF. (Fatemi et al., 2010) A study identified polyps among 32% of patients undergoing IVF. (Hinckley & Milki, 2004) Polyps are characterized by focal growths of uterine mucosa and considered to be a factor to contribute to infertility and recurrent pregnancy loss.(Al Chami & Saridogan, 2017) They are usually diagnosed by hysteroscopy during infertility treatment.

Commonly found congenital uterine abnormalities are uterine septum which is associated with infertility and recurrent pregnancy loss.(Walker & Tobler, 2022) Roughly 8% of female infertility causes are due to congenital abnormalities in the uterus. (Chan et al., 2011) A study reported that congenital uterine anomaly like septate uterus have higher incidence of infertility but it was not significant. (Shuiqing et al., 2002) Problems in cervical mucus can prevent sperm from entering the uterus, thus affecting reproduction. However, this is a rare cause of infertility. (Infertility Problems With Cervical Mucus - Women's Health Issues, n.d.)

1.4 Medicines and Drugs

Use of recreational drugs like marijuana, cocaine, LSD creates slightly elevated risk of ovulatory abnormality. (Mueller et al., 1990) Anticancer treatments like radiation, chemotherapy and surgery can severely damage ovarian function and lead to premature ovarian failure, thus affecting fertility. (Spears et al., 2019) Cytotoxic drugs like cyclophosphamide, methotrexate and 5-fluorouracil used in the treatment of cancer are great stimulators for infertility. Studies show that the treatment resulted in loss of ovarian function among 30% of the patients. (Sonmezer & Oktay, 2006) Exposure to higher levels of alkylating chemotherapy during cancer treatment using drugs like doxorubicin, bleomycin, vinblastine are associated with lower Anti-Mullerian Hormone (AMH) in women which impacts infertility in women (Decanter et al., 2010) including acute ovarian failure (AOF) and premature menopause. (Thomas-Teinturier et al., 2015) Cell transplantation during the treatment of leukemia pose a greater risk for ovarian failure and infertility in women. (Watson et al., 1999) Radiation can affect fertility when targeted to reproductive organs or structures producing hormones required for reproduction. (Wallace et al., 2003) The risk of infertility following hysterectomy is 100%. However, pregnancies can be achieved by oocyte retrieval and surrogacy. (Giacalone et al., 2001)

1.5 Unexplained Infertility

Unexplained infertility is the condition in which there is no definite medical cause for infertility. About 10-17% of infertile women experience unexplained or idiopathic infertility.(Ehsani et al., 2019)

1.6 Sterilization

Female sterilization involves surgical procedure to block the fallopian tubes, thus preventing sperm to reach and fertilize the ovum. (Female Sterilization - an Overview | ScienceDirect Topics, n.d.) Women who undergo sterilization are more than 99% infertile. (Female Sterilisation, 2017)

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2. Environmental Causes

Studies suggest that physical and psychological stress faced by women reduce the chances of conception. Almost 30% of women seeking infertility treatment are affected by it. (Barzilai-Pesach et al., 2006) Consumption of alcohol beyond the threshold increases the risk of infertility in women. (Jensen et al., 1998) Similarly, excessive smoking increases the risk for ovulatory disorders and hence affect fertility. (Stene-Larsen et al., 2009) Excessive caffeine intake is found to be associated with increased risk of spontaneous abortion, (Chen et al., 2014) reduced fecundity, and delayed conception. (Hassan & Killick, 2004) Substance abuse and use of recreational drugs like cannabis, heroin, cocaine disturbs the reproductive process affecting implantation failure, embryo development and spontaneous abortion hence leading to infertility. (Monica Bari, 2011)

Increased use of pesticides and insecticides is found to correlate with decreased fertility rates, spontaneous abortion, and multiple ovarian disorders. (Record Details, n.d.) Prolonged exposure to endocrine disrupting chemicals (EDCs) present in pesticides, fertilizers, plasticizers is found to reduce fertility by causing hormonal imbalance. (Ding et al., 2016) Exposure to heavy metals like lead, cadmium and arsenic can affect reproductive function and increase the risk for spontaneous abortion, preterm birth, and menstrual irregularities. (H. Wang et al., 2017) (Sabra et al., 2017) Air pollutants like heavy metals or hydrocarbons generate reactive oxygen species and produce oxidative stress which affect female reproduction system in regulating follicular growth and ovulation. (Hernández-Ochoa et al., 2009) Noise pollution can have impact on behavioral and physical well-being of individual. It can cause anger, stress, anxiety, agitation, sleep disturbances, sexual impotence, and emotional instability. (Stansfeld & Matheson, 2003) Solvents used in pharmaceuticals, paints, electronics, etc. may negatively affect fertility (Lipscomb et al., 1991). Indoor pollution due to use of wood and coal for cooking can increase the risk for defects in pregnancy. (Lacasaña et al., 2006) Gonads are highly sensitive to radiation exposure. Hence, exposure to radiation like X-ray, ultrasound can have detrimental effect on pregnancy, increase the risk of implantation failure and cause mental retardation. (De Santis et al., 2007) Studies have shown that exposure to gamma-radiation during cancer treatment results in depletion of ovarian follicles and premature ovarian failure. (C. J. Lee & Yoon, 2005)

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2.3.2 Risk Factors for Female Infertility

Age is one of the risk factors for infertility. Fertility declines with age in women (May-Panloup et al., 2016) which is as early as the mid-thirties. (Leridon, 2004) Increase in age results in decline in the number of oocytes and quality of existing oocytes and intercourse frequency is also decreased with age. (ESHRE Capri Workshop Group, 2005) Studies suggest that fertility significantly fell with age above 30 years. (Fédération et al., 1982) Increased aneuploidy in embryos among older women contributes to inability to bear a child as risk for implantation loss and pregnancy failure is increased. (Munné et al., 1995) With increase in age, women respond poorly to ovarian stimulation during IVF treatment. This is a strong predictor of declining ovarian reserve, resulting in reduced fertility and early menopause. (de Boer et al., 2002) (Lawson et al., 2003) Age at marriage also plays a vital role. People tend to delay marriages and get married at an older age resulting in females being older when attempting for first pregnancy. (Leke et al., 1993)

Studies show that intake of nutrient rich diet is associated with lower risk of ovulatory infertility in women. (Chavarro et al., 2007) Certain lifestyle factors like smoking, alcohol intake and

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obesity can decrease egg quality and ovulation rate, which can increase the risk of infertility in women. (R. Sharma et al., 2013) Smokers are more likely to experience infertility compared to non-smokers. (Augood et al., 1998) Also, a significant delay in conception was observed among female smokers. (Hull et al., 2000) Exposure to toxic components from smoking may induce intrafollicular stress (Paszkowski et al., 2002) and DNA damage. (Sinkó et al., 2005) Overnutrition and undernutrition can negatively affect fertility. (Pasquali et al., 2003) Increase in BMI impose an increased risk of ovulatory disorder in women. (Rich-Edwards et al., 2002) The risk of infertility is three times higher in those obese than nonobese. (Rich-Edwards et al., 1994)

Certain medications like opioids, antidepressants and chemotherapy can reduce the egg quality and ovulation rate, hence increasing the risk of infertility. (Duffy & Allen, 2009) Exposure to environmental toxins like BPA, lead, cadmium, pesticides also pose a risk for decreased reproductive function in females. (Piazza & Urbanetz, 2019) Having a history of medical conditions like diabetes and PCOS can be a risk factor for infertility. (Dennett & Simon, 2015)

2.4 Effects of Infertility

Childbearing is considered a crucial part of married life, hence couples who fail to conceive face pressure from family and the society. Infertility has negative effect on infertile couples, affecting various aspects of their life like marital relationship, sexual satisfaction, psychosocial well-being and overall Quality of life (QoL). (Luk & Loke, 2015)

A. Psychological effect of couples

Infertile couples are twice more likely to experience anxiety, depression and stress in their life which negatively impact fertility, infertility treatment and overall QoL. (Holter et al., 2006) (Maroufizadeh et al., 2018) Psychological factors may also contribute to negative effects on sexual performance and increased marital conflicts. (Gourounti et al., 2012) In addition, it also play a major role in increased rates of treatment dropout. (Ragni et al., 2005) (Dube et al., 2023)

a. Psychological effect on infertile women

Studies show that infertile women experience more stress than infertile men. (T. Y. Lee & Sun, 2000) This is because, in many cultures (including in Nepal), infertility is considered as a failure to fulfill her role as a woman. (Onat & Kizilkaya Beji, 2012) Thereby, women feel incomplete if they are unable to bear children. (Loke et al., 2012) A study conducted in Japan found a significant association between anxiety and depression among infertile women. Also, lack of support from their spouse and feelings of stress was found significant. (Matsubayashi et al., 2004) Studies by Albayrak et al and Noorbala et al found that infertile women experienced higher levels of distress, depressive disorders, anxiety and psychiatric disorders compared to fertile women. (Albayrak & Günay, 2007) (Noorbala et al., 2009) This might be due to the complex process of infertility treatment and stronger desire for a child among women. (Greil et al., 2010)

b. Psychological effect on infertile men

Infertile men were found to experience higher levels of psychological distress compared to fertile men. (Dyer et al., 2009) A study conducted in Iranian men found that the depression rate

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was higher among infertile men than those in western countries.(Ahmadi et al., 2011) Thus, these studies highlight the importance of addressing the psychological needs of male partners in the management of infertility.

B. Marital relationship of couples

Infertile couples are two times more likely to divorce than the fertile couples. (Y. Che & Cleland, 2002) A study done in Taiwan found that infertile women were less satisfied with their marriage than their spouse. Wives worried about being accepted by in-laws and family members from husband's side showed aggressive behavior towards them to end a childless marriage. To the contrary, wives' family gave less trouble to the couple even when male factor was the cause for infertility. (T. Y. Lee & Sun, 2000) The situation of Nigeria is such that the husbands take another wife in response to infertility. (Nieuwenhuis et al., 2009) These cases are very much relevant with rural areas of Nepal.

However, some studies have also found that infertile couples have significantly better relationship than fertile couples. They indicated that infertility was not associated with negative effect on marital relationship and additionally, quality of their marital relationship was even higher among infertile couples than that of fertile couples. (Drosdzol & Skrzypulec, 2009) A study in which more than two-thirds of infertile couples were married for more than five years found that QoL was higher among them. However, this can be due to the shared crisis of infertility for a longer duration. (Onat & Kizilkaya Beji, 2012) Better marital functioning can be explained by the ability of the couples to talk about their fertility problems and discuss about future. Greater emotional intimacy between partners and feelings of commitment and loyalty might have strengthened the marital relationships in infertile couples.(Drosdzol & Skrzypulec, 2009)

C. Sexual Relationship of couples

Difficulties with ejaculation can result in negative personal consequences in men like distress and frustration. Chronic cases of male factor infertility can also lead to decreased coital frequency. (Kondoh, 2011) A study conducted in China found higher incidences of premature ejaculation and higher degree of erectile dysfunction among infertile men. (Gao et al., 2013) Similarly, infertile women were found to have higher sexual dysfunction compared to fertile women. (Oskay et al., 2010) Additionally, infertile wives showed higher levels of sexual dissatisfaction compared to their husbands. (Oskay et al., 2010)(T. Y. Lee & Sun, 2000) The inability to delay ejaculation can further affect sexual intimacy among the couples. (Kondoh, 2011)

D. Social stigma among couples

Infertile couples experienced feelings of incompleteness, shame, guilt, and isolation.(Loke et al., 2012) A study conducted in Nigeria show that psychological disturbances faced by infertile men and women were mainly due to the social effect. Infertile women were more worried about their situation, felt depressed and often had suicidal thoughts. (Nieuwenhuis et al., 2009) A study by Loke et. al also support that psychological effect was more prevalent among infertile women. (Loke et al., 2012)

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E. Quality of Life

Infertility has negative impact in marital relationship, sexual satisfaction, psychological well-being, and societal relationships, which ultimately affects the Quality of Life (QoL). (J. Chachamovich et al., 2009)

QoL is defined as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, values and concerns”. (‘The World Health Organization Quality of Life Assessment (WHOQOL)’, 1995) Assessment of QoL allows better understanding of the impact of fertility conditions on patients in a broader perspective including emotional symptoms like emotional behavior, self-esteem and mental health. (Aarts et al., 2011) (J. R. Chachamovich et al., 2010) Furthermore, QoL addresses physical, cognitive, relationship, psychological and social domains of the individuals. Hence, determining the factors affecting QoL can help improve patient care and compliance in the treatment domain. (Karabulut et al., 2013)

a. QoL in infertile female

Infertile women were found to have lower quality of life. A study by Ragni et al. demonstrated that women measured significantly lower on QoL scores in terms of social functioning, emotional and mental health. (Ragni et al., 2005) Another study showed that women scored significantly lower in overall scores while higher in psychological and social relationship domain in comparison to men. (J. Chachamovich et al., 2009)

Similarly, impaired scores were observed in emotional, social, and mental domains among young women. (Souter et al., 2002)(J. R. Chachamovich et al., 2007) In a study conducted by Fekkes et al., social domain was highly affected among young women compared to old (Fekkes et al., 2003) which is assumed to be due to lesser life experience and lack of developmental strategies to cope up with stress. However, the study by Karabulut et al. found no difference in emotional, mind/body and social scores among younger age group. This difference in results is thought to be due to the supportive family behaviors in the culture of study population. (Karabulut et al., 2013)

Lower scores in QoL were observed in women experiencing primary infertility. Having at least one child decreased the distress while having no children resulted in social isolation and reduced tolerability to treatment. (Karabulut et al., 2013) This was supported by studies which compared couples with and without children and concluded that QoL was significantly impaired due to the absence of children. (Monga et al., 2004)(Johansson et al., 2009) Social isolation and decreased treatment tolerability might be the impact of conservative communities surrounding parenthood.

Lower educational status was related to poorer scores in social and mental health domains which assumes the association of higher educational status with higher income and better mental health. (J. R. Chachamovich et al., 2007) In a study conducted by Karabulut et al., high education status was associated with higher scores in the QoL domains. However, their total scores were lower among highly educated primary infertile women which indicates the intense effect of primary infertility on QoL domains. (Karabulut et al., 2013) Hence, specific study needs to be conducted to find the association of higher educational status with high income, housing, and better mental health.

The QoL among those residing in rural areas was lower as compared to the urban residents. (Namdar et al., 2017) It was supported by the findings from study by Dong et. al which

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concluded lower QoL scores among rural residents. (Dong & Zhou, 2016) Emotional domain was found to be lower among those living in extended families compared to nuclear families. This can suggest that women are pressurized by the elders in the extended family to achieve a pregnancy. (Karabulut et al., 2013)

History of ART failure was associated with low mental health scores and psychological health. (J. R. Chachamovich et al., 2007) (Ragni et al., 2005) Studies found that social, psychological and mind/body domains of QoL were affected by the number of ART failures, with women presenting lower scores than men in each domain. (Agostini et al., 2017) (Moura-Ramos et al., 2012) Similarly, lower scores in mind/body, social and tolerability subscales of QoL were associated with increased duration of infertility. (Ragni et al., 2005)

Furthermore, the stigma associated with infertility led patients to not talk about infertility issue which resulted in lack of social support. (Malik & Coulson, 2008) Fatigue was found to be an influential factor of QoL in infertile women. (Nho & Kim, 2022) Women with recurrent miscarriage were found to have negative effects on their functional ability and scored lower in well-being. (Tavoli et al., 2018) The women who had desire for psychological support demonstrated lower scores in QoL domains. Women with health insurance were found to have a better relationship with their partners and hence scored higher in relation domain. (Karabulut et al., 2013) It can be hypothesized that since infertility treatments are not supported by public health system, emotions evoked by financial impact is partially mitigated by being insured.

b. QoL in infertile men

Most of the findings in QoL among men is obtained from couple study. Men scored higher in terms of QoL scores as compared to women. However, on comparing with the normal population, the infertile men had similar QoL scores, thus suggesting that the scores were independent of infertility problems. (Ragni et al., 2005) The sensitivity of QoL measurement instrument used in the study can explain the discrepancy of the results. To the contrary, comparing against normative data, men scored lower in emotional and social functioning domains (Fekkes et al., 2003) and in mental health domains. (Shindel et al., 2008) Also, men scored lower in self-esteem and social functioning domains. (El-Messidi et al., 2004)

A group of studies have investigated the predictors of low QoL in infertile men. The findings concluded that strong will to have children, lower education level, poor marital relationship, history of ART failure and prolonged duration of infertility were associated with lower scores in mental health domains. (Lau et al., 2008) (Ragni et al., 2005) Planning for ART was also associated with impaired emotional behavior. (Fekkes et al., 2003)

c. QoL in couples

It has been assumed that individual QoL is influenced by partner's QoL. (Andrews et al., 1991) (Greil, 1997) Hence study regarding QoL should focus on men and women as a dyad rather than individual. Family system theory also suggests that studying individuals in integration with their relationship with family members is a better approach. (Peterson et al., 2003) Studies found that infertility stress has negative effect on individual's QoL but also has significant effect on QoL of his/her spouse. (J. H. Kim et al., 2018) (J. H. Kim & Shin, 2013) Individual and partner perception on infertility may also result in distress. (Benyamini et al., 2009) Lower congruence levels among couples were associated with marital satisfaction and lower levels of adaptation. (Peterson et al., 2006) Infertility related distress, marital relationship and

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depression were found to be the main factors influencing QoL. (J. H. Kim & Shin, 2013) QoL scores were found to be intrinsically linked to the presence of the clinical conditions like endometriosis, PCOS and cancer which result in infertility. (J. R. Chachamovich et al., 2010) A study conducted in rural China found 80% of infertile couples were desperate for a child and they felt that they could not live well without a child. This indicates that desire for a child was a major concern for them. (Lau et al., 2008)

Couples undergoing infertility treatment often struggle to balance job responsibilities with their treatments. The treatment process may include frequent and unpredictable visits in coordination with menstrual cycle. A study conducted in Japan found significant association between reduced access to time off at work and increased job demand and lower scores in QoL. (Maeda et al., 2022)

F. Psychological effects on QoL

Psychosocial studies illustrate a highly negative impact of infertility and its treatment on QoL and well-being. (Greil, 1997) (Verhaak et al., 2007) Psychological difficulties among couples relates to the cognition and personal beliefs regarding parenthood and childlessness. (Verhaak et al., 2007) A longitudinal study on psychosocial predictors of QoL among infertile couples found that parenthood was associated with increased QoL scores in infertile women and diminished marital life scores in the couples. (ABBEY et al., 1994) Some studies have found association between impact of partner's coping mechanism and couple's experience with infertility. (Peterson et al., 2006)(Berghuis & Stanton, 2002) Also, a partner's coping pattern influences women's ability to cope with infertility and vice versa. (Jordan & Revenson, 1999)(Peterson et al., 2006) Studies show strong association between depression and psychological domain of QoL.(J. R. Chachamovich et al., 2010)(Berlim et al., 2008)(J. Chachamovich et al., 2009) Hence, minimizing emotional distress may positively influence QoL and treatment compliance.

Measurements of QoL

Some of the generic instruments used for the assessment of QoL are Short Form 36 (SF-36), World Health Organization Quality of Life Brief Version (WHOQoL-BREF), Core Quality of Life Questionnaire (QLQ-C30), SF-12, General Health Questionnaire- 28 (GHQ-28), Enrich Inventory and Quality of Well-being scale. Similarly, specific instruments include Fertility Problem Inventory (FPI), Fertility Quality of Life (FertiQoL), Fertility Problem Stress (FPS), Infertility Questionnaire (IFQ) and Illness Cognitions Questionnaire adopted for Infertility (ICQ-I).

However, SF-36 and WHOQoL-BREF are the most widely used generic measures (Mousavi et al., 2013) and FertiQoL is the mostly used specific measure for assessing QoL in infertile patients. (Kitchen et al., 2017)

Disease-specific measure like FertiQoL is preferred due to its focus on specific aspects of the condition. FertiQoL is an internationally developed instrument used to measure QoL in male and female experiencing infertility problems. The questionnaire also includes an additional module for the assessment of treatment satisfaction. FertiQoL provides an adequate face and content validity in terms of number of items included (n=36), respondent's burden, clarity of instructions and balance in response options. It has strong evidence for internal consistency reliability measured by Cronbach's alpha values which range between 0.72 to 0.92 and

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construct validity to support the structure of conceptual framework of FertiQoL. (Boivin et al., 2011) Hence, FertiQoL is a reliable and valid measure to assess changes in QoL or treatment satisfaction in clinical studies with patients following treatment.

Table 2 Subscales of FertiQoL

S.No.	Subscale	Description
1.	Emotional	“Impact of Negative emotions like sadness, depression, jealousy, and resentment on QoL”
2.	Mind/ Body	“Impact on physical health (eg. Fatigue, pain), Cognition (eg. Concentration), Behavior (eg. Disrupted daily activities, delayed life plans)”
3.	Relational	“Impact on marriage or partnership (eg. Sexuality, communication, commitment)”
4.	Social	“Impact on social interactions (eg. Social inclusion, expectations, stigma, support)”
5.	Treatment Environment	“Impact of accessibility and quality of treatment on QoL.”
6.	Treatment Tolerability	“Extent to which fertility medical services impact on daily life”

2.5 Solutions

2.5.1 Solutions for Male Infertility

Acquired infections in male infertility can be treated with antibiotics which can help improve sperm quality and prevent further testicular damage and complications. (A. Sharma et al., 2020) Antioxidants can help reduce the damage of reactive oxidative species from factors like smoking and drinking and thus prevent damage to sperm and sperm DNA, thus reducing its impact on fertility. (Showell et al., 2011) Oral pharmacotherapy is an effective, noninvasive treatment option for cases of ejaculatory dysfunction. The condition can be treated effectively by Alpha-adrenergic agonists or anticholinergic and antihistaminic drugs. (Roberts & Jarvi, 2009)(Kamischke & Niesha, 2002, p. 1) Intrauterine Insemination (IUI) is less expensive and non-invasive which makes it more convenient treatment option. (Fraietta et al., 2013) IUI is a procedure in which laboratory processed sperm are placed in the uterus to attempt a pregnancy. It is a preferred treatment option for men who have sperm concentration higher than $5 \times 10^6/\text{mL}$ but fail for conception.

Hormone replacement therapy (HRT) with urinary or recombinant gonadotropins is widely accepted treatment option for hypogonadism cases. Men with hypogonadotropic hypogonadism were found to achieve 67% fertilization and 30% pregnancy rate per cycle on HRT following ICSI cycle.(Zorn et al., 2005) Progression in the field of ART (IVF, ICSI, sperm cryopreservation) has increased the treatment and management options among infertile men and women. Using these technologies, sperm can be retrieved from target sites like vas deferens, epididymis and testis (Kondoh, 2011) which is referred as Testicular sperm extraction

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(TESA) or testicular microdissection. TESA is a surgical procedure involving one or more testicular biopsies or needle aspirations to obtain sperm for use in IVF and/or ICSI. Intracytoplasmic Sperm Injection (ICSI)- a procedure in which a single spermatozoon is injected into the oocyte cytoplasm, can be opted for individuals with sperm concentrations $>5 \times 10^6/\text{mL}$ but fail for conception. (Bakircioglu et al., 2007) These are possible treatment options for male infertility. (Fραιetta et al., 2013) Additionally, reproductive potential of female partner should also be evaluated. Male patients can seek ART services for sperm banking or cryopreservation of sperm before undergoing cancer treatment or exposure to chemotherapy.

2.5.2 Solutions for female Infertility

Exercise can help to reduce stress related to infertility. (Goldman & Hatch, 1999) A reduced risk of ovulatory dysfunction was associated with 30 minutes of exercise per day. (Chavarro et al., 2007) Mutual support and consideration of partners are helpful ways to cope up with infertility for marital adjustment. (Peterson et al., 2006) It was reported that lack of support from husband increased distress and decreased marriage satisfaction among infertile women. (T. Y. Lee & Sun, 2000) Hence, support from husband can help protect women against negative thoughts and ultimately save marriage. (Albayrak & Günay, 2007) If couples can support each other, the infertility experience can bring them closer and strengthen their marital relationship. Couple's ability to talk about their fertility problem and plans further strengthens the feelings of commitment and loyalty among them and creates a stronger emotional intimacy. (Drosdzol & Skrzypulec, 2009) Providing psychological counselling and support to the couples through the emotional journey of infertility can help them to cope up with the emotional and psychological challenges associated with infertility. (Rooney & Domar, 2018) Patients who received psychological treatment during infertility treatment were 25% more likely to achieve a pregnancy. (Dube et al., 2023) Fertility drugs like clomiphene citrate and gonadotropins are useful to stimulate ovulation in women. (M. Sharma & Balasundaram, 2022) The first baby conceived by invitro fertilization, ART services brings hope to many infertile couples. (Ni et al., 2021) Advances in medical technology introduced IVF, ICSI and cryopreservation, which provides an opportunity for couples to become parents.

