"COMPARATIVE STUDY TO DETERMINE THE PREVALENCE AND PSYCHOSOCIAL CONSEQUENCES OF INFERTILITY IN RURAL AND URBAN FIELD PRACTICE AREAS OF SHRI B.M.PATIL MEDICAL COLLEGE, VIJAYAPUR"

By

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Dissertation submitted to

B.L.D.E. UNIVERSITY VIJAYAPUR, KARNATAKA

In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE

In

COMMUNITY MEDICINE

Under the guidance of

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KARNATAKA

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ACKNOWLEDGEMENT

First and foremost, I thank the Lord Almighty for blessing me with the strength and insight I needed to complete this dissertation, and for being by my side throughout this incredible journey.

I take this opportunity to express my profound gratitude and deep regards to my guide, **Dr. REKHA UDGIRI**$_{\textbf{M.D.}}$, Professor, Department of Community Medicine, Shri. B. M. Patil Medical College, Vijayapur, for her exemplary guidance, monitoring and constant encouragement throughout the course of this thesis.

I offer my deep sense of gratitude to **Dr. SHAILAJA.S.PATIL** $_{\textbf{M.D.}}$ Professor & Head, Department of Community Medicine, Shri. B.M.Patil Medical College, Vijayapur, who with her kindness and valuable suggestions constantly supported me throughout the preparation of this dissertation work and without whose encouragement this work would not have been possible.

My sincere thanks are due to **Dr. S. P. Guggarigoudar** $_{\textbf{M.S.}}$ Principal, Shri.B. M. Patil Medical College, Vijayapur, for permitting me to conduct this study.

I wish to acknowledge my Professors, **Dr. K.A.Masali** $_{\textbf{M.D.}}$ and **Dr. M. C. Yadavannavar** $_{\textbf{M.D.,}}$ Associate professor **Dr. M. R. Gudadinni** $_{\textbf{M.D.,}}$ Assistant professors **Dr. Santosh D. Patil** $_{\textbf{M.D.,}}$ **Dr. Praveen Ganganahalli** $_{\textbf{M.D.}}$ and **Dr. Chandrika Doddihal** $_{\textbf{M.D.,}}$ for their supervision