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2.6 Barriers

Increasing age is a barrier for seeking medical treatment. As the age increases among the couples, it becomes more difficult to conceive and treatments may also have lower success rates. (Mosalanejad et al., 2014) In many cultures, infertility still remains a taboo and childlessness is stigmatized which makes it difficult for couples to talk about the issue and seek for help. (Onat & Kizilkaya Beji, 2012) Infertile couples become more vulnerable to suffering from depression and feeling of shame. They often exhibit dysfunctional coping strategies and score lower in psychological functioning which can lead to emotional burden among the couples. (Hasanpoor-Azghdy et al., 2014) They may feel ashamed or embarrassed to talk about the infertility issue and hence may be reluctant to access the treatment option. (Domar et al., 2012) Lack of awareness about the available treatment options can also be a barrier among the couples to seek for infertility treatment. (Domar et al., 2021)

Despite the vast worldwide diffusion of IVF, political and social reactions about these treatments are heterogeneous. Criticisms towards these technologies have been raised that might result in patients being ashamed of their condition. Moreover, performing IVF may be

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considered a highly stressful event per se since patients generally feel it is the last chance to conceive. (Ragni et al., 2005) Repeated treatment failures with ART can lead to low compliance in treatment among the individuals and cause further anxiety and discomfort. It also pose an increased burden on the finance. (Akarsu et al., 2009) Multiple pregnancies and ectopic pregnancies are possible complications of infertility treatments like IVF. About 30% of pregnancies from IVF treatments result in multiple gestations. The multiple embryos transferred in the uterus during the IVF cycle increases the chances of multiple pregnancy. ('In Vitro Fertilization and Multiple Pregnancies', 2006) Similarly, the incidence of ectopic pregnancy is about 1-2% among women who undergo IVF treatments which is comparatively higher than the risk in fertile population. (Patil, 2012) These complications can be a barrier as they increase the risk associated with pregnancy and childbirth. Increased treatment duration is also a barrier for seeking fertility care. Couples may need to travel long distances frequently once they enroll in the treatment, thus imposing a financial and logistic burden among the couples. (Blakemore et al., 2020) Alternatively, treatment options including ART may not be available in all areas.

Infertility is a major reproductive health issue which is stigmatized and still remains a taboo in developing countries like Nepal. Infertility can cause mental problems and hence, this issue can be a stressful experience for infertile patients. Many couples face difficult challenges in physical, mental, social, emotional and relationship domains. Neglecting the emotional needs and other adverse effects of infertility in infertile patients can have a negative impact in the treatment of the couples. Hence, quality of life assessment should be conducted among patients experiencing infertility. Only two quality of life studies have been conducted in Nepal while only one study has used FertiQoL as a measurement tool. A study was identified on quality of life among infertile women in Nepal through gray literature in the library of Mahidol University which was conducted in an infertility center in Kathmandu. The study identified that 48.9% respondents had good level of Core QoL with mean score of 61.58 and 53.7% respondents had good level of Treatment QoL with mean score of 68.45. The study found significant association between Core QoL and education level of the respondent and her husband, duration of treatment, income of her husband, social support level, social pressure from female relatives and treatment service affordability. Also, it concluded significant association between Treatment QoL and husband's education, social support level and treatment service affordability.

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Nepal Health System and Infertility

Nepal Demographic and Health Survey (DHS) has not yet considered the prevalence of infertility in Nepal. Additionally, there is no national registry for activities involving IVF. IVF/ICSI, sperm donation and gamete donation are permitted Assisted Reproduction Technology (ART) practices in Nepal. A maximum of three embryos per transfer are allowed.

Nepal Law Commission under “The Right to Safe Motherhood and Reproductive Health Act, 2018” Act No. 9 states infertility under the definition of “Morbidity” as the state that affects reproductive system. In Chapter 5 - “Right to Morbidity Care”, it states that “Every woman shall have the right to get her examined, obtain counseling and receive treatment relating to morbidity by or in the health system.” However, with high out-of-pocket expenditure for health at 51%, low public health expenditure at 1.5% of gross domestic product (GDP) and only 0.4% of total federal government health budget allocated for sexual and reproductive health as in fiscal year 2019/2020, the right for fertility care has not been met. (United Nations Population Fund 2022, n.d.)

With the introduction of IVF technology in 2004, ART has existed for nearly two decades in Nepal. Given the minimal allocation of budget to sexual and reproductive health, ART remains either unavailable or inaccessible to most people. On conducting an online search, the principal researcher couldn't gather any information on infertility and infertility services from the website of Ministry of Health and Population (MoHP) in Nepal, hence it was not possible to find any information on publicly funded infertility treatments in Nepal. On asking key informants, the researcher found that infertility care is not included in the health insurance packages.

The infertility services are available only in privately owned institutions. Since the data on the number of available service providers for infertility care was not available in the MoHP or other authorized source, the principal researcher conducted an intensive online search on Google and Facebook using the keyword “Nepal infertility center” followed by a search using “IVF Nepal” which ended up with 53 results. However, the search didn't include some of the infertility centers known to the researcher. Hence, the principal researcher added three more names to the results thus, the search resulted in 56 infertility centers in Nepal. However, the names of three infertility centers in Nepal were mentioned in “OVU Fertility” website but were not identified, the name of one infertility center was repeated, three infertility centers were based in Delhi, India and three other infertility centers were not identified by location, hence ten infertility centers were discarded. A total of 46 functional infertility centers were identified in Nepal. 27 out of 46 service providers are located inside the Kathmandu Valley.

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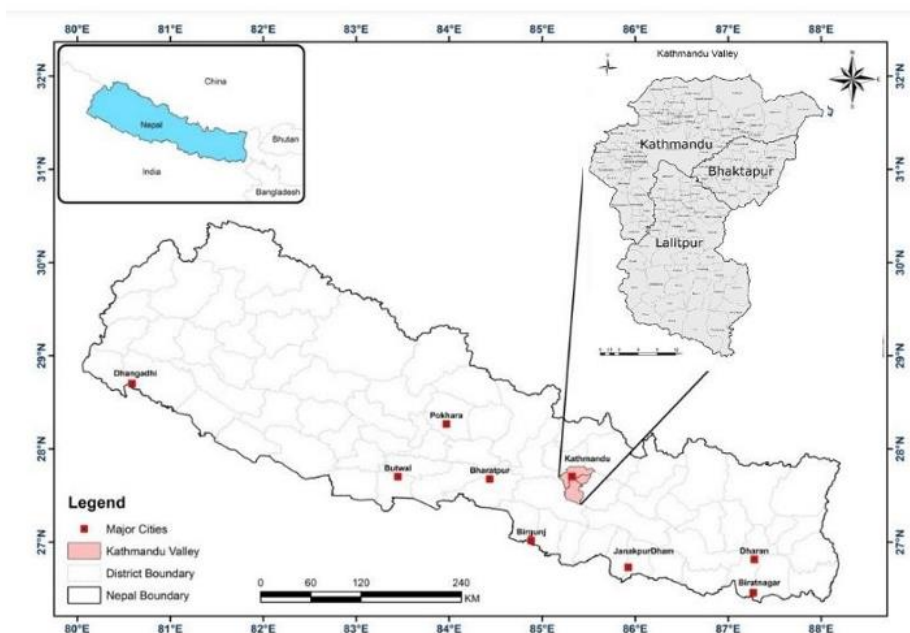


Figure 2 Map Indicating different districts and locations in Kathmandu Valley

The services offered by the providers are infertility diagnosis, infertility treatment, fertility preservation and donor treatment. Infertility treatment varies from pharmacotherapy with ovarian stimulation using oral medications or combined with intravenous gonadotropins, to expensive ART options. The diagnostic tests start from NRs. 10,000, infertility treatment ranges from NRs. 30,000 – 4,00,000, fertility preservation costs NRs. 25000 – 50000 and donor treatment cost ranges from NRs. 10,000 – 2,00,000 depending on the diagnosis. Hence, the overall cost for infertility treatment ranges between NRs. 75,000-700,000 which is approximately 570 – 5300 USD. With a Gross National Income (GNI) per capita of 1170 USD as per World Bank's data 2021, the infertility treatment cost is not affordable to the Nepali infertile patients seeking fertility treatment. Hence, financial burden is most important barrier for patients seeking infertility treatment. The author after five years of working experience in infertility center in Nepal has found that the couples consented for first IVF cycles despite financial constraints but had to stop treatment when they failed the cycle and had to repeat the treatment. Patients often turn to seek alternative measures for treatment which includes faith healing and ayurvedic medicine in hope for quick and successful outcome.

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CHAPTER III

RESEARCH METHODOLOGY

3.1 Study Design

The study design was a cross-sectional study.

3.2 Study Area and Population

The study area was Kathmandu district, which is located in Kathmandu valley, situated in Bagmati Province of Nepal.

There are seven provinces in Nepal formed by the grouping of the existing districts. Every district has local government authorities which are classified under metropolitan, sub-metropolitan, urban municipality, and rural municipality or Village Development Committee (VDC). Each district is a composite of any or all the four authorities. Each local government authorities have its smallest unit for the management of public administrative functions which are known as “Wards”.

Kathmandu valley comprises of three districts – Kathmandu, Bhaktapur and Lalitpur. Kathmandu district is the capital of Nepal. It covers an area of 49.45 sq.km and consists of 2,017,532 population as per census 2021. It has 11 local government authorities: one metropolitan and ten urban municipalities. Kathmandu Metropolitan is the main local government authority of the district and constitutes of 32 wards. The study area was situated in Ward No.1, Naxal, Kathmandu.

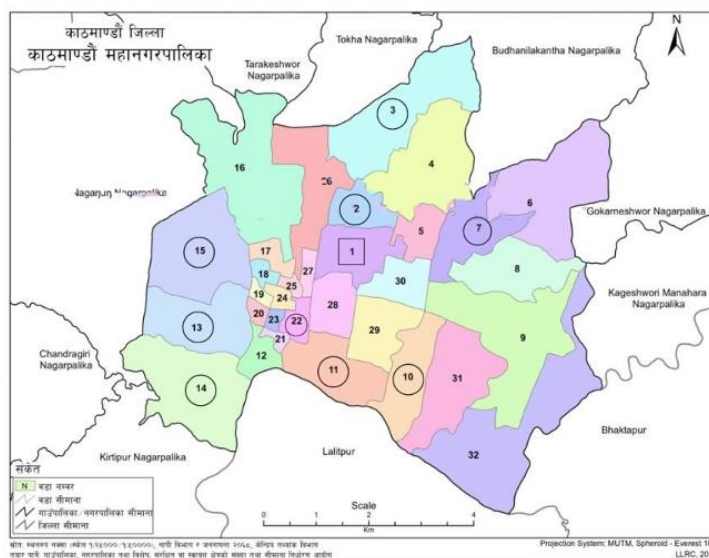


Figure 3 Map showing wards in Kathmandu Metropolitan

Note: Circles indicate the wards with infertility centers, Square indicate the ward with study site.

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As Kathmandu is the capital and most developed urban center in Nepal, it attracts huge population for better facilities including healthcare. A total of 46 service providers for infertility care has been identified in Nepal out of which 27 are located inside Kathmandu valley. There are 22 infertility centers in Kathmandu district alone. The National Demographic Health Survey data of Nepal doesn't cover the infertile population; hence no data could be retrieved on the number of infertile couples in Nepal.

3.3 Data Collection Period

The study period was 7th June to 15th June 2023.

3.4 Sample Size

The sample size was calculated by using the Cochran's formula. As no previous studies on quality of life among infertile men and women using disease specific FertiQoL in Nepal was found, the proportion of infertile patients with poor quality of life was set as 50% in the equation.

$$n_0 = \frac{(z\alpha/2)^2 \times p \times (1-p)}{d^2}$$
$$n_0 = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2}$$
$$n_0 = 384$$

A refusal of 25 patients was expected and hence, added to the calculated sample which resulted in 409 patients. Hence, the data was collected from 409 eligible patients. The patients were either individuals or couples.

3.5 Sampling Method

The sampling technique was multistage convenience sampling. All the patients presenting at the clinic every day, therefore, were recruited till the required sample size necessary for inferential statistical testing was reached.

The data on infertile population and list of infertility centers was not available on the website of Ministry of Health and Population (MoHP) of Nepal or any other authentic sources. Hence, the principal researcher conducted an intensive online search on Google and Facebook using the keyword "Nepal infertility center" followed by a search using "IVF Nepal" which ended up with 53 results. However, the search didn't include some of the service providers but was known to the researcher. Hence, the principal researcher added three more names, thus identifying 56 infertility centers in Nepal. Among the 56 infertility centers, the names of three infertility centers in Nepal were mentioned in "OVU Fertility" website but were not identified, the name of one infertility center was repeated, three infertility centers were based in Delhi,

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India and three other infertility centers were not identified by location, hence ten infertility centers were discarded. A total of 46 functional infertility centers were identified in Nepal. 27 out of 46 service providers are located inside the Kathmandu Valley. Multistage sampling technique was applied to obtain the representative sample of infertile couples in Kathmandu valley.

First Stage – Among the three districts inside Kathmandu valley- Kathmandu, Lalitpur and Bhaktapur, there are 22, five and null infertility centers respectively. Since Bhaktapur doesn't have any infertility centers, it was excluded from the study. Therefore, Kathmandu and Lalitpur district were selected by purposive sampling.

Second Stage – In Kathmandu district, there are 11 local government authorities – one metropolitan and ten urban municipalities. Kathmandu Metropolitan is the major local government authority of Kathmandu district. Additionally, 16 out of 22 infertility clinics are located inside Kathmandu Metropolitan. Hence, Kathmandu Metropolitan was selected purposively.

In Lalitpur district, there are six local government authorities- one metropolitan, two urban municipalities and three rural municipalities. Lalitpur Metropolitan is the major local government authority of Lalitpur district. Also, all the five identified infertility centers are located within Lalitpur Metropolitan; hence it was selected purposively.

Third Stage – A search was conducted on the website of “Nepal Society of Obstetrician and Gynecologists” to obtain the list of senior gynecologists involved in infertility care. Most of them were providing their services in private clinics rather than hospitals. So, infertility clinics were chosen over hospitals in Kathmandu and Lalitpur Metropolitan. Some infertility clinics were inside hospital premises but functioned as a separate unit from the hospital authority. Hence, choosing clinics would indicate better services and increased number of respondents.

In Kathmandu Metropolitan, two infertility hospitals, and 14 infertility clinics were identified. The six infertility hospitals were discarded and thus, the 14 infertility clinics were selected purposively. Among the five identified infertility centers in Lalitpur Metropolitan, three of them were private clinics and two of them were run by hospital. The hospitals were discarded and thus the three clinics were selected purposively.

Fourth Stage – The researcher searched whether more than one service providers (gynecologist) were available in one clinic, so that maximum number of respondents can be collected.

In Kathmandu district, one infertility center was identified where four gynecologists are providing IVF services in a single clinic. The name of the clinic is Vatsalya Natural IVF located in Ward No. 1, Naxal, Kathmandu. Additionally, the clinical records showed a huge number of patients visiting the clinic for infertility treatment. Hence, the clinic was selected purposively for the study.

However, there were only three infertility centers in Lalitpur and none of them had more than one gynecologist providing their service in one center. Since this would lead to insufficient respondents for our data collection, the clinics in Lalitpur district were discarded.

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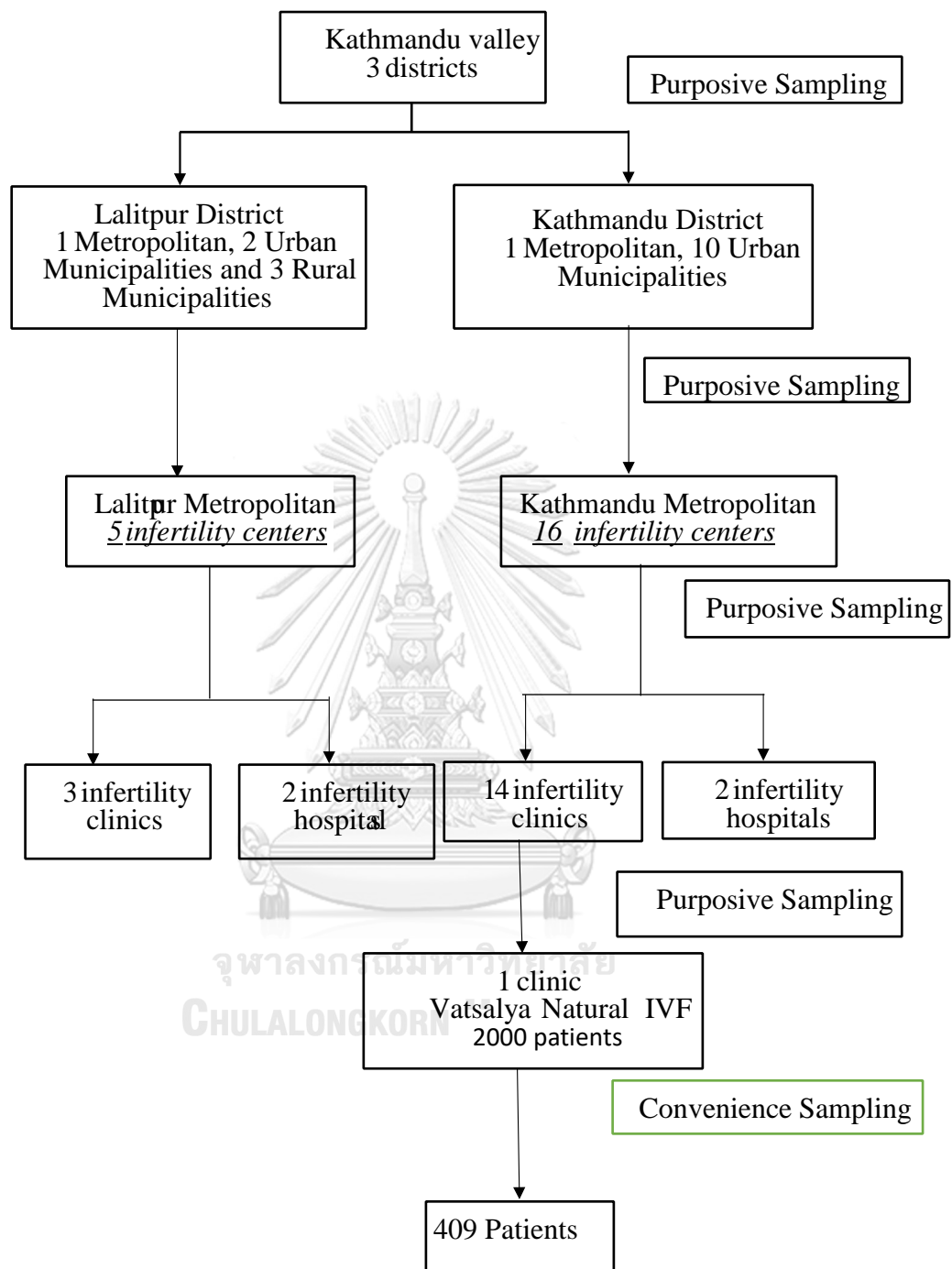


Figure 4 Sampling Flowchart

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Fifth Stage – After interviewing the clinical director of the clinic, the principal researcher was informed that, at present, there were 2000 patients visiting the selected infertility center located in Kathmandu district. To meet the sample size of our study, 409 patients were selected conveniently from the selected clinic.

Having the full list of patients available, the principal researcher could have selected the patients by random sampling, and it would also have been beneficial in generalizing the outcome. However, due to the time constraint for the data collection, the researcher chose not to use random sampling and instead go for convenience sampling.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion Criteria for Participants

1. Patients who were willing to participate in the study and gave written consent to participate.
2. Patients who were unable to conceive after at least a year of timed unprotected sexual intercourse. (Karabulut et al., 2013)
3. Patients who had been diagnosed for infertility.
4. Patients who could read/ write the questionnaire.

3.6.2 Exclusion Criteria for Participants

1. Patients who had a history of cancer treatment. (Karabulut et al., 2013)
2. Patients who were taking psychiatric medications/therapy or medications that may interfere with sex life. (J.-Y. Wang et al., 2022)
3. Patients who had experienced major life events like death of close relatives or a biological child during past twelve months prior to the interview. (Mao et al., 2022)
4. Patients with any form of disability. (Mao et al., 2022)

The patients with the above mentioned exclusion criteria were excluded from the study because from the literature review, we found that these conditions have effect on the quality of life. (Karabulut et al., 2013) (Mao et al., 2022) (J.-Y. Wang et al., 2022)

The participants were screened for inclusion and exclusion criteria by one nurse, trained as a research assistant, who was experienced in data collection and was working in the same clinic. She screened the respondents for duration of infertility, diagnosed cause of infertility and history of cancer treatment and intake of psychiatric medications through the medical records.

Additionally, the nurse orally screened the participants for assessing whether they had experienced major life events like death of close relatives or a biological child during the past twelve months prior to the interview. The nurse also screened for the presence of any form of disability and the ability to read/ write the questionnaire.

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If the participants didn't meet the eligibility criteria from medical records and oral screening, the nurse expressed gratitude to the participant for their time and excluded them from the study.

3.7 Measurement tools

The data was collected by using two questionnaires; one of them is developed by the researcher and remaining one is FertiQoL questionnaire developed by experts. The questionnaire developed by the researcher consisted of two sets; one set of questionnaires was reported by the principal investigator and the other set of questionnaires were self-reported by the respondent. The FertiQoL questionnaire was given to the respondents for self-report.

A. Questionnaire developed by researcher

The questionnaire developed by the researcher is divided into two parts; "Self-reported questionnaire by the respondent" (Annex 2) and "Questionnaire filled by the investigator". (Annex 3) There are 16 questions in the self-reported questionnaire (Part 1) and 16 questions in the questionnaire filled by investigator (Part 2). A total of 32 structured questions on sociodemographic, socioeconomic, couple related, fertility related, and medical characteristics of the respondent were used in the study. The adaptation of questionnaire on the characteristics were done by considering the results of former studies which used quantitative methods to assess QoL among infertile patients. (Karabulut et al., 2013) (Dong & Zhou, 2016) Item-objective congruence (IOC) index was also considered. The questionnaires are given as in Annex 2 and Annex 3. The questionnaires in Nepali which were given out to the respondents does not contain any complex questions to ensure readability. The questionnaires were translated in Nepali and back translated in English by reproductive health experts. Details can be found below under the sub-heading "Back-translation".

The questionnaires consist of five main parts which consisted of 32 questions.

Part 1 : Sociodemographic factors (6 questions) – See Q. No. 1.1-1.6

Part 2 : Socioeconomic factors (6 questions) – See Q. No. 1.7 – 1.11, 1.14

Part 3 : Couple-related factors (5 questions) – See Q. No. 1.13, 1.15, 2.1, 2.7, 2.15

Part 4: Fertility-related factors (7 questions) – See Q. No. 1.12, 2.2, 2.3, 2.5, 2.8, 2.11, 2.16

Part 5 : Medical History (8 Questions) – See Q. No. 1.16, 2.4, 2.6, 2.9, 2.10, 2.12, 2.13, 2.14

Question No. 1.1-1.16 as in Annex 2 were self-reported by the respondent and Question No. 2.1-2.16 as in Annex 3 were reported by the investigator.

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Table 3 Summary of evaluation variables

S.No.	Variables	Description	Variable Coding
Part 1: Sociodemographic			
1	Sex (Q1.1)	The information was collected under two groups.	0 = Female 1 = Male
2	Age (Q1.2)	The information was first collected with open ended question and later grouped into three categories.	1 = ≤ 30 2 = 31-35 3 = ≥ 36
3	Ethnicity (Q1.3)	The ethnicity of the respondent was collected under seven groups and later categorized into three groups.	0 = Others 1 = Janajati/ Newar 2 = Bahun/ Chhetri
4	Education (Q1.4)	This information was collected under 6 groups and later grouped as above high school education and below high school education.	0 = Below High School 1 = Above High School
5	Residence (Q1.5)	The information was collected under two groups.	0 = Rural 1 = Urban
6	Family type (Q 1.6)	The information was collected under two groups	0 = Nuclear 1 = Joint
Part 2: Socio-economic factors			
7	Occupation (Q1.7)	The information was collected under four groups and was later grouped later into three.	0=Unemployed 1= Laborer 2=Service/Self-employed
8	Working hours (Q1.8)	The information was collected with open-ended question and	0 = ≤ 0 hours 1 = 1-8 hours 2 = ≥ 9 hours

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		was later grouped into three categories.	
9	Access to take day off from work (Q1.9)	The information was collected under 5-point Likert scale. It was categorized under three groups.	0 = Easy 1 = Neutral 2 = Hard
10	Income level (Q1.10)	The information was collected under four groups	0 = Less than 20,000 NRs 1 = 20,000 - 50,000 NRs 2 = 50,000 – 1,00,000 NRs. 3 = Above 1,00,000 NRs.
11	Presence of Health Insurance (Q1.11)	The information was collected under two groups.	0 = No 1 = Yes
12	Travel long distance for service (Q1.14)	The information was collected under two groups.	0 = No 1 = Yes
Part 3: Couple-related factors			
13	Cognition of need of children (Q1.13)	The information was collected under two groups.	0 = Not so Important 1 = Very Important
14	Partner's supportiveness during treatment (Q1.15)	The information was collected under 5-point Likert scale. It was categorized under three groups.	0 = Not Supportive 1 = Neither Supportive nor Non-Supportive 2 = Supportive
15	Approaching infertility center (Q2.1)*	The information was collected under two groups.	0 = Individually 1 = With Partner
16	Duration of partnership (Q2.7)*	The information was collected with open ended question and	0 = ≤5 years 1 = 6-9 years 2 = ≥10 years

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		later grouped as such.	
17	Marital Status (Q2.15)*	The information was collected under two groups.	0 = First Marriage 1 = Second Marriage
Part 4: Fertility-related factors			
18	Presence of biological child (Q1.12) (Q2.5, Q2.16) *	The information was collected under two groups.	0 = No children 1 = One or more children
19	Type of Infertility (Q2.2) *	The information was collected under two groups.	1 = Primary Infertility 2 = Secondary Infertility
20	Cause of infertility (Q2.3) *	The information was collected under four groups and later categorized into three.	0 = Female 1 = Male 2 = Both and Unexplained
21	Duration of infertility (Q2.8) *	The information was collected with open-ended question and was later grouped	0 = ≤3 years 1 = 4-5 years 2 = ≥6 years
22	Type of current Infertility treatment (Q2.11) *	The information was collected under seven groups and then categorized under three groups.	0= Timed Intercourse 1= Assisted Reproduction (self) 2= Assisted Reproduction (donor)
Part 5: Medical History			
23	Professional psychological support (Q1.16)	The information was collected under two groups.	0 = No 1 = Yes
24	History of conception (Q2.4) *	The information was collected under two groups.	0 = No 1 = Yes
25	History of pregnancy loss (Q2.6) *	The information was collected under two groups.	0 = No 1 = Yes

[Type here]

26	History of ART treatment (Q2.9, Q2.10) *	The information was collected under two groups.	0 = No 1 = Yes
27	Presence of chronic illness (Q2.12) *	The information was collected under two groups.	0 = No 1 = Yes
28	Intake of Medications (Q2.13) *	The information was collected under two groups.	0 = No 1 = Yes
29	History of reproductive tract surgery (Q2.14) *	The information was collected under two groups.	0 = No 1 = Yes

* Reported by the investigator

B. FertiQoL Questionnaire

FertiQoL is a gold standard for assessing QoL among infertile patients which is developed by a team of experts from European Society of Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine in 2011. Fertility Quality of life (FertiQoL) is one of the sensitive, reliable, and valid measure of QoL among infertile patients which assesses the mind/body, relational, social, and emotional domains. (Boivin et al., 2011) Additionally, it measures the treatment tolerability and treatment environment as well. The questionnaire is in Annex 4. IOC index was considered. The questionnaire in Nepali which will be given out to the respondents does not contain any complex words to ensure readability. The questionnaire was translated in Nepali and back translated in English by reproductive health experts. Further details can be found below under the title “Back-translation”.

FertiQoL yielded six subscale and three total scores with a range of 0 to 100. Two additional items (marked A and B on the FertiQoL questionnaire given in Annex 3) captured an overall evaluation of physical health and satisfaction with quality of life and are not used in FertiQoL scoring. The questionnaire consisted of 36 items.

It yielded six subscales which are as such:

1. Emotional Subscale – 6 questions
2. Mind/ Body Subscale – 6 questions
3. Relational Subscale – 6 questions
4. Social Subscale – 6 questions
5. Treatment Environment Subscale – 6 questions
6. Treatment Tolerability Subscale – 4 questions

The Core FertiQoL represented the average fertility quality of life across all domains. There are four subscales for Core FertiQoL – Emotional, Mind-Body, Relational and Social subscales.

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The Treatment FertiQoL represents the average quality of life across treatment domains. There are two treatment subscales – Treatment Environment and Treatment Tolerability.

Table 4 Subscales of FertiQoL

S.No.	Subscale	Description	Question No. (refer to Annex 3)
1.	Emotional	“Impact of Negative emotions like sadness, depression, jealousy, and resentment on QoL”	Q4, Q7, Q8, Q9, Q16, Q23
1.	Mind/ Body	“Impact on physical health (eg. Fatigue, pain), Cognition (eg. Concentration), Behavior (eg. Disrupted daily activities, delayed life plans)”	Q1, Q2, Q3, Q12, Q18, Q24
3.	Relational	“Impact on marriage or partnership (eg. Sexuality, communication, commitment)”	Q6, Q11, Q15, Q19, Q20, Q21
4.	Social	“Impact on social interactions (eg. Social inclusion, expectations, stigma, support)”	Q5, Q10, Q13, Q14, Q17, Q22
5.	Treatment Environment	“Impact of accessibility and quality of treatment on QoL.”	T2, T5, T7, T8, T9, T10
6.	Treatment Tolerability	“Extent to which fertility medical services impact on daily life”	T1, T3, T4, T6

FertiQoL questionnaire consisted of 36 items which were scored according to five response categories. The response scale ranged from 0 to 4. Respondents were asked to rate the statements which reflected their current feelings and thoughts. Scores lower than mean value indicated poor quality of life. The categories and subscales are as such:

Table 5 Response Category of FertiQoL

Response Category	Scale
Evaluation	0 - Very Poor
	1 - Poor
	2 - Neither Poor nor Good
	3 - Good
	4 - Very Good
Satisfaction	0 - Very Dissatisfied
	1 - Dissatisfied
	2 - Neither Dissatisfied nor Satisfied
	3 - Satisfied

[Type here]

	4	-	Very Satisfied
Frequency	0	-	Always
	1	-	Very often
	2	-	Quite Often
	3	-	Seldom
	4	-	Never
Intensity	0	-	An extreme amount
	1	-	very much
	2	-	moderate amount
	3	-	a little
	4	-	not at all
Capacity	0	-	Completely
	1	-	a great deal
	2	-	moderately
	3	-	not much
	4	-	not at all

Table 6 Subscale and total scales of FertiQoL

	Core FertiQoL				Treatment FertiQoL	
	Emotional	Mind/Body	Relational	Social	Environment	Tolerability
Item	Q4R	Q1	Q6	Q5	T2R	T1
	Q7	Q2	Q11R	Q10	T5R	T3
	Q8	Q3	Q15R	Q13	T7	T4
	Q9	Q12	Q19	Q14R	T8	T6
	Q16	Q18	Q20	Q17	T9	
	Q23	Q24	Q21R	Q22	T10	

“The item numbers are the questions in the FertiQoL questionnaire. The items marked as “Q” and “T” represent “Core” and “Treatment” FertiQoL. Items with R require reverse marking before summing.”

The scoring was done in three steps.

1.The items marked with “R” required reverse marking before summing. The items were reversed first.

2.The raw scores were calculated by summing all the items which belonged to the subscale or total subscale. For the Total FertiQoL, core (24 items) and treatment (10 items) were added.

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3. The scaled scores for the subscale and total scores were computed by multiplying the relevant raw score by $25/k$. Here, k is the number of items in the subscale. The scales scores range is 0 to 100.

C. Back-translation

All the above-described questionnaires were translated in Nepali language and didn't contain complex questions to ensure readability among the respondents. The principal researcher proficient in reproductive health and English and Nepali language translated the English version of all the above-described sections of questionnaires in Nepali. The Nepali translation was back translated by another key person who is an undergraduate in Social Sciences and have three years of experience in conducting Reproductive Health programs. The back translator did not have access to any of the above-described parts of the original questionnaires in English.

The translator read all the back-translated sections of the questionnaires. However, the translator didn't correspond to translation of the word "fertility problem". The literal translation of fertility problem in Nepali language would indicate overall reproductive problem. Since there is no specific word for fertility problem and the questionnaire will be specifically distributed to infertile patients, both the translator and the back-translator agreed to use the term "infertility problem" instead of "fertility problem" wherever the terms were mentioned in the researcher developed questionnaire and FertiQoL questionnaire. Apart from that, there were minor words and phrases which the translator didn't correspond to the back translator. However, the translator and back-translator discussed on the translated questionnaires and concluded with necessary modifications.

The questionnaires thus translated were verified with another reproductive health expert, working as an embryologist in an infertility center for the past seven years. He was proficient in both Nepali and English language. The translator and the expert both had access to both the original English and back-translated Nepali questionnaires i.e. Questionnaire developed by researcher and FertiQoL questionnaire. No modifications were required for the questionnaire developed by researcher. However, for the FertiQoL questionnaire, both the English and back-translated Nepali questionnaire were placed together and subjected for necessary corrections. The Core and Treatment Domains of FertiQoL questionnaire were intensely discussed with the expert. Both the translator and expert having access to the original FertiQoL searched for synonyms of specific words like "impaired" (Q1), "cope" (Q4), "support" (Q5), "resentment" (Q7), "grief" (Q8), isolated (Q10), affectionate (Q11), obligations (Q12) and "bothered" (Q18). Thus, the back-translated Nepali words were made simpler, and the sentences were refined to make it convenient and understandable for the patient. In the treatment domain, the words "Surgery and medical treatments" as used in "T8" and "T9" were translated as "medical services and treatment" because the use of word "surgery" translated in Nepali language sounded more intense and complicated. Thus, the final questionnaires were prepared.

In this way, the questionnaires developed by the researcher and the FertiQoL questionnaire were translated in Nepali language.

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3.8 Validity and Reliability

3.8.1 Construct validity

A. Questionnaire developed by researcher

The important characteristics were drafted from relevant studies in literature review. (J. R. Chachamovich et al., 2010) (Karabulut et al., 2013) (Dong & Zhou, 2016)

The construct validity for the characteristics presented in conceptual framework (Figure 1) are explained as below:

1. Sociodemographic Characteristics

It included age, sex, ethnicity, education level, residence, and family type. The sociodemographic characteristics had construct validity because they are confounders in any kind of research, and they should be included in any kind of conceptual framework to control for the confounding.

2. Socioeconomic Characteristics

It included occupation, income level, working conditions (work hours, access to time off from work), travel long distance for service and presence of Health Insurance. The first two characteristics occupation and income level had construct validity because they are confounders in any kind of research and should be included in conceptual framework to control for confounding. Similarly, working conditions and presence of health insurance had construct validity because the characteristics were derived from a literature review. (Maeda et al., 2022) (Karabulut et al., 2013) Hence, these variables were valid for measuring an association with quality of life (QoL).

3. Couple Characteristics

It included marital status, duration of marriage, cognition of need of children, partner supportiveness in the treatment and approaching infertility center as couple. These variables were derived from systematic review paper and published articles. (J. R. Chachamovich et al., 2010; Fekkes et al., 2003) Hence, they were valid for measuring an association with QoL.

4. Fertility-related Characteristics

It included presence of biological children, type of infertility, cause of infertility, duration of infertility, duration of treatment, and type of current treatment. These variables were derived from published study. (Karabulut et al., 2013) Hence, they had construct validity to measure association with QoL.

5. Medical History

It included the following variables: desire for professional psychological support, history of conception, history of pregnancy loss, history of ART failure, presence of chronic illness, intake of medications, and history of reproductive tract. The variables were derived from

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literature review which had found association between medical history and QoL. (J. R. Chachamovich et al., 2010; Karabulut et al., 2013)

Since we had the construct validity for all the variables inside conceptual framework, we automatically had the construct validity of the questionnaires because each section of the questionnaires in Annex 2 and Annex 3 corresponded to the sections of the conceptual framework.

1. Sociodemographic factors (8 questions) - See Q. No. 1.1-1.6
2. Socioeconomic factors (6 questions) – See Q. No. 1.7 – 1.11, 1.14
3. Couple-related factors (6 questions) – See Q. No. 1.13, 1.15, 2.1, 2.7, 2.15
4. Fertility-related factors (8 question) – See Q. No. 1.12, 1.15, 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 2.12, 2.17
5. Medical History (6 Questions) – See Q. No. 1.16, 2.4, 2.6, 2.9, 2.10, 2.12, 2.13, 2.14

The questionnaires corresponded with the conceptual framework and operational definitions which were based on the literature review indicating association with QoL. Hence, the questionnaires had construct validity.

B. FertiQoL questionnaire

The FertiQoL questionnaire is derived from an initiative of two largest reproductive medical societies namely European Society of Human Reproduction and Embryology (ESHRE) and the American Society of Reproductive Medicine (ASRM). Hence, FertiQoL is the first and internationally validated instrument to measure QoL among individuals experiencing infertility issues. It provides an integral means for QoL issues in clinical care and research endeavors. FertiQoL provides an adequate face and content validity in terms of number of items included (n=36), acceptable respondent's burden, clarity of instructions and balance in response options. (Boivin et al., 2011)

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3.8.2 Content validity

Two questionnaires were used in the study. The questionnaires developed by the researcher was derived mainly from literature review. (J. R. Chachamovich et al., 2010) (Karabulut et al., 2013) (Dong & Zhou, 2016) The FertiQoL questionnaire is developed by a team of experts. (Boivin et al., 2011)

The content validity for the translated questionnaires were done by consultation with experts. The questionnaires were validated by three experts for content and construct validity to confirm whether the questionnaire measures what it has claimed in the conceptual framework and operational definitions. The individuals involved in the validation of the questionnaire were two experts with more than five years of experience in providing infertility services - Dr. Sanu Maiya Shrestha Pradhan (M.D., Senior Consultant Obstetrician/ Gynecologist, and IVF Specialist) and Mr. Dijan Vaidya (Clinical Embryologist, Master's in clinical Embryology) and one expert who is a researcher and lecturer with more than seven years of experience in teaching

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- Mrs. Subhadra Pradhan (Senior Nurse & Lecturer, Nepalese Army Institute of Health Sciences). Index of item-objective congruence (IOC) was used by summing up the scores from the experts. In each item, the experts were asked to determine the content validity score:

Score = 1 (for clear measuring),

Score = -1 (for not measuring clearly) or

Score = 0 (degree to which it measures the content area is unclear)

IOC index less than 0.66 was received from experts with comments for the following questions; Q 2.10 “Has the patient been under ART treatment before?”, Q1.6 “How many members are there in your family?”, “Does the patient have any history of pregnancy loss?” Q2.11 “What type of infertility treatment is the patient going through in this cycle?” Hence, they were subjected for revision.

The experts suggested that the term ART used in Q2.10 was vague and hence Q2.10 was divided into two questions; “Has the patient been under IUI treatment before?” and “Has the patient been under IVF treatment before?” Similarly, the experts commented that Q1.7 doesn't measure the parameter for family size. Hence, the question was changed to “What type of family are you living in?” And the choices were a. Nuclear family (with husband and children) b. Joint family (with husband and his family). The category for Q2.8 “Does the patient have any history of pregnancy loss?” was changed to a. No history b. Spontaneous Abortion and c. Induced Abortion. The experts suggested that spontaneous and missed abortion can be classified under the same category to avoid confusions during data collection. Similarly, the categorization of options for Q2.11 was also changed to avoid confusion and easy analysis of the data. The categorization was modified as a. Timed Intercourse (TI) b. IUI with Husband Sperm (IUI-H) c. IUI with donor sperm (IUI-D) d. IVF with husband sperm e. IVF with donor sperm f. ICSI with husband sperm g. ICSI with donor sperm h. Egg donation i. Embryo donation.

Following questions from received IOC index 0.66 and hence it was revised; Q1.12 “Monthly income of the couples”, Q3 “Do you feel drained or worn out because of fertility problems?” and Q18 “Are you bothered by fatigue because of fertility problems?”.

One of the experts advised to review the monthly income of the couples through guidelines in Central bureau of statistics Nepal. But the researcher found out that there is no standardized scale to assess the socioeconomic status of the Nepalese population. However, Kuppuswamy's scale was identified to be the commonly used tool to classify socioeconomic status in the Nepalese context. (Joshi & Acharya, 2019) Thus, taking reference from a recent study on socioeconomic determinants in Nepal which used the Kuppuswamy's scale (Sherchand et al., 2022), the income category was reclassified.

For Q3 and Q18 from FertiQoL questionnaire, since the questions seemed to be a repetition on “fatigue”, two experts marked them as unclear. However, on discussion with the study advisor who is also an Editor-in-Chief for Journal of Health Research and an experienced freelance consultant, we concluded that the repetition of the questions may have been a strategy to psychologically test whether the respondents are attentively and correctly answering all the

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questions in the questionnaire. Hence, we keep both the questions in our study questionnaire. Thus, IOC was carried out to ensure content validity.

Apart from the above-mentioned questions, all the other questions received an IOC index of 1 and hence, they didn't require any modifications.

3.8.3 Face validity

The face validity was checked as one of the objectives of the pilot testing. The details of pilot study are as follows.

3.8.4 Pilot Testing

The pilot testing was conducted by the principal researcher. The pilot study was done among 15 infertile patients visiting an infertility center in "Kathmandu Fertility Center", which is an infertility clinic located in Ward no. 3, Kathmandu Metropolitan. The selected pilot study site is similar in characteristics to the real study site. The patients in the pilot study represents the infertile patients from the clinical setting and infertility service in the center is provided by senior gynecologist.

The infertility center lies 4.5 km northwards to the selected clinic in Kathmandu. Thus, the site for pilot study is far from the selected study site which ensures avoidance of contamination with infertile patients participating in the real study.

The pilot testing was done among respondents who were present in the clinic for fertility treatment at the time of study and those who met the eligibility criteria for the study. The respondents were screened for eligibility with the help of nurse by checking their medical records. The medical records of the eligible participants were masked to ensure that the principal researcher doesn't know the name of the participant. The pilot testing was done among the eligible patients who gave consent to participate in the study. They were asked to participate in the survey while waiting for the ultrasound. Those who agreed to participate were included in the pilot testing and the purpose of study, process of face validation and researcher's inclusion criteria were explained to them. The questionnaires in Annex 2 and Annex 4 were given to the respondents for self-report. The respondents were requested to fill in all the answers so that there are no missing data. Meanwhile, the questionnaires in Annex 3 were reported by the investigator by assessing the medical records of the patient.

The details of administered questionnaires are same as in measurement tools described above.

The pilot testing of the questionnaires was conducted to make sure that the respondents understand the questionnaires well, to avoid misinterpretation of the questions and offensive, demotivation and ambiguous words. Through pilot testing, the questionnaires were pre-tested for usability and were ensured that its burden is least to the respondent. Moreover, the time to answer the questionnaires, and the clear flow of the questions were also checked with the respondents. Then, Cronbach's alpha was calculated for reliability.

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3.8.5 Reliability

The researcher used two questionnaires - one is developed by the researcher and the other is FertiQoL. There were 32 questions in the questionnaire developed by researcher as in Annex 2 and Annex 3. None of the questions in the questionnaires required internal validity because one question represented one variable measuring one fact. The only questionnaire that required internal validity is FertiQoL. However, the FertiQoL questionnaire has already been subjected to reliability testing. A study has found that Cronbach reliability for the Core and Treatment FertiQoL (and subscales) were satisfactory and in the range of 0.72 and 0.92 respectively. (Boivin et al., 2011) On conducting the pilot study, the Cronbach's alpha calculated for reliability was 0.835. Hence, the questionnaire is a reliable tool for measurement of fertility quality of life.

3.9 Data Collection

The principal researcher submitted a formal letter in the selected study clinic asking for permission from the clinical administration to conduct the research. On receiving the consent from the selected clinic, the principal researcher went to the clinic for data collection.

The researcher recruited the nurses from the selected clinic as the research assistants. The nurses who had been working for more than a year in the clinic, had completed a Diploma course in Nursing and had experience in data collection and conducting research were recruited as the research assistants.

The researcher collected data from four individuals at a time. It required 15-20 minutes for everyone to fill the questionnaire, hence, the researcher got about 50 responses in a day. With six working days per week, the researcher completed the data collection within two weeks. The principal researcher was assisted by the nurse duly trained as research assistant.

3.9.1 Training the Research Assistant

The nurses who were already working in the infertility center were recruited as the research assistants. The qualifications and experience in data collection were checked before recruiting them for data collection. A training of three hours was enough to recruit the nurse as research assistants.

1. **Place of training:** Interview room of the infertility center.
2. **Duration of training:** 3 hours
3. **Objective of the training**

The training objective were as such:

- 3.1 Explain to the nurse regarding the process and objective of the study.

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3.2 Training the nurse to screen the participants according to their eligibility criteria

3.3 Train to mask the medical records of the eligible participants.

3.4 Train regarding the consent form and the questionnaire.

3.5 Train the nurse on answering likely questions from participants in a standard way.

3.6 Train to receive written consent form from the participants.

3.7 Train to hand out the questionnaires to the consenting participants.

3.8 Train the nurse to check for any missing answers in the questionnaire once the respondent completes it.

3.9 Train the nurse to collect the questionnaire by expressing gratitude once the respondent completes the questionnaire.

4. Method of training

4.1 The training started with an oral presentation explaining the process and objective of the study.

4.2 Question and answer session was conducted with the research assistant.

4.3 A role play from two nurses was introduced: one as a research assistant and one as a participant.

4.4 The researcher observed the role play. After the role play, the principle researcher gave feedback with recommendations of improvement if necessary.

A list of patient's names was retrieved from the clinical database of both the clinics with the help of nurses in the respective clinics. The name list remained with the nurses, and they coded the names with specific numbers to ensure the process of masking of data from the principal researcher. An eligibility checklist as in Annex 5 was handed to the trained nurse.

The study was conducted while the patients waited for their consultation with the doctor. The nurse duly trained as research assistant screened for eligibility of the participants by orally asking and accessing the medical records. If the patients met all eligibility criteria, the nurse approached the participant and explained the process and purpose of the study. If the participant was willing to participate in the study, the nurse covered the name of the patient in the medical record file and wrote the number code from the name list to ensure the masking of data from the principal researcher. If the patients were not willing to participate, the nurse expressed gratitude to the patients for their time and excluded them from the study. Eligible patients (in a group of four) were requested to follow the nurse in a separate room where the patients would be informed regarding the objectives of the study and confidentiality of the data. She explained to the patients regarding consent, freedom to participate, right to withdraw, confidentiality, access to the final report and no use of the data for other purposes. She requested the participant to sign on a written consent to participate in the study. If the participants didn't give written

[Type here]

consent to participate, the nurse expressed her gratitude towards the patient for their time and exclude them from the study. The participants who were willing to sign the consent form were provided with a coded questionnaire to fill up.

The consenting participants were explained that the informed consent form which included the participant's name, and the signature will be kept separately from the questionnaire and that their answers could not be traced back to them. Once the researcher received the written consent from the participants, the consent form was kept separately. Then the researcher coded the questionnaires based on the code number mentioned on the medical record file of the participant. Thus, the self-reported questionnaires were coded before handing them to the respondents.

The translated Nepali questionnaire which consisted of self-reported sections and investigator reported sections of the questionnaire were used for data collection. The self-reported questionnaire was provided directly to the respondents. While the patients filled the self-reported questionnaires, the investigator assessed the medical file and filled out clinical characteristics of the respondent. The questionnaire items were explained to the participants when necessary. In case of any doubts or comprehension difficulties about the questions or the responses, the investigator personally cleared all the confusions. It required 15-20 minutes to complete the questionnaires. After the respondents completed the questionnaire, the researcher asked the respondents to recheck the involuntarily missed answers. Finally, the completed questionnaires received from the patients were kept in a sealed envelope.

During treatment, while female patients require frequent visits to the clinic for oocyte monitoring throughout the menstrual cycle, male patients are obliged to visit only for diagnostics and sperm collection. Hence, if the female patient approached the fertility clinic with their partner and both consented to participate in the study, data was collected from both the patients individually and independently. Finally, the completed questionnaires from the dyad couple were kept in one sealed envelope.

The answers from the participants were kept confidential and coded to identify the data collection form. The data of the respondents were coded to ensure anonymity and concealment of allocation. At the end of the research, the encoded name list of patients was destroyed.

3.10 Data Entry and Analysis

The data was entered in Epidata V3.1 and then transferred to Microsoft Excel. The data was cleaned and was transferred for analysis to Statistical Package of Social Sciences (SPSS software version 26.0) subjected to College of Public Health Sciences, Chulalongkorn University, Thailand. The answers were scored and grouped as mentioned in the description in measurement tool.

Descriptive Statistics

Participants' characteristics (independent variables) were summarized using frequencies and percentages.

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The descriptive statistics were conducted which are as summarized in the following table.

Table 7 Descriptive Statistics

Variables	Types of variables	Descriptive statistics
Sex of the respondent	Categorical (nominal)	Frequency, percentage
Age of the respondent	Categorical (discrete) ¹	Frequency, percentage
Ethnicity of the respondent	Categorical (nominal)	Frequency, percentage
Education level of the respondent	Categorical (ordinal)	Frequency, percentage
Residence of the respondent	Categorical (nominal)	Frequency, percentage
Family type of the respondent	Categorical (nominal)	Frequency, percentage
Occupation of the respondent	Categorical (nominal)	Frequency, percentage
Working hours of the respondent	Categorical (discrete) ²	Frequency, percentage
Access to time off from work of the respondent	Categorical (nominal)	Frequency, percentage
Income level of the respondent	Categorical (ordinal)	Frequency, percentage
Presence of health insurance	Categorical (ordinal)	Frequency, percentage
Travel long distance for treatment	Categorical (ordinal)	Frequency, percentage
Cognition for need of children	Categorical (ordinal)	Frequency, percentage
Supportiveness of partner	Categorical (ordinal)	Frequency, percentage
Approach to infertility center	Categorical (ordinal)	Frequency, percentage
Duration of marriage	Categorical (ordinal) ³	Frequency, percentage
Marital Status of the respondent	Categorical (ordinal)	Frequency, percentage
Presence of biological child	Categorical (ordinal)	Frequency, percentage
Type of infertility	Categorical (ordinal)	Frequency, percentage

[Type here]

Cause of Infertility	Categorical (ordinal)	Frequency, percentage
Duration of Infertility	Categorical (ordinal) ⁴	Frequency, percentage
Type of Current infertility treatment	Categorical (ordinal)	Frequency, percentage
Desire for psychological support	Categorical (ordinal)	Frequency, percentage
History of conception	Categorical (ordinal)	Frequency, percentage
History of pregnancy loss	Categorical (ordinal)	Frequency, percentage
History of ART failure	Categorical (ordinal)	Frequency, percentage
Presence of Chronic Illness	Categorical (ordinal)	Frequency, percentage
Intake of Medications	Categorical (ordinal)	Frequency, percentage
History of Reproductive Tract Surgery	Categorical (ordinal)	Frequency, percentage

Note:

1 - ≤31 years, 32-35 yrs, ≤36 years

2 - ≤0 hours, 1-8hours, ≥9hours

3 - ≤5 years, 6-9 years, ≥10 years

4 - ≤3 years, 4-5 years, ≥6 years

Inferential Statistics

Based on the literature review, the researcher focused on the outcome in QoL score as a categorical variable and used multiple logistic regression.

In bivariate analysis, the association between independent variable and the dependent variable- quality of life were assessed using Chi-square test.

Independent variables with $P < 0.2$ in bivariate analysis were included in a multivariate logistic regression model to determine which ones are associated with QoL. The multivariate model was fitted in hierarchical manner using the stepwise method. Variance inflation factors was used to assess multicollinearity and variables of VIF of > 2.5 were excluded from the final model. Associations were expressed as beta-

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coefficients (mean differences) with 95% confidence intervals. All the analysis was done by using SPSS V.28.

3.11 Ethical Approval from Chulalongkorn University ERB

The ethical approval to conduct this study was obtained from Chulalongkorn University Ethical Review Board, Bangkok, Thailand. Permission was received from the Administrative Committee of Vatsalya Natural IVF to conduct the research in the clinical setting. Furthermore, written consent was taken from the participants before enrolling them for the study. Those who didn't consent for the study were not included in the study. The data received from the participants were kept confidential.



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CHAPTER IV

RESULTS

4.1 Background information

The study aimed to describe the socio-demographic factors, socio-economic factors, couple-related factors, fertility-related factors, and medical history which may have association with quality of life of infertile patients visiting fertility clinic in Kathmandu, Nepal. The study was conducted in the selected infertility clinic situated at Naxal, Kathmandu. The sample size requested for statistical testing of the study hypothesis was 384. Following 25 refusals to participate, the researcher continued to recruit consenting eligible patients till the number of 385 was reached. To this number, 25 consenting patients were further recruited to make up for those who did not consent to participate. The total participants' data presented in the results is therefore 409. All patients who consented to participate, completed the questionnaire. The required sample size was achieved within nine days in June 2023. The data was entered daily in EpiData version 3.1, exported to Microsoft Excel, cleaned, and then analyzed using Statistical Package of Social Sciences (SPSS software version 26.0) subjected to College of Public Health Sciences, Chulalongkorn University, Thailand.

The patients were provided with a self-reported questionnaire whose item-objective congruence (IOC) score was greater than and equal to 0.66. The pilot testing was done among 15 infertile patients from an infertility center located at 4km distance from our original study site. The self-reported questionnaire and the data from medical records didn't require reliability test. Hence, after pilot study, the Cronbach's alpha coefficient was calculated for FertiQoL questionnaire which was 0.835. After the data collection, the mean scores were 67.8 ± 16.1 (22.9-98.9) for core FertiQoL, 67.7 ± 13.2 (27.5-97.5) for treatment FertiQoL and 67.7 ± 13.2 (35.3-96.3) for total FertiQoL. The results are presented in two parts: descriptive statistics and inferential statistics.

4.2 Descriptive analysis

In descriptive analysis, the socio-demographic factor, age variable was described using mean, standard deviation, maximum and minimum values, frequency, percentage, and cumulative percentage. Similarly, socio-economic variables – working hours, couple related variables-duration of marriage and medical history variable - duration of infertility were also described using mean, standard deviation, maximum and minimum values, frequency, percentage, and cumulative percentage. Using the percentile value, these variables were then categorized into three groups and described using frequency, percentage, and cumulative percentage.

For categorical socio-demographic variables (sex, ethnicity, education, residence and family type), socioeconomic variables (employment status, ease of access from work, income level, travel long distance for service and presence of health insurance), couple-related variables (marital status, cognition of need of child, partner's supportiveness in treatment, approach to fertility center), fertility-related variables (presence of biological child, type of infertility, cause

[Type here]

of infertility, duration of infertility and type of current treatment) and medical variables (desire for psychological support, presence of chronic illness, history of medication intake, history of ART failure, history of conception, history of pregnancy loss and history of reproductive tract surgery) only frequency, percentage and cumulative percentage were used for descriptive data. Following the resulting descriptive data, the variables (except with dichotomous attributes) were categorized into three attributes except for monthly income.

For Quality-of-life assessment, the scores were first described in mean, standard deviation, maximum and minimum values. Then, using the mean value, the variables were categorized into two levels – good and poor FertiQoL, and described using frequency, percentage, and cumulative percentage.

4.2.1 General Characteristics of Infertile Patients

I. *Socio-demographic factors*

Table 8 shows all the socio-demographic factors.

The mean age of the respondents was 33.1 ± 5.0 (21-47) years. Most of the respondents were females (68.9%) with a mean age of 32.4 ± 4.9 (21-45) years while 31.1% were male with a mean age of 34.8 ± 4.9 (24-47) years. The percentile range was used to group the age of the respondents into three groups. 53.5% respondents had education above high school. 47.7% respondents belonged to a higher ethnicity i.e. Brahmin and Chhetri while 44% belonged to the indigenous ethnic groups. 76.3% respondents belonged to urban area and 70.2% of the respondents lived in a joint family.

Table 8 Socio-demographic characteristics of infertile patients (n=409)

S.No.	Variables	Frequency (n)	Percentage (%)
1.	Gender		
	Male	127	31.1%
	Female	282	68.9%
2.	Age		
	≤31 years	145	35.5
	32-35 years	141	34.5
	≥36 years	123	30.1
3.	Ethnicity		
	Brahmin/Chhetri	195	47.7%
	Janajati (Indigenous)	180	44%
	Others	34	8.3%
4.	Education		
	Above High School	219	53.5%
	Below High School	190	46.5%

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5.	Residence		
	Rural	97	23.7%
	Urban	312	76.3%
6.	Type of family		
	Nuclear	122	29.8%
	Joint	287	70.2%

II. Socio-economic factors

Table 9 presents the socio-economic factors. Majority of the respondents (55%) were service/self-employed while 36.9% were unemployed. Majority (43.8%) had an income between NRs. 20,000 – 50,000. The mean duration of daily work hours was 5.4 ± 4.3 (0-12) hours. All the respondents were paying out-of-pocket for infertility treatment as only 25.7% had health insurance but didn't cover any fertility expenses. 58.7% respondents had travelled to Kathmandu only to receive fertility services. However, 32.3% respondents found it difficult to get access to day-off from work for coming to receive fertility treatment.

Table 9 Socio-economic characteristics of infertile patients (n=409)

S. No.	Variables	Frequency (n)	Percentage (%)
1.	Occupation		
	Unemployed	151	36.9%
	Service/ Self-Oriented	225	55%
	Laborer	33	8.1%
2.	Monthly income		
	Less than NRS. 20,000	129	31.5%
	Between NRs. 20,000 – 50,000	179	43.8%
	Between NRs. 50,000 – 1,00,000	60	14.7%
	Above NRs. 1,00,000	41	10%
3.	Work hours		
	≤0 hours	150	36.7%
	1-8 hours	166	40.6%
	≥9 hours	93	22.7%
4.	Access to day-off		
	Easy	103	25.2%
	Neither Easy nor Difficult	174	42.5%
	Difficult	132	32.3%
5.	Presence of Health Insurance		
	No	304	74.3%
	Yes	105	25.7%
6.	Travel for service		
	No	169	41.3%
	Yes	240	58.7%

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III. Couple-characteristics

Table 10 shows couple-related characteristics. Majority 92.2% respondents didn't have any children, 98.5% responded that the cognition of children was very important to them and 98.3% responded that they have supportive partners. The mean duration of marriage was 7.8 ± 4.1 (1-20) years. Almost all the participants 57.9% of the patients approached to the fertility center as couples while the remaining came for service as individuals.

Table 10 Couple-related characteristics of infertile patients (n= 409)

S.No.	Variables	Frequency (n)	Percentage (%)
1.	Marital Status		
	First Marriage	403	98.5%
	Second Marriage	6	1.5%
2.	Duration of marriage		
	≤5 years	142	34.7%
	6-9 years	132	32.3%
	≥10 years	135	33%
3.	Children Present		
	No	377	92.2%
	Yes	32	7.8%
4.	Perception of need of children		
	Very Important	404	98.78%
	Not so Important	5	1.22%
5.	Partner's Supportiveness		
	Not Supportive	4	0.97%
	Neither Supportive nor non-supportive	3	0.73%
	Supportive	402	98.3%
6.	Approach to fertility center		
	Couple	237	57.9%
	Individual	172	42.1%

IV. Fertility-related characteristics

Table 11 shows fertility related characteristics. 58.9% of the patients were experiencing primary infertility and the female cause of infertility was prevalent at 48.7%. The mean duration of infertility was 4.5 ± 3.1 (1-15) years. Majority of the respondents 46.9% were undergoing ART cycles using self-gametes (sperm and egg) while 19.1% were undergoing donor ART cycles (donor sperm, egg, or embryo).

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Table 11 Fertility-related characteristics of infertile patients (n=409)

S.No	Variables	Frequency	Percentage (%)
1.	Type of Infertility		
	Primary	241	58.9%
	Secondary	168	41.1%
2.	Cause of Infertility		
	Female	199	48.7%
	Male	71	17.4%
	Both + unexplained	139	34.0%
3.	Duration of infertility*		
	≤3 years	205	50.1%
	4-5 years	94	23%
	≥6 years	110	26.9%
4.	Type of Infertility treatment		
	Timed Intercourse	139	34%
	Assisted Reproduction (self)	192	46.9%
	Assisted Reproduction (donor)	78	19.1%

V. *Medical History*

Table 12 shows the medical history variables. About a quarter of respondents (25.4%) had chronic conditions and 23% of them were taking medications. 64.5% respondents had a history of pregnancy loss while 52.8% had a history of ART failure. Only 11.5% respondents had a history of reproductive tract surgery. Majority of the respondents (80.7%) desired professional psychological support.

Table 12 Medical History related variables in infertile patients (n = 409)

S.No.	Variables	Frequency	Percentage (%)
1.	Presence of Chronic Illness		
	No	305	74.6%
	Yes	104	25.4%
2.	Intake of Medications		
	No	315	77%
	Yes	94	23%
3.	History of conception		
	No	248	60.6%
	Yes	161	39.4%

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4.	History of Pregnancy Loss	145	35.5%
	Yes	264	64.5%
	No		
5.	History of Childbirth		
	No	367	89.7%
	Yes	42	10.3%
6.	History of ART failure		
	No	216	52.8%
	Yes	193	47.2%
7.	History of Reproductive Tract Surgery		
	No	362	88.5%
	Yes	47	11.5%
8.	Desire for professional psychological support		
	Yes	330	80.7%
	No	79	19.3%

4.2.2 Quality of Life in Infertile Patients

Table 13 shows the descriptive of FertiQoL domains and total FertiQoL scores. The mind/body domain had a mean score of 60.5 ± 23.3 (0 – 100) which was the lowest score observed among all other domains. Similarly, the emotional domain had a mean score of 62.4 ± 20.5 (8.3 – 100) which was the second lowest score observed. However, the relational domain had a mean score of 82.7 ± 12.7 (50-100) which was the highest score among all other domains. The mean scores for total core FertiQoL and total treatment FertiQoL were 67.8 ± 16.1 (22.9-98.9) and 67.75 ± 14.1 (27.5-97.5) respectively. The sum of the means of six domains of FertiQoL (mind/body, emotional, relational, social, environment and tolerability) is 406.5 divided by 6 categories gives a total FertiQoL mean of 67.7 ± 13.2 (35.2-96.3).

Table 13 Descriptive of FertiQoL domains and Total FertiQoL scores

S.No.	Domain	Mean	SD	Minimum	Maximum
1.	Emotional	62.4	20.5	8.3	100
2.	Mind/Body	60.5	23.3	0	100
3.	Relational	82.7	12.7	50	100
4.	Social	65.1	20.4	0	100
5.	Environment	69.4	15.0	29.1	100

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6. Tolerability	65.1	21.4	6.2	100
7. Total Core	67.8	16.1	22.9	98.9
8. Total Treatment	67.7	14.1	27.5	97.5
9. Total FertiQoL	67.7	13.2	35.2	96.3

I. Emotional Domain

Table 14 shows the descriptive of Emotional Domain based on gender of the respondents. While 37.6% male and 31% female respondents felt that they can cope with fertility problems to a great extent, about 16% of both respondents felt that they are not able to cope up with the fertility problems. About 46% of both respondents seldom had the feeling of jealousy and resentment. While 43% females seldom had feelings of grief and loss, 37.8% of men never had feelings of grief and loss. About 40.1% females often had had the feelings of fluctuation between hope and despair while these feelings were comparatively lower at 34.4% among men. 47.9% females seldom fluctuated between hope and despair.

Majority 32.7% females felt sad and depressed at an extreme amount while only 16% men felt extremely sad and depressed. 30.3% females had very much to moderate levels of sadness and depression. About 36% men responded to being sad and depressed to very much and moderate levels. 19% females felt very much anger because of their fertility problems compared to 8.8% men. A total of 33.1% females felt anger in extreme and moderate levels while 66.4% men felt little to no anger at all.

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Table 14 Descriptive of Emotional Domain based on Gender (n=409)

S.NO.	Core FertiQoL Statements	Frequency (Percentage)									
		Completely		A Great Deal		Moderately		Not Much		Not at All	
Emotional Domain		Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)
Q4R	Cope with fertility problem	34 (27.2%)	75 (26.4%)	47 (37.6%)	88 (31%)	24 (19.2%)	76 (26.8%)	10 (8%)	28 (9.9%)	10 (8%)	17 (6%)
		Always		Very Often		Quite Often		Seldom		Never	
Q7	Feeling of jealousy and resentment	5 (4%)	10 (3.5%)	14 (11.2%)	24 (8.5%)	9 (7.2%)	39 (13.7%)	58 (46.4%)	133 (46.8%)	39 (31.2%)	78 (27.5%)
Q8	Feelings of grief and loss	6 (4.8%)	16 (5.6%)	15 (12%)	26 (9.2%)	11 (8.8%)	37 (13%)	47 (37.6%)	122 (43%)	46 (36.8%)	83 (29.2%)
Q9	Fluctuate between hope and despair	9 (7.2%)	30 (10.6%)	16 (12.8%)	41 (14.4%)	18 (14.4%)	43 (15.1%)	51 (40.8%)	136 (47.9%)	31 (24.8%)	34 (12%)
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not At All	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q16	Feelings of being sad and depressed	20 (16%)	93 (32.7%)	26 (20.8%)	56 (19.7%)	19 (15.2%)	30 (10.6%)	40 (32%)	87 (30.6%)	20 (16%)	18 (6.3%)
Q23	Feeling of Anger	9 (7.2%)	40 (14.1%)	11 (8.8%)	54 (19%)	22 (17.6%)	34 (12%)	42 (33.6%)	102 (35.9%)	41 (32.8%)	54 (19%)

II. Mind/ Body Domain

Table 15 shows the descriptive of Mind/ Body Domain based on gender in infertile patients. 42.9% of female respondents and 35.2% of male respondents had impaired attention due to infertility. Likewise, 54.4% male respondents and 48.2% female respondents didn't have any thoughts about not being able to move ahead to other life goals due to infertility problems. While 40.8% of females felt drained to a complete and greater extent, 47.2% male participants were not drained because of fertility issues. However, about 30% of both respondents felt drained and worn out moderately.

32.7% females and 36.8% males seldom felt that the infertility problems interfered with their day-to-day work. Conversely, about 43% of both respondents felt that the infertility problems didn't interfere with their day-to-day work at all. Fatigue was prevalent among 37.3% females while only 24% men felt extreme to moderate fatigue. 40.8% men didn't feel any fatigue at all due to infertility problems. Majority (75.2%) men didn't have any pain and discomfort following infertility treatment while 35.3% females experienced the feeling of pain and discomfort.

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Table 15 Descriptive of Mind/Body Domain based on Gender (n=409)

Mind/ Body Domain		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not at All	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q1	Impaired attention and concentration	19 (15.2%)	39 (13.7%)	25 (20.0%)	83 (29.2%)	45 (36%)	102 (35.9%)	23 (18.4%)	43 (15.1%)	13 (10.4%)	17 (6%)
Q2	Not able to move ahead with life goals	8 (6.4%)	21 (7.4%)	23 (18.4%)	57 (20.1%)	26 (20.8%)	69 (24.3%)	26 (20.8%)	58 (20.4%)	42 (33.6%)	79 (27.8%)
Q3	Feeling drained and worn out	8 (6.4%)	29 (10.2%)	23 (18.4%)	87 (30.6%)	35 (28%)	83 (29.2%)	18 (14.4%)	35 (12.3%)	41 (32.8%)	50 (17.6%)
		Always		Very Often		Quite Often		Seldom		Never	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q12	Interference with day-to-day work	5 (4%)	10 (3.5%)	8 (6.4%)	28 (9.9%)	12 (9.6%)	31 (10.9%)	46 (36.8%)	93 (32.7%)	54 (43.2%)	122 (43%)
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not At All	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q18	Bothered by fatigue	14 (11.2%)	56 (19.7%)	16 (12.8%)	50 (17.6%)	20 (16%)	30 (10.6%)	24 (19.2%)	80 (28.2%)	51 (40.8%)	68 (23.9%)
Q24	Feelings of pain and physical discomfort	11 (8.8%)	30 (10.6%)	7 (5.6%)	38 (13.4%)	13 (10.4%)	32 (11.3%)	32 (25.6%)	90 (31.7%)	62 (49.6%)	94 (33.1%)

III. Relational Domain

Table 16 represents the descriptive of Relational Domain categorized under gender among infertile patients. Over 70% respondents were sexually satisfied with their partners even though they had fertility problems. However, 16.2% females and 14.4% men expressed dissatisfaction with sexual relationship with their partner. More than 85% respondents were always affectionate with their partner while less than 4% respondents were not affectionate with their partners. 78.4% males and 71.1% females had strengthened commitment with their partner following fertility problems. In 19.7% females and 15.2% males, infertility had moderately strengthened the commitment between the partners. Likewise, 72.8% males and 67.3% females felt that infertility didn't have any negative impact in their relationship. However, 23.9% females and 13.6% males responded that infertility had had a little negative impact in their relationships.

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Table 16 Descriptive of Relational Domain based on Gender (n = 409)

Relational Domain		Very Dissatisfied		Dissatisfied		Neither Satisfied nor Dissatisfied		Satisfied		Very Satisfied	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q6	Satisfaction with sexual relationship	7 (5.6%)	23 (8.1%)	11 (8.8%)	23 (8.1%)	15 (12%)	39 (13.7%)	52 (41.6%)	140 (49.3%)	40 (32%)	59 (20.8%)
		Always		Very Often		Quite Often		Seldom		Never	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q11R	Affectionate with partner	110 (88%)	242 (85.2%)	8 (6.4%)	23 (8.1%)	3 (2.4%)	11 (3.9%)	0	2 (0.7%)	4 (3.2%)	6 (2.1%)
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not at All	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q15R	Strengthening of commitment to partner	57 (45.6%)	116 (40.8%)	41 (32.8%)	86 (30.3%)	19 (15.2%)	56 (19.7%)	4 (3.2%)	17 (6%)	4 (3.2%)	9 (3.2%)
Q19	Negative impact on relationship with partner	2 (1.6%)	3 (1.1%)	6 (4.8%)	9 (3.2%)	9 (7.2%)	13 (4.6%)	17 (13.6%)	68 (23.9%)	91 (72.8%)	191 (67.3%)
Q20	Difficulty in talking to partner	4 (3.2%)	10 (3.5%)	1 (0.8%)	4 (1.4%)	9 (7.2%)	15 (5.3%)	12 (9.6%)	36 (12.7%)	99 (79.2%)	219 (77.1%)
Q21R	Contentment with relationship	71 (56.8%)	156 (54.9%)	33 (26.4%)	65 (22.9%)	10 (8%)	39 (13.7%)	5 (4%)	12 (4.2%)	6 (4.8%)	12 (4.2%)

IV. Social Domain

Table 17 represents the descriptive of social domain among infertile men and women. About 45% respondents were satisfied with the support they receive from their friends regarding their fertility problems. Nearly 70% of both respondents never felt socially isolated due to infertility issues. However, 20.8% males and 18% females seldom felt isolated. 45.6% males never felt uncomfortable attending any social events while 65.1% females felt uncomfortable to attend social events in extreme to moderation.

Majority 72.8% males and 64.1% females felt that their family could understand what they are going through while 23.9% females felt that the family seldom understands them, and less than 15% respondents felt that their families don't understand what they are going through. While 65.6% females felt inferior to people with children in extreme to moderate levels, 59.2% men felt inferior in extreme to moderate while 40.8% didn't felt inferior at all.

Among females, 46.2% felt extreme to moderate, 28.5% felt a little and 25.4% didn't feel any social pressure on them due to infertility issues. Likewise, 39.2% men felt extreme to moderate pressure, 29.6% felt little pressure and 31.2% felt no social pressure at all.

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Table 17 Descriptive of Social Domain based on Gender (n=409)

Social Domain		Very Dissatisfied		Dissatisfied		Neither Satisfied nor Dissatisfied		Satisfied		Very Satisfied	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q5	Support from friends	8	20	18	31	42	115	43	95	14	23
		6.4%	7%	14.4%	10.9%	33.6%	40.5%	34.4%	33.5%	11.2%	8.1%
		Always		Very Often		Quite Often		Seldom		Never	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q10	Social isolation	2	14	5	12	9	16	26	51	83	191
		1.6%	4.9%	4%	4.2%	7.2%	5.6%	20.8%	18%	66.4%	67.3%
Q13	Uncomfortable attending social events	3	22	11	29	11	30	43	104	57	99
		2.4%	7.7%	8.8%	10.2%	8.8%	10.6%	34.4%	36.6%	45.6%	34.9%
Q14R	Understanding by family	36	71	28	58	27	53	17	68	17	34
		28.8%	25%	22.4%	20.4%	21.6%	18.7%	13.6%	23.9%	13.6%	12%
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not at All	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Q17	Feelings of inferiority	17	57	16	32	9	23	32	74	51	98
		13.6%	20.1%	12.8%	11.3%	7.2%	8.1%	25.6%	26.1%	40.8%	34.5%
Q22	Social Pressure	17	46	15	55	17	30	37	81	39	72
		13.6%	16.2%	12%	19.4%	13.6%	10.6%	29.6%	28.5%	31.2%	25.4%

V. Treatment Environment

Table 18 shows the descriptive of Treatment Environment domain in infertile men and women. 93.3% women and 88.8% men responded that the fertility medical services that they want are available to them. Majority of respondents 89.6% men and 88% women found that the fertility staffs understood what they are going through. However, the incidence decreased to about 65% of both the respondents regarding satisfaction of quality of services available to them to address their emotional needs. 67% respondents were satisfied with the services that they were receiving. More than 70% respondents were satisfied with the quality of information they received. Nearly 80% respondents were satisfied with the interaction they had with the fertility staff regarding their fertility issues.

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Table 18 Descriptive of Treatment Environment based on Gender (n=409)

	Treatment Environment	Always		Very Often		Quite Often		Seldom		Never	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
T2	Availability of medical services	33 (26.4%)	64 (22.5%)	40 (32%)	102 (35.9%)	38 (30.4%)	99 (34.9%)	11 (8.8%)	16 (5.6%)	3 (2.4%)	3 (1.1%)
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not At All	
T5	Understanding by fertility staff	33 (26.4%)	68 (23.9%)	36 (28.8%)	104 (36.6%)	43 (34.4%)	78 (27.5%)	9 (7.2%)	25 (8.8%)	4 (3.2%)	9 (3.2%)
		Very Dissatisfied		Dissatisfied		Neither Satisfied nor Dissatisfied		Satisfied		Very Satisfied	
T7	Quality of treatment fulfill emotional need	4 (3.2%)	8 (2.8%)	5 (4%)	12 (1.2%)	34 (27.2%)	77 (27.1%)	60 (18%)	148 (52.1%)	22 (17.6%)	39 (13.7%)
T8	Rate the received treatment	3 (1.1%)	3 (1.1%)	4 (3.2%)	10 (3.5%)	34 (27.2%)	79 (27.8%)	57 (45.6%)	157 (55.3%)	27 (21.6%)	35 (12.3%)
T9	Received quality of information	2 (1.6%)	4 (1.4%)	4 (3.2%)	11 (3.9%)	30 (24%)	62 (21.8%)	61 (48.8%)	166 (58.5%)	28 (22.4%)	41 (14.4%)
T10	Interaction with medical staff	6 (4.8%)	7 (2.5%)	2 (1.6%)	16 (5.6%)	16 (12.8%)	38 (13.4%)	55 (44%)	151 (53.2%)	46 (36.8%)	72 (25.4%)

VI. Treatment Tolerability Domain

Table 19 shows the descriptive of Treatment Tolerability Domain among infertile men and women. 40.1% females seldom had negative effect on their mood due to infertility treatment while 49.6% men never had any negative effect. 40.8% and 29.3% females thought that dealing with the procedures and administration of drugs during the treatment process was moderately and extremely complicated respectively. 45.6% men thought the same with the treatment in a moderate level. 57.4% females and 60% males were not bothered by the effect of treatment in their daily or work-related activities. While 48.6% female respondents were moderately bothered by physical side effects of fertility medications and treatments, 48% men were not bothered by physical side effects at all.

Table 19 Descriptive of Treatment Tolerability based on Gender (n=409)

	Treatment Tolerability	Always		Very Often		Quite Often		Seldom		Never
		Male	Female	Male	Female	Male	Female	Male	Female	Male
T1	Negative effect on mood	2 (1.6%)	14 (4.9%)	1 (0.8%)	28 (9.9%)	6 (4.8%)	29 (10.2%)	54 (43.2%)	114 (40.1%)	62 (49.6%)
		An Extreme Amount		Very Much		A Moderate Amount		A Little		Not At All
T3	Complications with treatment	13 (10.4%)	26 (9.2%)	12 (9.6%)	57 (20.1%)	57 (45.5%)	116 (40.8%)	10 (8%)	43 (15.1%)	33 (26.4%)
T4	Effect of treatment in daily life	13 (10.4%)	23 (8.1%)	15 (12%)	47 (16.5%)	22 (17.6%)	51 (18%)	39 (31.2%)	85 (29.9%)	36 (28.8%)
T6	Bothered by physical side effects of treatment	5 (4%)	28 (9.9%)	9 (7.2%)	34 (12%)	27 (21.6%)	60 (21.1%)	24 (19.2%)	78 (27.5%)	60 (48%)

4.2.3 Categorization of Total FertiQoL scores

The quality-of-life scores were categorized by taking the mean of the score as the cutoff point. The scores equal to and greater than the mean value was considered as good QoL, and the scores less than the mean value was taken as the poor QoL. 52.3% respondents had good QoL while 47.7% had poor QoL.

4.3 Inferential Statistics

4.3.1 Bivariate Analysis

Bivariate analysis was done using the Pearson's Chi-square between each independent categorical variable and the dependent variable.

A. Sociodemographic variables with FertiQoL

Table 20 shows the socio-demographic characteristics and its association with FertiQoL among infertile patients. Females (52.1%) were found to have poor quality of life compared to males (37.8%) and the difference was significant at p-value 0.007.

Table 20 Socio-demographic characteristics and its association with poor FertiQoL (n=409)

S. No.	Variables	Poor	Good	Chi-square	P-value
1.	Gender			7.210	0.007
	Male	48 (37.8%)	79 (62.2%)		
	Female	147 (52.1%)	135 (47.9%)		
2.	Age			4.350	0.114
	≤31 years	62 (42.8%)	83 (57.2%)		
	32-35 years	77 (54.6%)	64 (45.4%)		
	≥36 years	56 (45.5%)	67 (54.5%)		
3.	Ethnicity			4.771	0.092
	Others	21 (61.8%)	13 (38.2%)		
	Janajati	77 (42.8%)	103 (57.2%)		
	Bahun/ Chhetri	97 (49.7%)	98 (50.3%)		

4.	Education				
	Below High School	97 (51.1%)	93 (48.9%)	1.621	0.203
	Above High School	98 (44.7%)	121 (55.3%)		
5.	Residence				
	Urban	149 (47.8%)	163 (52.2%)	0.003	0.954
	Rural	46 (47.4%)	51 (52.6%)		
6.	Family type				
	Nuclear	67 (54.9%)	55 (45.1%)	3.654	0.056
	Joint	128 (44.6%)	159 (55.4%)		

B. Socioeconomic variables with FertiQoL

Table 21 describes the relationship between socio-economic characteristics and FertiQoL. There was significant association between working hours and FertiQoL at a significance of 0.008. Similarly, FertiQoL was found to be significantly associated with access to time off from work (p-value 0.011). 56.7% respondents who had to travel long distance for fertility treatment had poor quality of life compared to 39.4% who didn't have to travel more, and the difference was highly significant at a p-value <0.001.

Table 21 Socio-economic characteristics and its association with FertiQoL (n=409)

S. No.	Variables	Poor	Good	Chi-Square	P-value
1.	Employment				
	Unemployed	79 (52.3%)	72 (47.7%)	2.255	0.324
	Laborer	16 (48.5%)	17 (51.5%)		
	Service/ Self-employed	100 (44.4%)	125 (55.6%)		
2.	Income level				
	Below 20,000	70 (54.3%)	59 (45.7%)	5.693	0.128
	Between 20,000-50,000	86 (48%)	93 (52%)		

	Between 50,000 – 1,00,000	24 (40%)	36 (60%)		
	Above 1,00,000	15 (36.6%)	26 (63.4%)		
3.	Work Hours				
	≤0 hours	79 (52.7%)	71 (47.3%)	9.565	0.008
	1-8 hours	64 (38.6%)	102 (61.4%)		
	≥9 hours	52 (55.9%)	41 (44.1%)		
4.	Access to day off				
	Easy	42 (40.8%)	61 (59.2%)	9.090	0.011
	Neutral	76 (43.7%)	98 (56.3%)		
	Hard	77 (58.3%)	55 (41.7%)		
5.	Presence of Health Insurance				
	No	145 (47.7%)	159 (52.3%)	0.000	0.989
	Yes	50 (47.6%)	55 (52.4%)		
6.	Travel for service				
	No	59 (34.9%)	110 (65.1%)	18.815	<0.001
	Yes	136 (56.7%)	104 (43.3%)		

C. Couple characteristics with FertiQoL

Table 22 describes the relationship between couple characteristics and FertiQoL. FertiQoL was found to be highly significant with duration of marriage (p-value <0.001). 48.3% respondents who thought that having a child is very important had a poor quality of life and the difference was significant at p-value 0.032.

Table 22 Couple characteristics and its association with FertiQoL (n=409)

S. No.	Variables	Poor	Good	Chi-square	P-value
1.	Marital Status				
	Second Marriage	2 (33.3%)	4 (66.7%)	0.502	0.479
	First Marriage	193 (47.9%)	210 (52.1%)		
2.	Duration of marriage				
	≤5 years	52 (36.6%)	90 (63.4%)	15.204	<0.001
	6-9 years	62 (47%)	70 (53%)		
	≥10 years	81 (60%)	54 (40%)		
3.	Presence of Biological Child				
	No	180 (47.7%)	197 (52.3%)	0.009	0.925
	Yes	15 (46.9%)	17 (53.1%)		
4.	Cognition of children				
	Very Important	195 (48.3%)	209 (51.7%)	4.612	0.032
	Not so important	0 (0%)	5 (100%)		
5.	Supportiveness of partner				
	Not Supportive	4 (100%)	0 (0%)	4.894	0.087
	Neutral	2 (66.7%)	1 (33.3%)		
	Supportive	189 (47%)	213 (53%)		
6.	Approach to the clinic				
	With partner	104 (43.9%)	133 (56.1%)	3.254	0.071
	Individually	91 (52.9%)	81 (47.1%)		

D. Fertility-related characteristics with FertiQoL

Table 23 describes the fertility-related characteristics and its association with FertiQoL.

FertiQoL was highly significant with type of current treatment (p-value <0.001). Similarly, FertiQoL was significant with duration of infertility (p-value 0.010).

Table 23 Fertility-related characteristics and its association with FertiQoL (n=409)

S. No.	Variables	Poor	Good	Chi-square	P-value
1.	Type of infertility				
	Primary	120 (49.8%)	121 (50.2%)	1.052	0.305
	Secondary	75 (44.6%)	93 (55.4%)		
2.	Cause of infertility				
	Male	40 (56.3%)	31 (43.7%)	3.741	0.176
	Female	87 (43.7%)	112 (56.3%)		
	Both + unexplained	68 (48.9%)	71 (51.1%)		
3.	Duration of infertility				
	≤3 years	90 (43.9%)	115 (56.1%)	9.310	0.010
	4-5 years	39 (41.5%)	55 (58.5%)		
	≥6 years	66(60%)	44 (40%)		
4.	Type of current treatment				
	Timed Intercourse	48 (34.5%)	91 (65.5%)	14.754	<0.001
	ART (self)	103 (53.6%)	89 (46.4%)		
	ART (donor)	44 (56.4%)	34 (43.6%)		

E. Medical history with FertiQoL

Table 24 describes the relationship between FertiQoL and medical history among infertile patients. 56.5% respondents who had a history of ART failure had poor FertiQoL compared to 39.8% patients who didn't have failure history and the difference was highly significant at <0.001 . 63.8% patients with a history of reproductive tract surgery had a poor quality of life. The difference was statistically significant at p-value 0.018. Patients who desired for professional psychological support (51.8%) had highly significant poor quality of life at p-value <0.001 .

Table 24 Medical History and its association with FertiQoL (n=409)

S. No.	Variables	Poor	Good	Correlation Coefficient	P-value
1.	Presence of chronic illness			2.241	0.134
	No	152 (49.8%)	153 (50.2%)		
	Yes	43 (41.3%)	61 (58.7%)		
2.	Intake of medications			2.573	0.109
	No	157 (49.8%)	158 (50.2%)		
	Yes	38 (40.4%)	56 (59.6%)		
3.	History of pregnancy loss			1.128	0.288
	No	131 (49.6%)	133 (50.4%)		
	Yes	64 (44.1%)	81 (55.9%)		
4.	History of conception			0.581	0.446
	No	122 (49.2%)	126 (50.8%)		
	Yes	73 (45.3%)	88 (54.7%)		
5.	History of Childbirth			0.000	0.994
	No	175 (47.7%)	192 (52.3%)		
	Yes	20 (47.6%)	22 (52.4%)		

6.	History of ART failure	86 (39.8%)	130 (60.2%)	11.343	<0.001
	No	109 (56.5%)	84 (43.5%)		
	Yes				
7.	History of Reproductive Tract Surgery	165 (45.6%)	197 (54.4%)	5.554	0.018
	No	30 (63.8%)	17 (36.2%)		
	Yes				
8.	Desire for psychological support	24 (30.4%)	55 (69.6%)	11.744	<0.001
	No	171 (51.8%)	159 (48.2%)		
	Yes				

4.3.2 Multivariate Analysis

The multivariate analysis was undertaken to analyze the relationship between the independent variables and the dependent variable. As the dependent variable was total FertiQoL scores which was categorized into two levels; good and poor FertiQoL, binary logistic regression was used.

The independent variables which entered the binary logistic regression were those whose p-values were less than 0.2 in bivariate analysis and those whose p-values were greater than 0.2 in current study but significant in other studies.

The independent variables entered in the binary logistic model were as follows:

Table 25 List of independent variables which entered the binary logistic model

S.No.	Variables	p-value <0.05	p-value <0.2 but greater than 0.05	Significant in other studies
A. Socio-demographic				
1.	Sex	✓		
2.	Age		✓	
3.	Ethnicity		✓	

4.	Education		✓
5.	Family Type	✓	
B. Socio-economic			
1.	Income Level	✓	
2.	Occupation		✓
3.	Work hours	✓	
4.	Access to day-off from work	✓	
5.	Travel for service	✓	
C. Couple-related			
1.	Partner's Supportiveness	✓	
2.	Approach to fertility clinic	✓	
3.	Duration of marriage	✓	
D. Fertility-related			
1.	Cause of Infertility	✓	
2.	Duration of Infertility	✓	
3.	Type of Infertility		✓
4.	Type of current treatment	✓	
E. Medical History			
1.	Presence of Chronic Illness		✓
2.	Intake of Medications		✓
3.	History of ART failure	✓	
4.	History of Reproductive Tract Surgery	✓	
5.	Desire for psychological support	✓	

- i. For $p\text{-value} < 0.05$ – sex, work hours, access to time off, migration for service, cognition of child, desire for psychological support, duration of marriage, duration of infertility, history of ART failure, history of reproductive tract surgery, type of current treatment.

- ii. For p-value <0.2, but greater than 0.05 – age, ethnicity, family type, income, supportiveness of partner, approach for service, cause of infertility, presence of chronic illness, intake of medications.
- iii. Independent variables that were significant in other studies –Education, Occupation, Type of Infertility.

Table 26 shows the results of binary logistic regression of fertility quality of life at 95% confidence interval. In the table, only the results of variables of column 1 (p<0.05) in Table 25 are shown because all the variables of column 2 (p<0.2) and column 3 (from literature) were not significant. Among all the independent variables, sex, working hours, access to time off, duration of infertility and history of reproductive tract surgery were found to have significant association with poor QoL. And, travel long distance for service, desire for professional psychological support, duration of marriage, history of ART treatment and type of current infertility treatment were found to have highly significant association with poor QOL.

Table 26 Binary logistic regression for poor FertiQoL (n=409)

S. No.	Variables	B	Sig.	Adjust. OR	95% Confidence Interval	
					Lower	Upper
1.	Sex	0.583	0.008	1.792	1.168	2.750
2.	Working hours					
	0 hours ^(R)		0.009			
	1-8 hours	0.573	0.012	1.773	1.133	2.775
	≥9 hours	-0.131	0.622	0.877	0.522	1.476
3.	Access to time off					
	Easy ^(R)		0.011			
	Neutral	-0.119	0.637	0.888	0.542	1.455
	Hard	-0.710	0.008	0.492	0.291	0.830
4.	Travel long distance ^(R)	-0.891	<0.001	0.410	0.273	0.616
5.	Desire for psychological support ^(R)	-0.902	<0.001	0.406	0.240	0.686
6.	Duration of marriage					
	≤5 years ^(R)		<0.001			
	6-9 years	-0.427	0.083	0.652	0.402	1.057
	≥10 years	-0.954	<0.001	0.385	0.237	0.626
7.	Duration of infertility					
	≤3 years ^(R)		0.010			

4-5 years	0.099	0.696	1.104	0.673	1.809
≥6 years	-0.651	0.007	0.522	0.326	0.835
8. History of ART treatment ^(R)	-0.674	<0.001	0.510	0.344	0.756
9. History of Reproductive Tract Surgery ^(R)	-0.745	0.020	0.475	0.253	0.891
10. Current Infertility treatment Timed Intercourse ^(R)		<0.001			
ART (Self)	-0.786	<0.001	0.456	0.291	0.715
ART (Donor)	-0.897	<0.002	0.408	0.231	0.719

Note: Good FertiQoL is the reference. ^(R) = Reference group

As shown in table 27, the variables that maintained their significance for its association with poor FertiQoL are 1) gender of the patient, 2) access to time off from work 3) migration for service 4) duration of marriage, 5) type of current treatment, 6) Desire for professional psychological support, while the variables; working hours, duration of infertility, history of ART failure and history of Reproductive Tract Surgery lost their significance. There is no variable which is not significant in bivariate analysis and becomes significant in multivariate analysis. There is no variable which is not significant in bivariate analysis and from literature review (see table 25) that becomes significant in multivariate analysis.

Table 27 Multiple logistic regression for poor Fertility Quality of Life (n=409)

S. No.	Variables	B	Sig.	Adjust. OR	95% Confidence Interval	
					Lower	Upper
1.	Sex	-0.680	0.004	0.507	0.319	0.805
2.	Access to time off Hard	0.674	0.004	1.962	1.244	3.093
3.	Travel for service	0.595	0.011	1.812	1.149	2.858
4.	Desire for psychological support ^(R)	0.794	0.006	2.213	1.259	3.889
5.	Current Infertility treatment ART (Self)	0.540	0.030	1.716	1.055	2.791
	ART (Donor)	0.689	0.030	1.991	1.068	3.712

6. Duration of marriage ≥10 years	0.521	0.032	1.684	1.046	2.713
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Note: Good FertiQoL is the reference. ^(R) = Reference group

In detail, table 27 showed the results of multivariate logistic regression of fertility quality of life at 95% confidence interval. The significant observations were as such:

1. Females were 50% more likely to have poor quality of life compared to males. (AOR=0.50, 95% CI = 0.319-0.805, p-value 0.004)
2. Infertile patients who had hard access to time off from work were 1.9 times more likely to have poor quality of life compared to those who had easy access to time off from work. (AOR= 1.96, 95% CI = 1.24-3.09, p-value 0.004)
3. Infertile patients who had to travel long distance for service were 1.8 times more likely to have poor quality of life compared to those who didn't have to travel long distance. (AOR= 1.81, 95% CI = 1.15-2.86, p-value 0.011)
4. Infertile patients who desired professional psychological support were 2.2 times more likely to have poor quality of life compared to those who didn't desire for professional psychological support. (AOR= 2.21, 95% CI = 1.26-3.89, p-value 0.006)
5. Infertile patients who were undergoing ART using self-gametes (sperm, egg) were 1.7 times more likely to have poor quality of life compared to those who were undergoing Timed Intercourse. (AOR= 1.71, 95% CI = 1.05-2.8, p-value 0.030)
6. Infertile patients who were undergoing ART using donor gametes (sperm, egg, embryo) were 1.99 times more likely to have poor quality of life compared to those who were undergoing timed intercourse. (AOR= 1.99, 95% CI = 1.07-3.71, p-value 0.030)
7. Infertile patients who were married for more than 10 years were 1.6 times more likely to have poor quality of life. (AOR= 1.68, 95% CI = 1.04-2.71, p-value 0.032)

Table 28 Comparative table of association between independent and two levels of dependent variables in bivariate and multivariate analysis (n=409)

Independent variables	Analytical results of two levels of dependent variable	
	Bivariate analysis	Multivariate analysis
Age	Statistical association	-
Sex	Statistical association	Statistical association
Ethnicity	Statistical association	-
Education	-	-
Residence	-	-
Family type	-	-
Migration for service	Statistical association	Statistical association
Employment Status	-	-
Working hours	Statistical association	-
Access to take day off	Statistical association	Statistical association
Income Level	-	-
Presence of Health Insurance	-	-
Marital History	-	-
Duration of marriage	Statistical association	Statistical association
Presence of Biological Child	-	-
Perception of need of child	-	-
Partner's supportiveness in treatment	-	-
Approach to fertility center	-	-
Type of Infertility	-	-
Cause of Infertility	-	-
Duration of infertility	-	-
Type of current treatment	Statistical association	Statistical association
Presence of Chronic Illness	-	-
Intake of Medications	-	-
History of ART failure	Statistical association	-
History of pregnancy loss	-	-

History of reproductive tract surgery	Statistical association	-
Desire for professional psychological support	Statistical association	Statistical association



CHAPTER V

DISCUSSION

The study was a cross-sectional descriptive study carried out among 409 infertile patients attending an infertility center in Kathmandu, Nepal. It aimed at describing the characteristics and fertility quality of life among infertile patients and to evaluate any association between these characteristics and fertility QoL among the infertile patients.

Twenty-five eligible participants refused to participate in the study. So, 25 consenting eligible patients were recruited to make up for those who did not consent to participate. Thus, data was collected from 409 consenting participants. Unlike in many studies, most of the eligible participants consented to participate in the study. This might be because the researcher approached the eligible respondents as the medical staff of the clinic to participate in the study. The researcher received a verbal consent and then requested for a written consent. The researcher requested the respondents to utilize their time by filling up the questionnaire while they wait to meet the doctor.

A. General Characteristics of Infertile patients

The respondents were 68% females, and more than half of the respondents approached to the infertility center as couples while remaining 41.4% approached as individuals. Females had to visit the clinic frequently for monitoring the development of egg, hence most of the respondents who approached as individuals were females. Thus, the higher percentage of female respondents is justified. Also, majority of the male participants were reluctant to participate in the study and hence, they were excluded from the study as they didn't give their consent. In our study, females were more likely to have poor quality of life compared to men. (AOR=0.50, 95% CI = 0.319-0.805, p-value 0.004) The findings are relevant with the systematic study conducted by J. Chachamovich in 2009 which showed that women scored significantly lower in overall FertiQoL scores compared to men. (J. Chachamovich et al., 2009) Another study by Ragni et al. conducted among infertile couples in Italy in 2005 also supports our findings as it has demonstrated that women measured significantly lower in QoL scores. (Ragni et al., 2005) This can be explained as women experience major physical and emotional consequences of infertility as well as infertility treatment. Also, the stronger desire to have children among women further aids in diminishing the quality of life compared to men.

The mean age of respondents was 33.1±5.0 (21-47) years. The mean age for male was 34.8 ± 4.9 (24-47) years and the mean age for female was 32.4 ± 4.9 (21-45) years. The result from our study is comparable to a cross-sectional study conducted on infertile

patients in Nepal by Pradhan et al in 2013 which showed the mean age of the females to be 30 years. (Pradhan et al, 2013) A case control study with 180 infertile women in Iran had a mean age 33.19 ± 5.9 among infertile women. (Bakhtiyar et al., 2019) Similarly, the result is also comparable to a case-controlled study by Valsangkar et al conducted with 106 infertile women in India in 2011 which resulted in mean age of 35 years. (Valsangkar et al., 2011) In Nepali society, the age of marriage is usually between 25-30years. Many couples plan for a child few years after marriage and seek for fertility treatment, thus a mean age of 33 years is an ideal age for seeking fertility treatment among Nepali respondents. However, our study didn't find any significant difference between age and poor FertiQoL. The results contrast with a study conducted by Fekkes et al. in Netherlands among infertile men and women which found that QoL of young women were more affected compared to old. (Fekkes et al., 2003) Alternatively, a study by Karabulut among infertile women in Turkey found no difference in QoL scores among young and old age groups. (Karabulut et al., 2013) Another study conducted among 135 infertile women in Iran didn't find any significant association between age and FertiQoL.(Maroufizadeh et al., 2017) These findings suggest that although age is a major risk factor for infertility and has a declining effect on fertility, other factors might be more significant as a predictor for low QoL.

Three quarter of respondents in our study belonged to urban area. This might be because the study was conducted in urban area. In our study, the place was residence was not found to be significantly associated with fertility quality of life (FertiQoL). However, findings from a study conducted by Dong et. al in China among infertile couples in 2016 found that couples residing in rural areas had considerably lower FertiQoL scores than those from urban residents. (Dong & Zhou, 2016) However, he also mentions the difference of coping style, cognition of children, family monthly net income, employment status, educational level, and social support in the rural counterparts as the risk factors for predicting FertiQoL in rural infertile patients. This contrasting result in our study could be explained by the fact that the respondent's permanent area of residence was taken as the basis for categorizing the place of residence. Since some respondents belonged to rural area but had been staying in Kathmandu (urban area) since a long time for employment and education, the risk factors associated with the difference in FertiQoL in rural and urban counterparts might have been affected. To address this discrepancy, the researcher added one more variable to the study i.e., travel long distance for service.

B. Socio-economic characteristics among infertile patients

In our study, we found that around 37% of the respondents were unemployed yet were seeking expensive fertility treatment. This shows that in the cultural setting of Nepal, having children and giving continuity to one's generation is considered a social norm with very high positive value. Despite being unemployed, couples may feel immense pressure from family and society to have children. Additionally, individuals may feel a strong personal desire to become parents regardless of their employment status. This

cultural emphasis on procreation might have driven the respondents to seek for fertility treatments even while facing financial constraints. Also, individuals might have been willing to invest financially in the fertility treatment as these treatments offer higher chances of success, potentially overlooking their employment status as they prioritize starting a family. Additionally, the infertile patients might have received financial support from their family, relatives or by selling assets such as land and livestock (goats, cows, cattle, etc.) which might have enabled them to afford fertility treatments despite not having an income of their own. Only additional qualitative research could provide clearer, evidence-based understanding of the previously suggested explanations.

About 1/3rd of the respondents had a monthly income of less than NRs. 20,000. An increase in job demand and decrease in market might be the major reason for high unemployment. While 1/4th of the respondents in our study had health insurance, all the respondents were paying out-of-pocket for the fertility treatment. This is because the Nepal Health System doesn't cover the cost of fertility treatment. However, despite high unemployment and low income, people are seeking expensive treatment like Assisted Reproduction Technologies (ART) to fulfill the desire to have a child.

Our study found that those who had difficulty in accessing time off from work for fertility treatment had significantly poor QoL. (AOR= 1.96, 95% CI = 1.244-3.093, p-value 0.004) While there is limited research on predicting QoL based on access from work, our findings are comparable to a study conducted in 2022 among infertile patients in Japan which found that work related stress had an impact on FertiQoL. (Maeda et al., 2022) Fertility treatment requires frequent visits to service provider and often requires time off from work. While providing flexibility among patients with infertility issues could help improve job retention, such flexibility is not included in workplace policies in the context of Nepal. Hence, work related factors like reduced access to time off can have significant effect on QoL among infertile patients.

A predictor variable "travel long distance for service" was later addition after conducting the pilot study which was responded by the participant through self-report. Our study found that more than half of the respondents had travelled to Kathmandu to specifically receive fertility services. Since Kathmandu is the capital of the country and vast range of facilities and services including infertility treatment are available here, the patients might have travelled to Kathmandu in the hope to conceive a child. In our study, a significant association was found between travel long distance for service and FertiQoL. (AOR= 1.81, 95% CI = 1.149-2.858, p-value 0.011) A study conducted among 137 Chinese infertile women with recurrent implantation failure in 2019 showed that patients who had to travel long distances for fertility treatment exhibit poor fertility QoL compared to those who belonged to urban areas and didn't have to travel much. (Ni et al., 2021) Another study which was conducted among North American men in 2022 found that men who travelled long distances for fertility treatment have a lower QoL. (Chen et al., 2022) Hence, these studies support our findings on the effect of travel distance on FertiQoL. The need to travel far from home for frequent examinations and prolonged duration of treatment causes hardships among infertile patients specifically

with transportation and accommodation costs. The emotional and financial burden to travel for fertility treatment further leads to poor QoL.

C. Couple characteristics among infertile patients

Almost all the respondents felt that having a child is very important for them. This is specifically due to the cultural norms in the Nepali society where a couple is expected to provide a child to the family within few years of marriage. Since almost all the respondents had the same answer to this predictor, the association of cognition of need of child couldn't be determined with FertiQoL in our study.

Our study showed that patients who were married for more than 10 years significantly had poor quality of life. (AOR= 1.68, 95% CI = 1.046-2.713, p-value 0.032) A study by above mentioned Karabulut found that prolonged duration of infertility had negative impact on total QoL scores. (Karabulut et al., 2013) Also, study by above mentioned Ragni et al. found that increased duration of infertility was associated with lower QoL scores. (Ragni et al., 2005) To the contrary, a case-control study conducted among 58 Turkish women found that QoL was higher among infertile couples who were married for more than five years. (Onat & Kizilkaya Beji, 2012) Our findings could be explained by the inability to jointly cope up with the crisis of infertility. With increase in duration of marriage and the inability to have a child, the couples may be reluctant to talk about their fertility problems and discuss about their future together which negatively impacts the QoL. Additionally, in the context of Nepal, increased duration of marriage without a child is considered as a failed marriage which further builds stress among the infertile couples, thus leading to poor QoL.

D. Fertility-related characteristics among infertile patients

Additionally, our study didn't observe any significant associations between poor FertiQoL and duration of infertility. The result contrasts with the study by above mentioned Ragni et al. who found that duration of infertility affected QoL. (Ragni et al., 2005) However, a study conducted by Lau et al. among infertile couples in China found no significant difference between FertiQoL and duration of infertility. (Lau et al., 2008) This might be because the patients experiencing infertility might have adapted and developed coping mechanisms over time to deal with the challenges associated to infertility. The adaptation and coping process among the patients might have attenuated the impact of duration of infertility on FertiQoL. It is also possible that majority of the respondents in our study didn't have a longer duration of infertility to have a significant association with QoL.

However, our study found that infertile patients undergoing ART using self-gametes had significantly poor quality of life. (AOR= 1.71, 95% CI = 1.055-2.791, p-value 0.030) Also, significantly poor QoL was observed among patients undergoing ART using donor gametes. (AOR= 1.99, 95% CI = 1.068-3.712, p-value 0.030) A study

conducted among 1062 infertile Chinese women in 2019 found that women undergoing ART treatment had poor quality of life. (Song et al., 2021) Another study conducted among 432 infertile women in China concluded that IVF treatment cycles had negative impact on FertiQoL and the risk of anxiety and depression gradually increased. (Ni et al., 2023) A study by Imrie et al. among couples who underwent ART cycles with donor egg in UK fertility clinic found significantly poorer psychological health compared to those who underwent ART cycles using self-gametes. (Imrie et al., 2019) ART treatments can be emotional burden with additional physical and logistic demands including frequent visits to the clinic, multiple doses of hormonal injections and medical procedures which impacts on patients' well-being and overall QoL. Additionally, the financial burden and uncertainty of success associated with ART cycles further impacts FertiQoL negatively. Furthermore, patients undergoing donor ART cycles can be accompanied by social stigma and judgement which can contribute to feelings of shame and reduced QoL. Additionally, patients undergoing donor cycles need to face complex decisions regarding donor selection and the fear of disclosure. Such challenges further adds up emotional burden and impacts FertiQoL.

E. Medical History among infertile patients

Our study couldn't find significant association between having a history of ART failure and poor QoL. However, a study by above mentioned J.R. Chachamovich et al. found lower scores in mental and psychological health among patients with a history of ART failure. (J. R. Chachamovich et al., 2007) Similarly, a longitudinal study by Agostini et al. in 2017 among 85 sub-fertile men and women in Italy found that QoL domains were affected by the number of ART failures and women presented with lower scores compared to men. (Agostini et al., 2017) To the contrary, the study by El-Messidi et al. conducted among infertile women in Spain didn't find any significant association between history of ART failure and QoL. (Heredia et al., 2013) The results might have varied between the studies due to the influence of other factors beyond the history of ART failure in determining the QoL among infertile patients. It is possible that other variables might have had a stronger impact on FertiQoL in our study population. Also, we included failure of both IUI (intrauterine insemination) and IVF/ICSI cycles under ART failure which might have resulted in its inability to find significant association with QoL. Although having a history of ART failure includes physical, emotional and financial burden, probably other predictors of fertility have major effect on QoL among infertile patients.

Our study demonstrated that those who desired for professional psychological support had poor quality of life. (AOR= 1.68, 95% CI = 1.046-2.713, p-value 0.032) The findings can be compared to a study conducted by above mentioned Karabulut which found that women desiring psychological support demonstrated lower QoL in all core domains. (Karabulut et al., 2013) Another study conducted among 536 infertile German men and women concluded that psychosocial counselling was an integral part in fertility treatment and it could help improve FertiQoL. (R. E. Sexty et al., 2018) It is justifiable that those who are facing major challenges with infertility have poor QoL

and desire for psychological support to cope up with the stress. Hence, psychological support is a crucial aspect in improving FertiQoL among infertile patients. Additionally, psychological support can minimize the treatment drop-out rates and minimize the stress related to infertility and its treatment.

F. FertiQoL Domains in infertile patients

The mean Core FertiQoL score was found to be 66.9 ± 17.3 which is comparative to the study conducted in Nepal by Pradhan et al. among infertile women in 2013. (Pradhan et al., 2013) This might be explained probably due to similar methodology and similar setting. Also, the scores are comparative to a cross-cultural comparative study among infertile couples of Germany, Hungary and Jordan which found the mean QoL scores to be 64.1 ± 12.3 . (R. Sexty et al., 2016) The study revealed only a few culturally based differences in FertiQoL between couples of the three countries. Another study by above mentioned Valsangkar et. al found a mean score of 65.97 ± 2.8 which is comparable to our study. (Valsangkar et al., 2011) This might be due to the shared cultural similarities among Nepali and Indian individuals.

The mean score for mind/body domain in our study was 60.5 ± 23.3 which is the lowest score obtained compared to other domains. Indeed, a study conducted among German infertile women found a mean score of 75 ± 17 which is higher compared to our study. (Neumann et al., 2018) The difference can be explained as the study took place in a high-income country and thus, the socioeconomic conditions of the study population might have contrasted the results in our study. The study by above mentioned Valasangkar et al. found a relatively low mean score of 42.1 ± 4.3 . (Valsangkar et al., 2011) The study involved participation of young females so they might have found it difficult to cope up with the physical and mental effects of fertility on QoL compared to older women. Thus, they might have experienced impaired attention and inability to move forward with other life goals. Also, our study included the participation of both men and women. A study by Hsu et al. by Taiwanese couples showed that men were more likely to cope up with fertility stress and had minimum physical effects in terms of infertility and infertility treatment, thus scored higher in terms of mind/body domain of FertiQoL compared to women. (Hsu, Lin et al. 2013)

The mean score for emotional domain was found to be 62.4 ± 20.5 in our study which is comparatively higher than the results from above mentioned Pradhan et al. (Pradhan et al., 2013) with mean score of 48.0 ± 21.2 . This can be explained by the participation of both male and female participants in our study while the study conducted by Pradhan et al was carried out only among infertile female patients. Since females experience more emotional challenges related to infertility and the concerns about self-identity, femininity and desire for biological motherhood, these factors can contribute to heightened emotional experiences in FertiQoL domain for females. This is supported by a study conducted in Iran by Keramat et al. which found that emotional domain was

significantly better in men compared to women as the respondents. (Keramat et al., 2014)

The mean score in relational domain was highest compared to the other domains at 82.7 ± 12.7 which is comparable to the study by above mentioned Pradhan et al. at 79.7 ± 12.4 . (Pradhan et al., 2013) It is possible that despite infertility issues, couples are happy and satisfied with their relationship. Conversely, it might also be possible that in a patriarchal setting of Nepali society, patients are not willing to share negative aspects about their relationship even though they might be facing hardships in their relationship due to fertility problems.



LIMITATIONS

1. Due to the time constraints, a random selection of the respondents could not be carried out. Since a convenience sampling is conducted in the study, the outcomes couldn't be generalized to a larger population.
2. The data was collected from individuals as well as couples. However, the couple data are treated as individual data to meet the required sample size. The effect of responses couldn't be measured among the couples.
3. Due to the limitation in setting of the clinic, the couples couldn't be kept in separate spaces to complete the responses. Hence, there might be some influence of each other in the responses received in the final data.
4. The questionnaire consisted of 68 questions which is quite long. Thus, it might have exhausted the respondents and made them answer it without reading carefully.
5. The multiple choices and yes/no questions in the questionnaire might not have possibly determined the actual responses from the respondents.
6. Due to the sensitive nature of the questionnaire, despite measures to ensure privacy and comfort through utilization of female interviewers, some questions regarding marital life and sexual life may not have obtained accurate responses.

STRENGTHS

1. The study includes both the infertile men and women. While majority of the studies only consider females in infertility studies, male responses are equally important while assessing quality of life in infertile patients as both the partners are equally involved throughout the infertility journey.
2. This is the first study on Fertility Quality of Life using a standard back translated FertiQoL questionnaire which finds significant association between characteristics of infertile patients and their QoL. It is a significant contribution to the knowledge on fertility quality of life among Nepali infertile patients.
3. As it is the first study, it provides a baseline data of infertile patients' quality of life in Nepal as well as provides points to consider in future research.
4. The study provides suggestions for specific needs for assessing quality of life among infertile patients including focus on psychological needs of infertile patients.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. Dyad studies on couples should be conducted to observe the proper findings on fertility quality of life and its effect.
2. Qualitative research should be conducted on infertile patients to explore further regarding the effect of infertility in their quality of life.
3. Qualitative research to understand the unexpected finding of relatively high number of unemployed respondents and the ability to pay for expensive fertility treatment service.
4. Further research on fertility quality of life in other districts and regions of Nepal are recommended.
5. A longer duration available for research can use a random sampling and hence, the results can be generalized to a population.

RECOMMENDATIONS FOR POLICIES

1. Patients undergoing infertility treatments might require additional emotional support and counseling to navigate the challenges they face. Proper counselling and emotional support services should be made available throughout the fertility treatment process to address the emotional impact of infertility.
2. Patient-centered care should be given emphasis as the foundation of fertility services. Patients should be involved in decision-making, and they should be provided comprehensive information.
3. Fertility services should be made accessible and affordable. Policies should be implemented to address financial barriers like insurance coverage for those who cannot afford fertility treatment but are desperately seeking for one.
4. Considerations should be made in drafting workplace policies with regard to people experiencing infertility and seeking treatment.
5. Quality assurance measures should be developed and enforced to maintain the standard of care. Assessment and monitoring for effectiveness, safety and outcomes of fertility services should be involved.
6. Fertility services should be decentralized and made available in other districts and regions of the country with ample manpower and resources.

CONCLUSIONS

This is the very first study on the Fertility Quality of Life among infertile patients including male and females using a specific tool FertiQoL questionnaire in Nepal. This is an important study as it provides the baseline information on predictors of fertility quality of life in infertile patients including both men and women. This study highlighted a need of similar research on psychological support among the infertile patients to cope with the stress related to infertility and to minimize the increased treatment drop-out rates due to stress. It further focused on the development of standard policies to assess and monitor the patients for effectiveness, safety, and outcomes of fertility services. The findings of this study can summarize below.

1. Majority of female infertile patients had poor QoL.
2. Difficult access to time off from work lead to poor QoL among infertile patients.
3. The patients who have travelled long distance only to receive fertility services had a poor QoL.
4. Increased marital duration result in poor QoL.
5. Patients undergoing ART using self-gametes and donor gametes had poor QoL compared to those undergoing natural cycles.
6. Patients who desire for psychological support have poor QoL.

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APPENDICES

Annex 1: Consent form and Respondent Information Sheet

Research Title: Predictors of Fertility Quality of Life among infertile patients visiting two infertility centers in Kathmandu, Nepal: A cross-sectional study.

You are invited to take part in a research project. Before you decide to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and do not hesitate to ask if anything is unclear or if you would like more information.

The research aims to study the quality of life among patients facing infertility issues through a self-reported questionnaire. The questionnaire includes questions on general sociodemographic factors like age, ethnicity, and education, socio-economic factors like income, presence of health insurance, and couple characteristics related to fertility. Additionally, the questionnaire includes various questions on your physical, mental, social, relationship, and treatment-related effects of fertility issues. Furthermore, the researcher will access your medical records for medical data on the cause of infertility, treatment history, and type of undergoing treatment. The researcher has already received permission from the fertility center to access your medical records.

The study will include 456 eligible patients facing fertility problems. However, you should meet the following criteria to be eligible to participate in the study.

1. You are facing fertility problems and are unable to conceive after at least a year or more of regular unprotected sexual intercourse.
2. You are able to read and write in Nepali.
3. You consent to participate in the study by providing a signature on the written consent form provided by the researcher.
4. You have been diagnosed with infertility at the time of the study.

You are not eligible to participate in the study if you meet one or more of the following conditions.

1. You or your partner have or have had a history of cancer treatment.
2. You are taking psychiatric medications or therapy at the time of the study.
3. You have experienced major life events like the death of close relatives or a biological child during the past twelve months prior to the interview.
4. You or your partner have any form of disability.

You will be requested to fill up the questionnaire completely and reach out to the researcher in case of any inconvenience. If you (and your partner) consent, you will be given the questionnaire to fill out anonymously which you will hand over to the researcher after

completion. The researcher will check the completeness of the responses and then keep the completed responses in an envelope to be sealed in front of you.

The researcher will access your medical records to screen your eligibility for the study. You will be approached and invited to a separate room while you wait for your consultation with the doctor in the infertility center. You will be orally screened for accessing certain eligibility criteria which are not available in your medical records. You will be explained about the purpose of the study, its objective, the anonymity of responses, and the confidentiality of the final data. If you meet all the eligibility criteria, you will be requested to provide your signature on a written consent form. In case the husband is interviewed, he must also sign his name on the consent form. However, the consent form will be kept separate from the questionnaire and hence, the signature on the consent form cannot be tracked back to the questionnaires. Additionally, the questionnaire will not include your names or any other details which can identify the individual filling the questionnaire. All the information received from the questionnaire will be anonymous, kept confidential, and will not be shared with anybody. All the consent forms and questionnaires will be stored confidentially.

It would require 15-20 minutes for you to complete the questionnaire. The researcher will be available all the time in case of any queries or confusion while filling up the questionnaire. If you require any further information regarding the study, it will be provided by the principal researcher. Moreover, any advice related to the study from your side is welcome and you can contact the researcher freely at any time.

There are a few negligible risks related to the research. The study includes some questionnaires which require information regarding your sexual life. You may feel uncomfortable or inconvenient to answer the questions. However, the information is required to assess all the aspects which affect your quality of life due to fertility problems. Also, since the questionnaire doesn't consist your name, the information provided is strongly anonymous. Thus, you are requested to answer the questions without the fear of being judged or misinterpreted. In case you feel uncomfortable, or are not willing to answer the questions, you can freely reach out to the researcher and drop out of the study. Choosing not to participate in the study will not have any negative consequences on you. Your support to answer all questions in the questionnaire precisely would be greatly appreciated. In case of any concerns or questions before, during, or after filling out the questionnaires, you can speak to the researcher without any hesitation.

There will be no compensation for participation in the study. As the research study doesn't have any budget, the researcher would not be able to give you any physical presents. However, the researcher expresses gratitude for your time and effort in participation in the study. There might not be an immediate benefit to participating in the study. But the information that you provide will be very helpful for assessing the effects of infertility on Quality of life which will eventually benefit in terms of developing appropriate supportive interventions to serve the needs of infertile patients in Nepal. The information from this study will pave a path for future

studies in Nepal which can benefit other patients suffering from infertility problems.

In case of any questions or any complaints about the study or the researcher, please contact Ms. Shital Shakya, +977-9860013043 shakya.shital1996@gmail.com or report any misbehavior or misconduct during the study to the Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University (RECCU), Chamchuri 1 Building, 2nd Floor, 254, Phayathai Road, Pathumwan District, Bangkok 10330, Thailand, Tel./Fax. 0-2218-3202
Email: eccu@chula.ac.th

I have been explained by researcher and understand all the details provided. And I voluntarily signed my name to enroll in this project and receive a copy of this document.

Sign.....

Sign.....

(.....)

(.....)

Principal investigator

Research participant

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Annex 2: Self-reported questionnaire by the respondent

Patient Code:

Q.N	Questions	Response
1.1	Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female
1.2	Age at last birthday	Answer:
1.3	Ethnicity	Answer: <input type="checkbox"/> Brahmin <input type="checkbox"/> Chhetri <input type="checkbox"/> Dalit <input type="checkbox"/> Newar <input type="checkbox"/> Janjati <input type="checkbox"/> Madhesi <input type="checkbox"/> Others
1.4	Highest level of education	Answer: <input type="checkbox"/> Literate (never been to school but can read and write simple Nepali language) <input type="checkbox"/> Basic education level (1-8) <input type="checkbox"/> Secondary Education level (9-12) <input type="checkbox"/> University Degree (Bachelors) <input type="checkbox"/> Post graduate degree (Masters or Higher)
1.5	Permanent Address	District Metropolitan/Municipality/ VDC
1.6	What kind of family are you living in?	Answer: <input type="checkbox"/> Nuclear family (with husband and children) <input type="checkbox"/> Joint family (with husband and his family)
1.7	What type of occupation are you involved in?	Answer: <input type="checkbox"/> Worker/ Laborer/ Daily wages <input type="checkbox"/> Government/ private service oriented <input type="checkbox"/> Self-employed (Business/Freelance/ Entrepreneur) <input type="checkbox"/> Unemployed

1.8	How many hours do you have to work per week? hours
1.9	How easy is it for you to get time off from work to visit the clinic for treatment?	Answer: <input type="checkbox"/> Very easy <input type="checkbox"/> Easy <input type="checkbox"/> Neither Easy nor difficult <input type="checkbox"/> Difficult <input type="checkbox"/> Very difficult
1.10	What is the total monthly income of the couples?	Answer: <input type="checkbox"/> Less than NRs. 20,000 <input type="checkbox"/> Between NRs. 20,000 – 50,000 <input type="checkbox"/> 50,000 – 1,00,000 <input checked="" type="checkbox"/> More than 1,00,000
1.11	Do you have a health insurance that covers the cost of infertility treatment? If yes, then what type of health insurance are you covered by? If you have health insurance, does it cover all treatment cost?	Answer: <input type="checkbox"/> No <input type="checkbox"/> Community-based Health Insurance <input type="checkbox"/> Health Insurance through employer <input type="checkbox"/> Social Security <input type="checkbox"/> Other Privately Purchased Health Insurance <input checked="" type="checkbox"/> No Insurance <input type="checkbox"/> Doesn't cover the cost of fertility treatment <input type="checkbox"/> Partially covered <input type="checkbox"/> Fully covered
1.12	Do you have any child/children? If yes, mention number and gender of child/children.	<input type="checkbox"/> No <input type="checkbox"/> Yes Male/Female
1.13	How important it is for you to have a child?	<input type="checkbox"/> Very Important <input type="checkbox"/> Not so important
1.14	Did you travel to Kathmandu only for fertility treatment?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.15	How supportive is your partner during the infertility treatment process?	Answer: <input type="checkbox"/> Not supportive at all <input type="checkbox"/> Not so supportive <input type="checkbox"/> Neither supportive nor non-supportive

		<input type="checkbox"/> Supportive
		<input type="checkbox"/> Very supportive
1.16	Would you want to receive any psychological support from the healthcare provider to facilitate your infertility treatment?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Annex 3: Questionnaire reported by the investigator

Patient Code:

2.1	Visiting the clinic for treatment	<input type="checkbox"/> Individually <input type="checkbox"/> With Partner
2.2	Type of infertility	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary
2.3	Diagnosed cause of infertility	<input type="checkbox"/> Unexplained <input type="checkbox"/> Female factor <input type="checkbox"/> Male factor <input type="checkbox"/> Both male and female factor
2.4	Has the patient conceived before?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2.5	Has the patient ever given birth?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2.6	Does the patient have any history of pregnancy loss? If yes, mention how many times?	Answer: <input type="checkbox"/> No History <input checked="" type="checkbox"/> Spontaneous abortion <input type="checkbox"/> Induced abortion
2.7	For how long has the patient been married to current partner?years
2.8	Since how long has the patient been trying to conceive? years
2.9	Has the patient been under IUI treatment before? If yes, how many times.	<input type="checkbox"/> No <input type="checkbox"/> Yes times
2.10	Has the patient been under IVF treatment before? If yes, how many times?	<input type="checkbox"/> No <input type="checkbox"/> Yes times

2.11	What type of infertility treatment is the patient going through in this cycle?	<input type="checkbox"/> TI <input type="checkbox"/> IUI (H) <input type="checkbox"/> IUI (D) <input type="checkbox"/> IVF/ ICSI (Husband sperm) <input type="checkbox"/> IVF/ ICSI (Donor sperm) <input type="checkbox"/> Egg donation <input type="checkbox"/> Embryo donation
2.12	Does the patient have any chronic disease conditions? If yes, mention it.	<input type="checkbox"/> No <input type="checkbox"/> Yes
2.13	Is the patient currently taking any medications? If yes, mention it.	<input type="checkbox"/> No <input type="checkbox"/> Yes
2.14	Does the patient have any history of reproductive tract surgery?	<input type="checkbox"/> No <input type="checkbox"/> Yes
2.15	Is this first marriage of patient?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.16	Does the patient have any children from previous partner?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Annex 4: FertiQoL Questionnaire

	For each question, check the response that is closest to your current thoughts and feelings.	Very Poor	Poor	Neither Good nor Poor	Good	Very Good
A.	How would you rate your health?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	Very Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Very Satisfied
B.	Are you satisfied with your quality of life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	For each question, check the response that is closest to your current thoughts and feelings.	Compl etely	A Great Deal	Modera tely	Not Much	Not at All
Q1	Are your attention and concentration impaired by the thoughts of infertility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q2	Do you think you cannot move ahead with other life goals and plans because of fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q3	Do you feel drained or worn out because of fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q4	Do you feel able to cope with your fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	Very Dissati sfied	Dissatisfi ed	Neither Satisfie d Nor Dissatisf ied	Satisf ied	Very Satisf ied
Q5	Are you satisfied with the support you receive from friends with regard to your fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q6	Are you satisfied with your sexual relationship even though you have fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	Alway s	Very Often	Quite Often	Seldo m	Neve r
Q7	Do your fertility problem cause feelings of jealousy and resentment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q8	Do you experience grief and/or feelings of loss about not being able to have a child (or more children)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q9	Do you fluctuate between hope and despair because of fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q10	Are you socially isolated because of fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q11	Are you and your partner affectionate with each other even though you have fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q12	Do your fertility problems interfere with your day-to-day work or obligations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q13	Do you feel uncomfortable attending social situations like holidays and celebrations because of your fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q14	Do you feel your family can understand what you are going through?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	An Extre Amou nt	Very Much	A Modera te Amount	A little	Not at All
Q15	Have fertility problems strengthened your commitment to your partner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q16	Do you feel sad and depressed about your fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q17	Do your fertility problems make you inferior to people with children?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q18	Are you bothered by fatigue because of fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q19	Have fertility problems had a negative impact on your relationship with your partner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q20	Do you find it difficult to talk to your partner about your feelings related to infertility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q21	Are you content with your relationship even though you have fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q22	Do you feel social pressure on you to have (or have more) children?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q23	Do your fertility problems make you angry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q24	Do you feel pain and physical discomfort because of your fertility problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	Always	Very Often	Quite Often	Seldom	Never
T1	Does fertility treatment negatively affect your mood?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T2	Are the fertility medical services you would like available to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	An Extreme Amount	Very Much	A Moderate Amount	A little	Not at All
T3	How complicated is dealing with the procedure and/or administration of medication for your infertility treatment (s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

T4	Are you bothered by the effect of treatment on your daily or work-related activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T5	Do you feel the fertility staff understand what you are going through?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T6	Are you bothered by the physical side effects of fertility medications and treatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For each question, check the response that is closest to your current thoughts and feelings.	Very Dissatisfied	Dissatisfied	Neither Satisfied Nor Dissatisfied	Satisfied	Very Satisfied
T7	Are you satisfied with the quality of services available to you to address your emotional needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T8	How would you rate the surgery and/or medical treatment(s) you have received?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T9	How would you rate the quality of information you received about medication, surgery and/or medical treatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T10	Are you satisfied with your interactions with fertility medical staff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Annex 5 : Eligibility Checklist

S.No.	Criteria	Eligible	Non-Eligible	Comments
1.	The patient consents to participate in the study.	<input type="checkbox"/>	<input type="checkbox"/>	
2.	The patient can read and write in Nepali.	<input type="checkbox"/>	<input type="checkbox"/>	
3.	The patient and their partner doesn't have any form of physical disability.	<input type="checkbox"/>	<input type="checkbox"/>	
4.	The patient has been unable to conceive after at least a year of time unprotected sexual intercourse.	<input type="checkbox"/>	<input type="checkbox"/>	
5.	The patient has been diagnosed for infertility.	<input type="checkbox"/>	<input type="checkbox"/>	
6.	The patient or their partner doesn't have a history of cancer treatment.	<input type="checkbox"/>	<input type="checkbox"/>	
	The patient or their partner doesn't have a history of taking psychiatric medications or psychiatric therapy.	<input type="checkbox"/>	<input type="checkbox"/>	
7.	The patient and their partner have not experienced any major life events like death of close relatives or biological child during the past twelve months.	<input type="checkbox"/>	<input type="checkbox"/>	

Annex 6 : Questionnaire Translated in Nepali

भाग १

सहभागीले भने प्रश्नावली

सहभागीको परिचय नं. :

मिति:

दिइएको हरेक प्रश्नमा आफ्नो सोचाइ र भावनालाई सबैभन्दा नजिकबाट चिनाउने प्रतिक्रियामा (ठिक) चिन्ह लगाउनुहोस्। तपाईंको प्रतिक्रियालाई हालको सोचाइ र भावनाहरूसँग जोडेर उत्तर दिनुहोस्। कुनै कुनै प्रश्नहरू एकदम तपाईंको निजी जीवनसँग गाँसिएका हुनसक्छन् तर यी प्रश्नहरू तपाईंको जीवनको सबै पक्षहरूको पूर्णरूपले मापन गर्नका लागि महत्वपूर्ण छन्।

प्र नं	प्रश्नहरू	प्रतिक्रिया
१.१	लैंगिक पहिचान	<input type="checkbox"/> पुरुष <input type="checkbox"/> महिला
१.२	गएको जन्मदिनमा तपाईं कति वर्ष हुनुभयो? वर्ष
१.३	तपाईं कुन समुदायबाट हुनुहुन्छ?	<input type="checkbox"/> बाहुन <input type="checkbox"/> क्षेत्री <input type="checkbox"/> दलित <input type="checkbox"/> नेवार <input type="checkbox"/> जनजाति. <input type="checkbox"/> मधेसी <input type="checkbox"/> अन्य
१.४	तपाईंले हालसम्ममा हासिल गर्नुभएको सबैभन्दा उच्च शैक्षिक योग्यतामा चिन्ह लगाउनुहोस्।	<input type="checkbox"/> उच्च अध्ययन (मास्टर वा सोभन्दा माथि) <input type="checkbox"/> विश्वविद्यालय (ब्याचलर) <input type="checkbox"/> माध्यमिक तह (कक्षा ९ – कक्षा १२) <input type="checkbox"/> प्रारम्भिक तह (कक्षा १ – कक्षा ८) <input type="checkbox"/> साक्षर (कहिल्यै विद्यालय नगएको तर नेपाली भाषामा सामान्य लेखपढ गर्न सक्ने)
१.५	स्थायी ठेगाना लेख्नुहोस्। (पालिका सहित लेख्नुहोस्)	जिल्ला/ महा/उप – नगरपालिका/ गाउँपालिका
१.६	दिइएको मध्ये तपाईं कस्तो किसिमको परिवारमा बस्नुहुन्छ?	<input type="checkbox"/> एकल परिवार (श्रीमान्, श्रीमती) <input type="checkbox"/> संयुक्त परिवार (श्रीमान्, श्रीमती र श्रीमानको परिवार)
१.७	तपाईं कुन किसिमको पेशामा संलग्न हुनुहुन्छ?	<input type="checkbox"/> कामदार ज्यालामजदुरी <input type="checkbox"/> सरकारी वा प्राइभेट सेवा क्षेत्र <input type="checkbox"/> स्वरोजगार <input type="checkbox"/> बेरोजगार
१.८	तपाईं दिनको कति घण्टा काम गर्नुहुन्छ? घण्टा
१.९	उपचारको निम्ति क्लिनिकमा आउनको लागि कामबाट समय निकाल्न वा छुट्टी लिन कतिको सजिलो छ?	<input type="checkbox"/> एकदम सजिलो छ <input type="checkbox"/> गान्हो छ <input type="checkbox"/> सजिलो नै छ <input type="checkbox"/> एकदम गान्हो छ <input type="checkbox"/> सजिलो पनि होइन गान्हो पनि होइन
१.१०	तपाईं र तपाईंको जीवनसाथीको कुल मासिक आमदानी कति छ?	<input type="checkbox"/> २०,००० भन्दा कम <input type="checkbox"/> २०,००० देखि ५०,००० <input type="checkbox"/> ५०,००० देखि १,००,००० <input type="checkbox"/> १,००,००० भन्दा माथि

१.११	के तपाईंले आफ्नो नाममा कुनै किसिमको स्वास्थ्य बीमा गर्नुभएको छ? यदि गर्नुभएको छ भने कुन किसिमको स्वास्थ्य बीमा गर्नुभएको छ? यदि स्वास्थ्य बीमा गर्नुभएको छ भने के त्यस बीमाले यस क्लिनिकमा उपचार गरेको खर्चको भुक्तानी गर्छ?	<input type="checkbox"/> छैन <input type="checkbox"/> सामुदायिक स्तरको स्वास्थ्य बीमा <input type="checkbox"/> कर्मचारी स्वास्थ्य बीमा <input type="checkbox"/> सामाजिक सुरक्षा <input type="checkbox"/> अन्य संस्थामार्फत किनेको बीमा <input type="checkbox"/> बीमा गरेको छैन <input type="checkbox"/> बीमा छ तर खर्च भुक्तानी गर्दैन <input type="checkbox"/> आंशिक रूपमा गर्छ <input type="checkbox"/> पूर्णरूपमा गर्छ
१.१२	के तपाईंको सन्तान छ? छ भने कति जना छोरा/छोरी उल्लेख गर्नुहोस्।	<input type="checkbox"/> छैन <input type="checkbox"/> छ छोरा / छोरी
१.१३	हालको अवस्थामा तपाईंको निम्ति आफ्नै सन्तान हुनु कतिको महत्वपूर्ण लाग्छ?	<input type="checkbox"/> एकदम महत्वपूर्ण छ <input type="checkbox"/> त्यति धेरै महत्वपूर्ण छैन
१.१४	के तपाईं निसन्तान स्वास्थ्य सेवा लिनको लागि मात्रै काठमाडौं आउनुभएको हो?	<input type="checkbox"/> हो <input type="checkbox"/> होइन
१.१५	निसन्तान उपचारको क्रममा तपाईंको जिवनसाथीले तपाईंलाई कतिको साथ दिनुहुन्छ?	<input type="checkbox"/> पटकै साथ दिँदैन <input type="checkbox"/> खासै साथ दिँदैन <input type="checkbox"/> साथ दिने पनि होइन नदिने पनि होइन <input type="checkbox"/> साथ दिन्छ <input type="checkbox"/> एकदम साथ दिन्छ
१.१६	निसन्तान उपचारको क्रममा के तपाईंले स्वास्थ्यकर्मी मार्फत कुनै किसिमको मनोवैज्ञानिक परामर्श पाउने ईच्छा राख्नुभएको छ?	<input type="checkbox"/> छ <input type="checkbox"/> छैन

भाग २

दिइएको हरेक प्रश्नमा आफ्नो सोचाइ र भावनालाई सबैभन्दा नजिकबाट चिनाउने प्रतिक्रियामा (ठिक) चिन्ह लगाउनुहोस्। तपाईंको प्रतिक्रियालाई हालको सोचहरू र भावनाहरूसँग जोडेर उत्तर दिनुहोस्। कुनै कुनै प्रश्नहरू एकदम नै तपाईंको निजी जीवनसँग गाँसिएका हुनसक्छन् तर यी प्रश्नहरू तपाईंको जीवनको सबै पक्षहरूको पूर्णरूपले मापन गर्नका लागि महत्वपूर्ण छन्।

दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।	एकदम कम जोर	कम जोर	राम्रो पनि होइन कमजोर पनि होइन	राम्रो	एकदम राम्रो
क) तपाईंले आफ्नो स्वास्थ्यलाई कसरी मूल्याङ्कन गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	एकदम	असन्तुष्ट	सन्तुष्ट पनि होइन	सन्तुष्ट	एकदम सन्तुष्ट

दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		असन्तुष्ट		असन्तुष्ट पनि होइन		
ख)	के तपाईं आफ्नो जीवनस्तरबाट सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		पूर्णरूपले	एकदम	ठिकठिकै	धेरै छैन	कदापि छैन
प्र.१.	निसन्तानपनले तपाईंको कुनै कुरामा ध्यान दिने वा केन्द्रित रहने क्षमतालाई प्रभाव पारेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२.	निसन्तान समस्याहरूको कारण के तपाईं आफ्नो जीवनको अन्य लक्ष्यहरूमा अघि बढ्न सकिदैन भन्ने सोच्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.३.	निसन्तान समस्याहरूका कारण के तपाईं गलेको अथवा थकित भएको महसुस गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.४.	के तपाईंलाई आफ्नो निसन्तान समस्याहरूको सामना गर्न सक्छु भन्ने महसुस हुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		एकदम असन्तुष्ट	असन्तुष्ट	सन्तुष्ट पनि होइन असन्तुष्ट पनि होइन	सन्तुष्ट	एकदम सन्तुष्ट
प्र.५.	के तपाईं आफ्नो निसन्तान समस्याहरूको विषयमा आफ्ना साथीहरूसँग सहायतासँग सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.६.	आफ्नो निसन्तान समस्याहरू भए पनि के तपाईं आफ्नो यौन सम्बन्धबाट सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		सधैं	धेरैजसो	प्रायः	कहिले काहीं	कहिल्यै पनि छैन
प्र.७.	के तपाईंको निसन्तान समस्याले ईर्ष्या र आक्रोशको भावना पैदा गर्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.८.	के तपाईंले सन्तान (वा धेरै सन्तानहरू) जन्माउन नसकेकोमा शोक अथवा केही गुमाउनु परेको भावना अनुभव गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.९.	निसन्तान समस्याहरूका कारण के तपाईंमा आशा र निराशा बीच उतारचढाव आएको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१०.	निसन्तान समस्याका कारण के तपाईं सामाजिक रूपमा अलग्गिनु भएको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.११.	के तपाईं र तपाईंको जीवनसाथी निसन्तान समस्याका बावजूद एकअर्कालाई स्नेह र माया गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

प्र.१२.	के तपाईंको निसन्तान समस्याहरूले तपाईंको दैनिक कार्य वा दायित्वहरूमा हस्तक्षेप गरेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१३.	के तपाईं आफ्नो निसन्तान समस्याका कारण सामाजिक भेटघाट र उत्सवहरूमा सहभागी हुन असहज महसुस गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१४.	के तपाईंले अनुभव गरिरहनु भएको अवस्थालाई तपाईंको परिवारले बुझ्न सक्छन् भन्ने महसुस गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		एकदम नै धेरै	धेरै	ठिक्क मात्र	अलि कति	पटकै छैन
प्र.१५.	के निसन्तान समस्याहरूले तपाईंको जीवनसाथीप्रतिको तपाईंको प्रतिबद्धतालाई बलियो बनाएको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१६.	के तपाईंलाई आफ्नो निसन्तान समस्याहरूको बारेमा सौच्चा दुःख तथा निराशा महसुस हुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१७.	के निसन्तान समस्याहरूका कारण तपाईंलाई सन्तान भएका अन्य व्यक्तिहरूको अगाडि सानो महसुस हुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.१८.	निसन्तान समस्याहरूका कारण के तपाईं थकान भएको महसुस गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		एकदम नै धेरै	धेरै	ठिक्क मात्र	अलि कति	पटकै छैन
प्र.१९.	के निसन्तान समस्याहरूले तपाईंको जीवनसाथीसँगको सम्बन्धमा नकारात्मक असर पारेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२०.	के तपाईंलाई निसन्तानपनसँग सम्बन्धित आफ्नो भावनाको बारेमा आफ्नो जीवनसाथीसँग कुरा गर्न गाह्रो लाग्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२१.	निसन्तान समस्याहरू भए पनि के तपाईं आफ्नो वैवाहिक सम्बन्धमा सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२२.	के तपाईंलाई सन्तान (वा थप सन्तान) पाउन सामाजिक दबाव परेको महसुस हुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२३.	के आफ्नो निसन्तान अवस्थाले गर्दा तपाईंलाई रिस उठ्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
प्र.२४.	के निसन्तानपनका कारणले तपाईंलाई दुखाइ तथा शारीरिक असहजता महसुस हुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।		सधैं	धेरैजसो	प्रायः	कहिले काहीं	कहिल्यै पनि नाइँ
T1	के निसन्तानपनको उपचारले तपाईंको मनस्थितिमा नकारात्मक असर पारेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T2	के तपाईंले चाहनुभएका निसन्तान उपचार सेवाहरू तपाईंका लागि उपलब्ध छन्?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।	एकदम नै धेरै	धेरै	ठिकठिकै	अलिकति	छैन
T3	तपाईंले लिइरहनुभएको निसन्तान उपचारको प्रक्रिया (औषधी सेवन, सुइ लिने) कतिको जटिल छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T4	के निसन्तान उपचारको असरले तपाईंको दैनिक जीवन वा पेशागत गतिविधिहरूमा कुनै प्रभाव परेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T5	के निसन्तान उपचार सेवामा संलग्न स्वास्थ्यकर्मीहरूले तपाईंको अवस्था बुझ्नुभएको महसुस गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T6	निसन्तान उपचार र त्यस क्रममा प्रयोग हुने औषधीबाट सिर्जना हुने शारीरिक असरले तपाईंलाई दिक्क पारेको छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	दिइएको हरेक प्रश्नमा, तपाईंको हालको सोचाइ र भावनाहरूसँग नजिक रहेको प्रतिक्रियामा चिन्ह लगाउनुहोस्।	एकदम असन्तुष्ट	असन्तुष्ट	सन्तुष्ट पनि होइन असन्तुष्ट पनि होइन	सन्तुष्ट	एकदम सन्तुष्ट
T7	के तपाईं आफ्नो भावनात्मक आवश्यकताहरू सम्बोधन गर्न उपलब्ध सेवाहरूको गुणस्तरसँग सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T8	आफूलाई प्राप्त निसन्तान सम्बन्धी स्वास्थ्य उपचार र सेवालालाई तपाईं कसरी मूल्याङ्कन गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T9	स्वास्थ्य तथा औषधी उपचारको क्रममा तपाईंलाई उपलब्ध गराइएको जानकारीको गुणस्तरलाई तपाईं कसरी मूल्याङ्कन गर्नुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T10	आफ्नो उपचारको क्रममा स्वास्थ्यकर्मीहरूसँग भएको अन्तर्क्रियाबाट के तपाईं सन्तुष्ट हुनुहुन्छ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

भाग २

सहभागीको परिचय नं. :

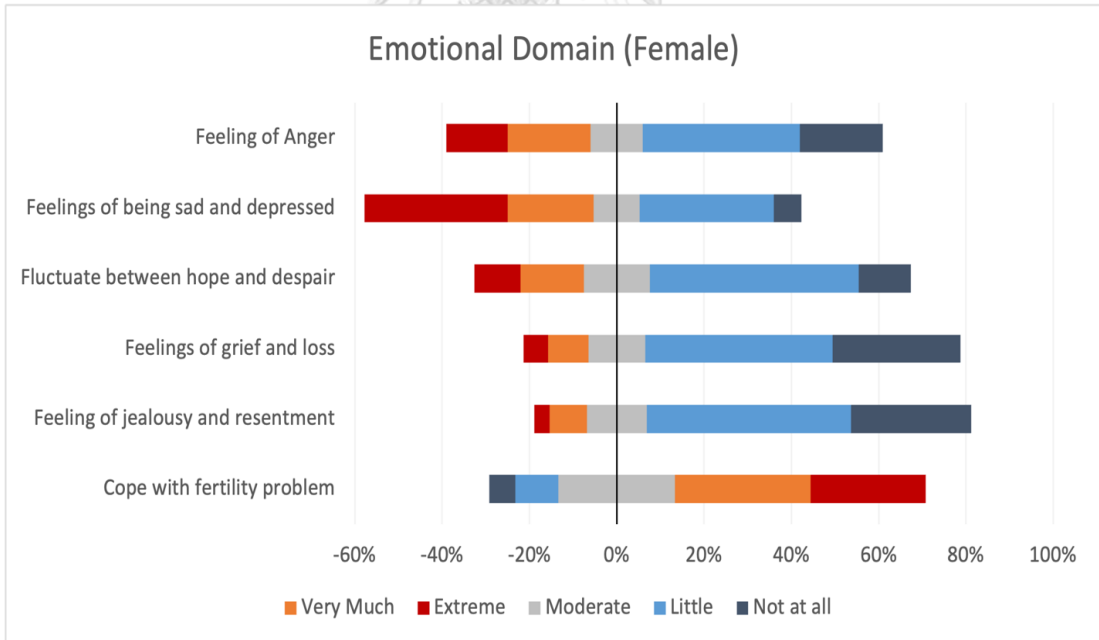
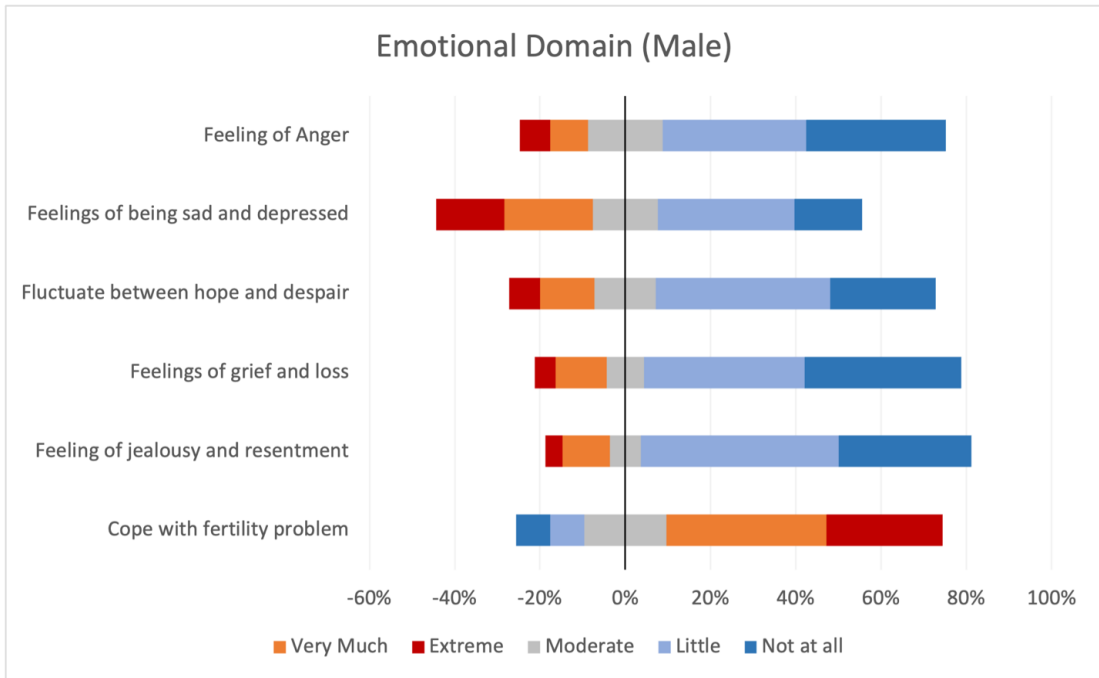
मिति:

प्र.नं.	प्रश्नहरू	प्रतिक्रिया
२.१	निसन्तान सेवा लिन एकलै आएको वा जीवनसाथीसँग?	<input type="checkbox"/> एकलै <input type="checkbox"/> जीवनसाथीसँग
२.२	कुन प्रकारको निसन्तान समस्या देखिएको छ?	<input type="checkbox"/> प्राइमेरी <input type="checkbox"/> सेकेन्डेरी
२.३	निसन्तान हुनुको कारण के हो?	<input type="checkbox"/> पुरुष <input type="checkbox"/> दुबै <input type="checkbox"/> महिला <input type="checkbox"/> पत्ता नलागेको
२.४	पहिले बच्चा बसेको छ कि छैन?	<input type="checkbox"/> छ <input type="checkbox"/> छैन
२.५	सन्तानलाई जन्म दिएको छ कि छैन?	<input type="checkbox"/> छ <input type="checkbox"/> छैन
२.६	विगतमा बच्चा खेर गएको छ कि छैन? यदि छ भने कतिपटक खेर गएको छ?	<input type="checkbox"/> छैन <input type="checkbox"/> Spontaneous abortion <input type="checkbox"/> Induced Abortion

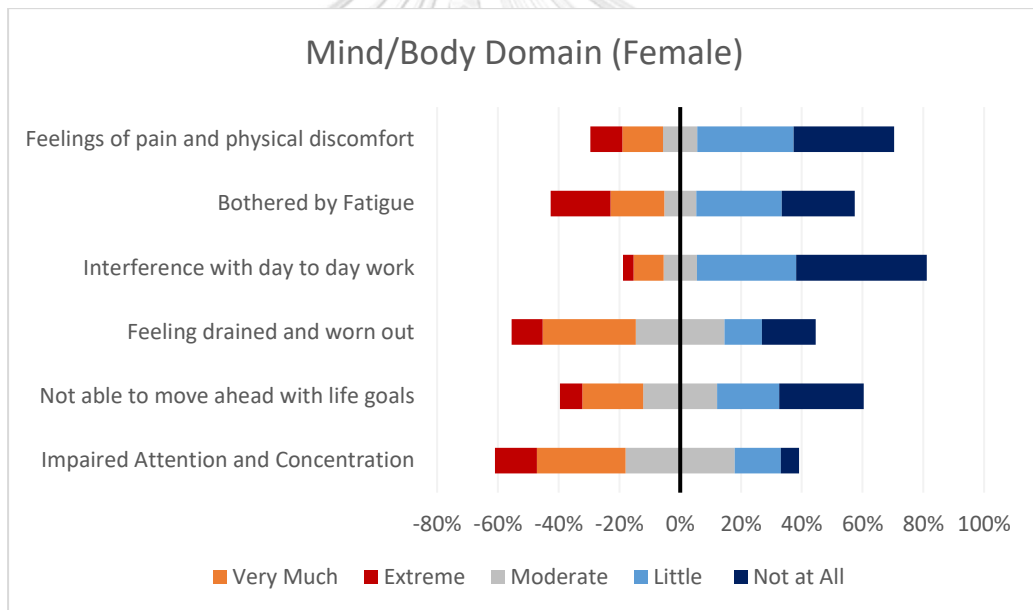
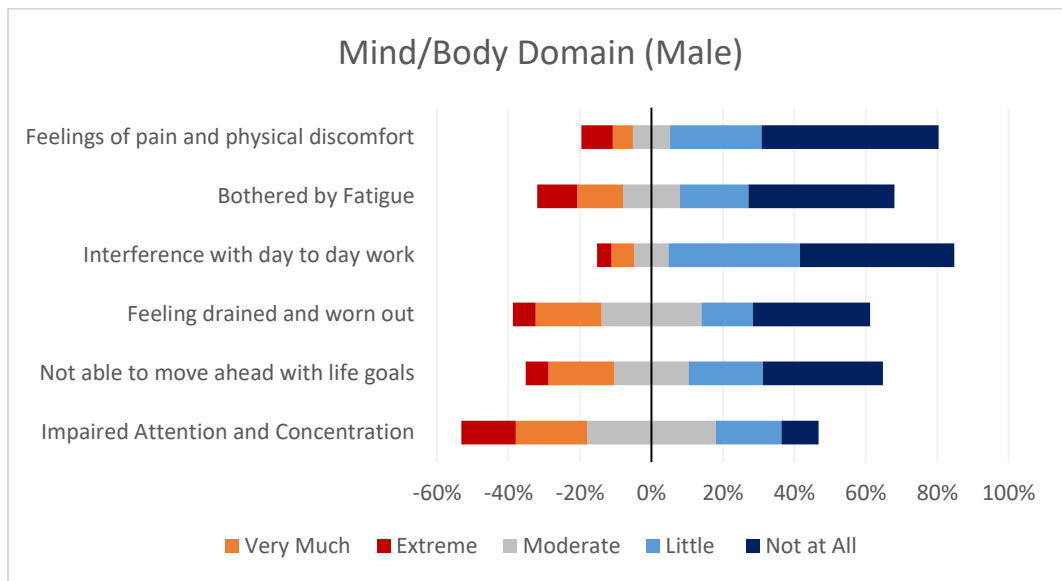
	 पटक
२.७	वैवाहिक सम्बन्ध कति वर्षको भयो? वर्ष
२.८	बच्चा पाउने प्रयास गरेको कति वर्ष भयो? वर्ष
२.९	विगतमा IUI विधिबाट उपचार गरेको छ कि छैन? छ भने कति पटक?	<input type="checkbox"/> छ <input type="checkbox"/> छैन पटक
२.१०	विगतमा IVF विधिबाट उपचार गरेको छ कि छैन? छ भने कति पटक?	<input type="checkbox"/> छ <input type="checkbox"/> छैन पटक
२.११	यस महिनावारी चक्रमा कुन उपचार प्रक्रियामा लागि रहनु भएको छ?	<input type="checkbox"/> TI <input type="checkbox"/> IUI (H) <input type="checkbox"/> IUI (D) <input type="checkbox"/> IVF (Husband sperm) <input type="checkbox"/> IVF (Donor sperm) <input type="checkbox"/> Egg donation <input type="checkbox"/> Embryo donation
२.१२	कुनै किसिमको दीर्घ रोग छ कि छैन? छ भने कुन?	<input type="checkbox"/> छ <input type="checkbox"/> छैन
२.१३	कुनै किसिमको औषधी सेवन गरिरहेको छ कि छैन? छ भने कुन?	<input type="checkbox"/> छ <input type="checkbox"/> छैन
२.१४	विगतमा कुनै किसिमको प्रजनन प्रणालीसँग सम्बन्धित शल्यक्रिया गरेको छ कि छैन? छ भने कुन?	<input type="checkbox"/> छ <input type="checkbox"/> छैन
२.१५	के यो पहिलो विवाह हो?	<input checked="" type="checkbox"/> हो <input type="checkbox"/> होइन
२.१६	के पहिलेको जीवनसाथीबाट सन्तान भएको छ?	<input type="checkbox"/> छ <input type="checkbox"/> छैन

ANNEX 7: Descriptive of FertiQol Domain Classified by Gender shown in figures.

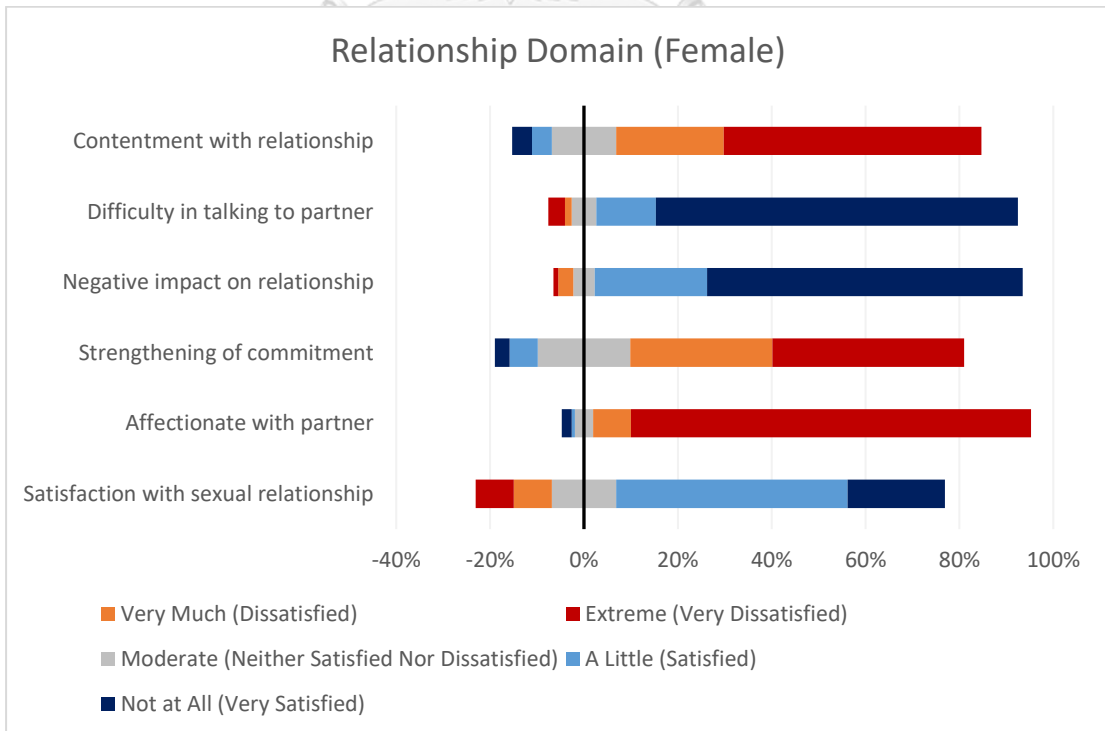
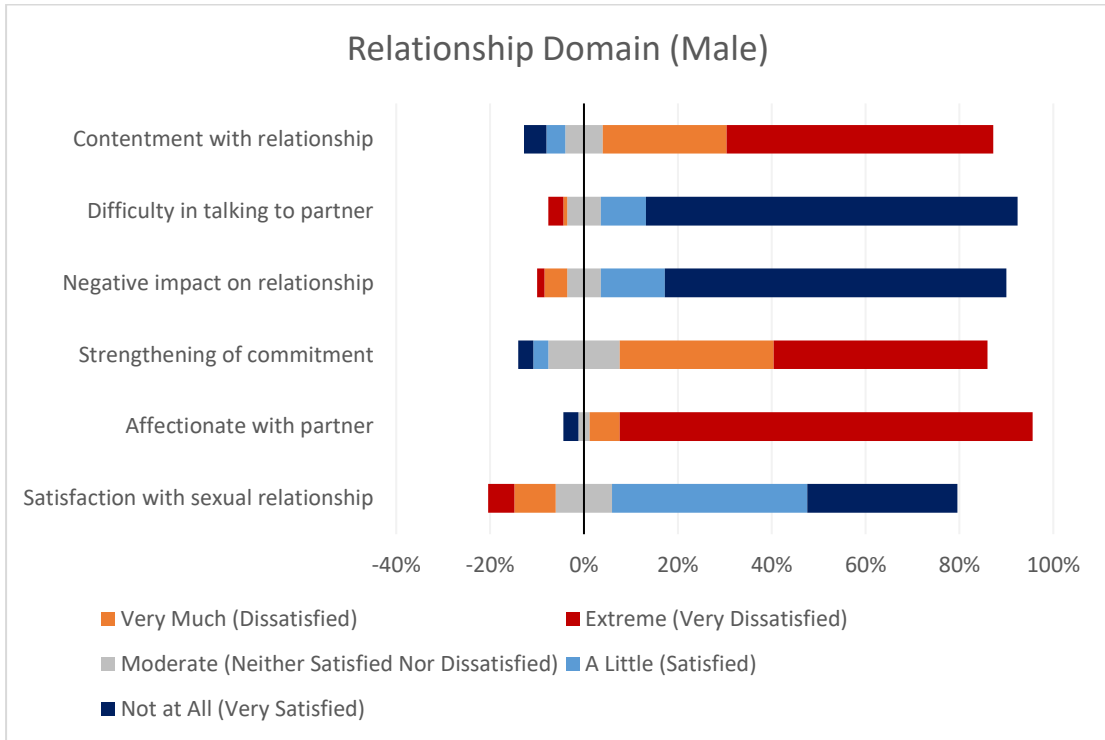
A. Emotional Domain



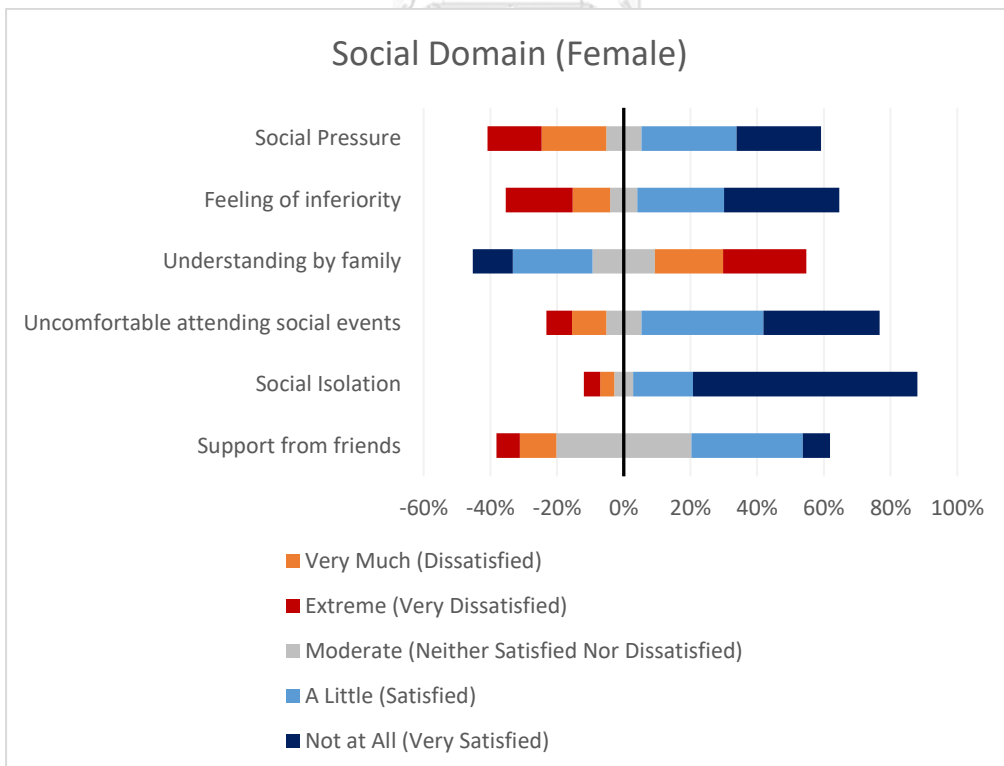
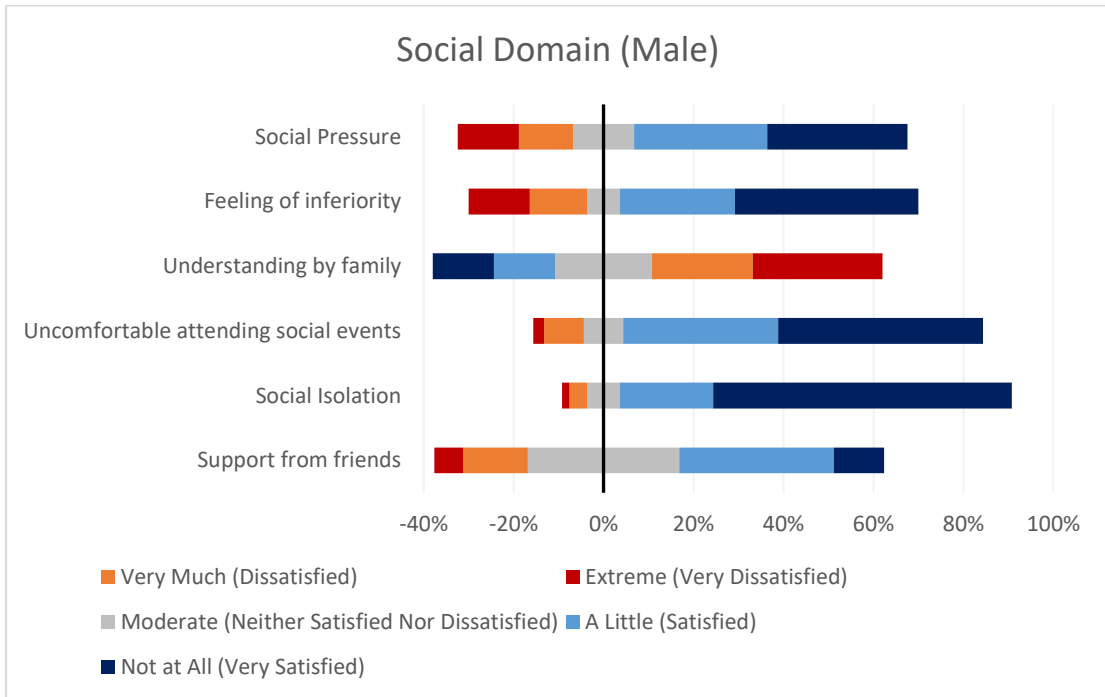
B. Mind/ Body Domain



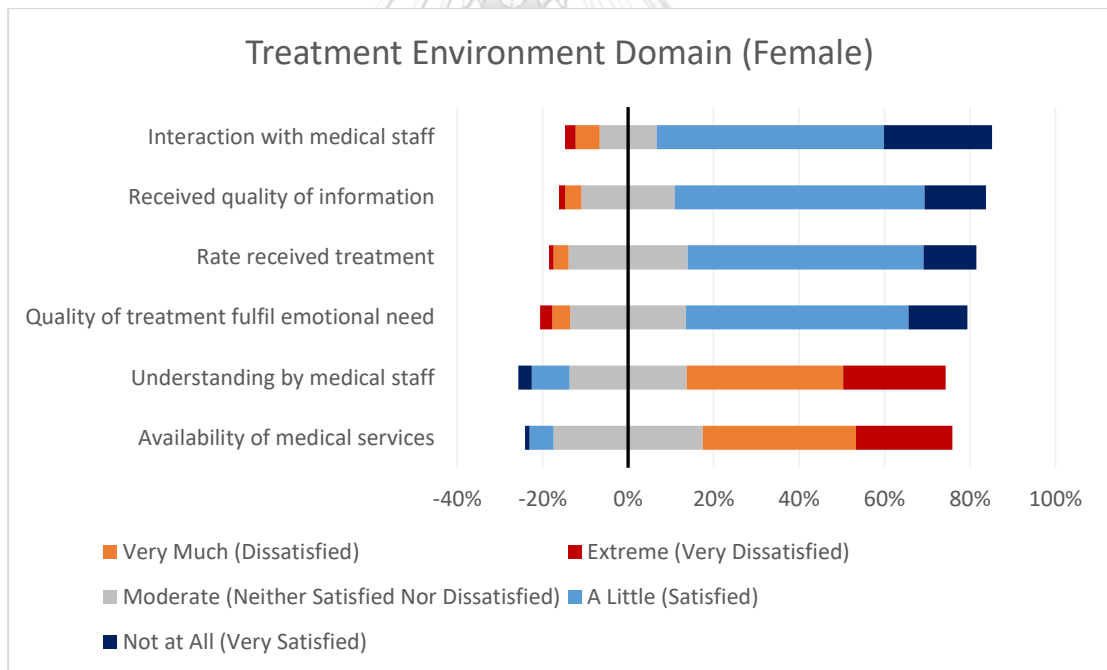
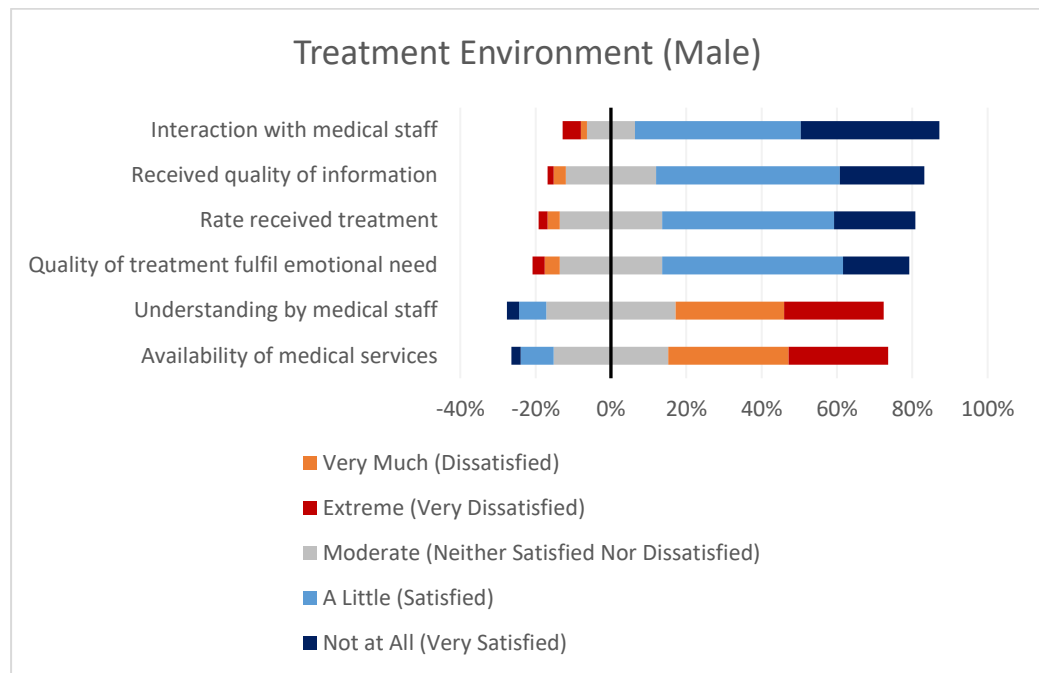
C. Relationship Domain



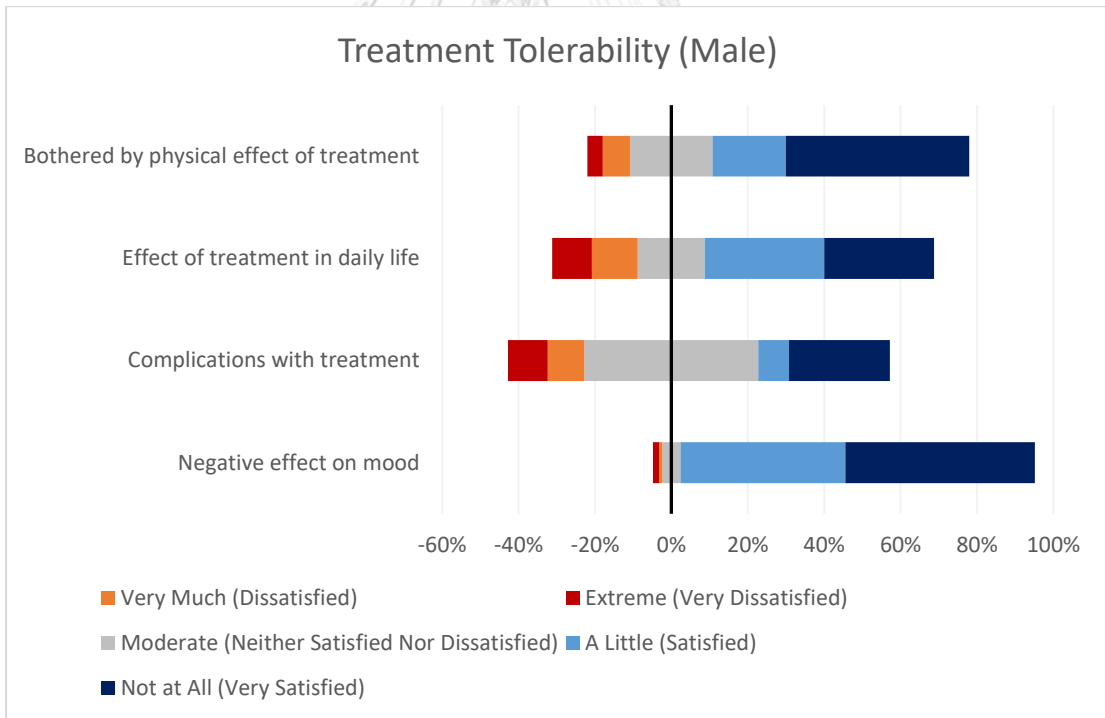
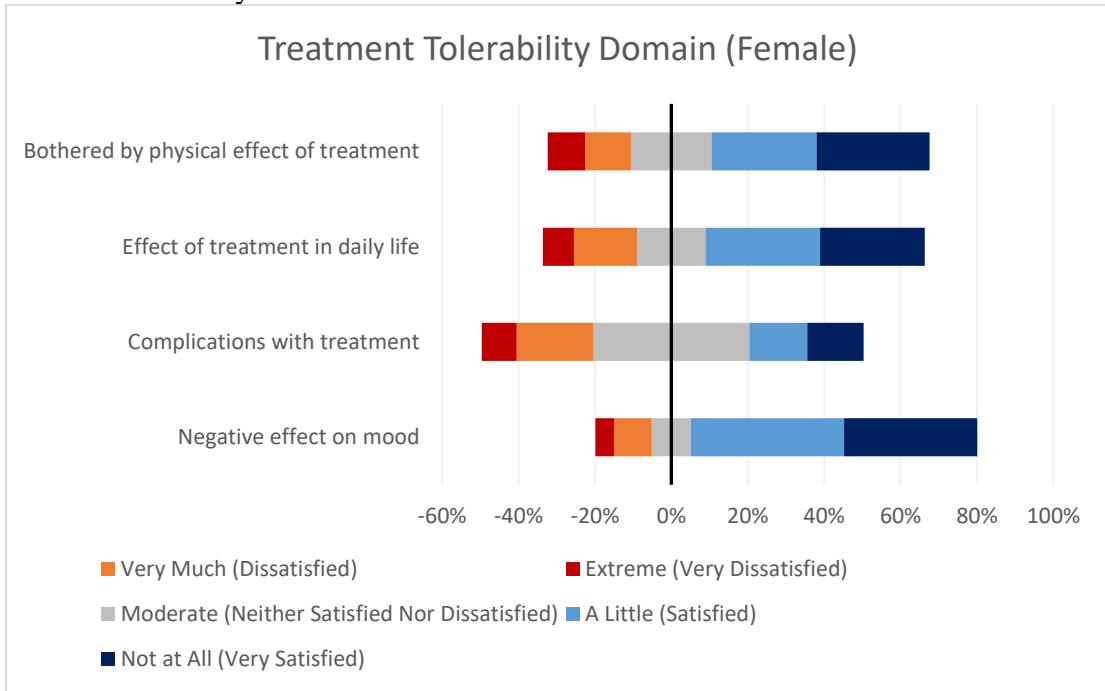
D. Social Domain



E. Environment Domain

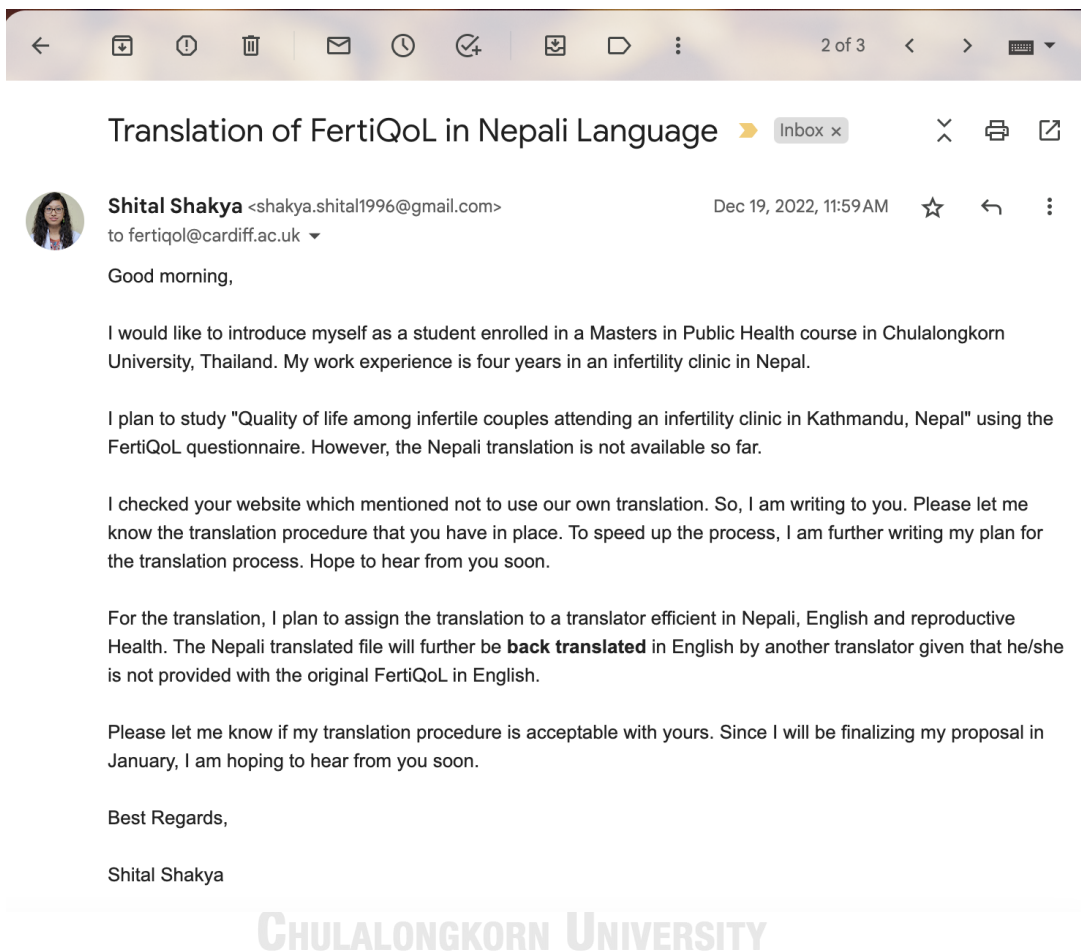


F. Tolerability Domain



Annex 7: Letter of permission to use FertiQoL questionnaire

Mail sent by the researcher



Mail received from FertiQoL studies

← [Icons] 2 of 3 < > [Icons]

F **FertiQoL Studies** <fertiqol@cardiff.ac.uk> Apr 14, 2023, 12:09 PM ☆ ↶ ⋮
to me ▾

Dear Shital,

Apologies. Sometimes emails go into my 'spam' box. Please we already have a Nepalese translation. However, I don't think it has been verified. Please see attached. What are your thoughts about it? Kinds regards, Jacky

<p>Professor Jacky Boivin, PhD, CPsychol Professor of Health Psychology Cardiff Fertility Studies Research Group School of Psychology, (College of Biomedical and Life Sciences) Cardiff University 70 Park Place Cardiff, Wales, United Kingdom CF10 3AT tel: +44 2920 874 007 Email: boivin@cardiff.ac.uk Website: https://www.cardiff.ac.uk/people/view/845289-boivin-jacky School of Psychology</p>	<p>Yr Athro Jacky Boivin, PhD, CPsychol Yr Athro Seicoleg Iechyd Grŵp Ymchwil Astudiaethau Ffrwythlondeb Caerdydd Yr Ysgol Seicoleg (Coleg y Gwyddorau Biofeddygol a Bywyd) Prifysgol Caerdydd 70 Plas-y-Parc Caerdydd CF10 3AT Ffôn : +44 (0)29 2087 4007 E-bost: boivin@caerdydd.ac.uk https://www.cardiff.ac.uk/people/view/845289-boivin-jacky</p>
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CHULALONGKORN UNIVERSITY

Annex 8: Letter of permission from Director of Clinics



OBSTETRICS
FERTILITY
GYNAECOLOGY

1st June, 2023

To whom it may concern

Subject: Permission granted for accessing medical records

This is to inform that Ms. Shital Shakya, a Chulalongkorn University MPH student, has been given permission to conduct a study on "**Predictors of Fertility Quality of Life in Infertile Patients Visiting Two Infertility Centers in Kathmandu, Nepal: A Cross-sectional Study**" in our clinic. Additionally, she has received access to the patient's medical records that she needs to record the variables in her research study from the clinic

Thank you.

We all wish good luck for her future endeavors.

With best regards,

Yugantika Basnyat
Operations Manager

Vatsalya Natural IVF Pvt. Ltd.

271, Situ Plaza, Narayan Chaur, Naxal, Kathmandu, Nepal
German Homes Building, Gathaghar, Bhaktapur
Hotline No.: +977-1-5970611 | info@vatsalya.com.np

vatsalya.com.np

Letter of permission to access medical records from Vatsalya Healthcare, Kathmandu, Nepal.

Annex 9: Gantt chart

	Dec	Jan	Feb	Mar	April	May	June	July
Proposal preparation								
Proposal submission								
Proposal Examination								
Pilot test								
Ethical consideration								
Data collection, entry, analysis, and defense writing								

Annex 10: Budget

No	Item	Cost		Unit	Total cost	
		Nepali Rupees	Thai baht		Nepali Rupees	Thai Baht
1.	Photocopies (questionnaire, consent, and information sheet)	40	~ 10	500	20,000	5,200
2.	Stationary	50	~ 15	500	25,000	6,500
5.	Transportation Cost	200	~ 50	60	12,000	3,000
6.	Translation of the English documents to Nepali language	1000	~250	6	6,000	1,500
7.	Book binding and preparation of thesis paper	24000	~6000	1	24,000	6,000
	Total				87000 Nepali Rupees	22,200 Thai Baht

Annex 11: Researcher Information

Principal Researcher's Name – Ms. Shital Shakya

Position – Master student of Public Health

Date of Birth – 26th Jan 1996

Home Address – Natole-20, Lalitpur, Nepal

Phone No. +977-9860013043

Email : shakya.shital1996@gmail.com



VITA

NAME	Shital Shakya
DATE OF BIRTH	26 January 1996
PLACE OF BIRTH	Lalitpur, Nepal
INSTITUTIONS ATTENDED	Kathmandu University
HOME ADDRESS	Natole-20, Lalitpur, Nepal.
PUBLICATION	Swastika Hada, Rojeena Koju Shrestha, Pushpa Parajuli, Jenisha Timalsina, Supriya Dhungel, Shital Shakya, Manika Humagain (2018) “Prevalence of Cardiovascular Disease and Prescribing Pattern of Drugs in Patients admitted in Cardiovascular Unit in Dhulikhel Hospital”, International Journal of Advances in Science, Engineering and Technology (IJASEAT), pp. 23-26, Volume-6, Issue-4, Spl. Iss-2
AWARD RECEIVED	None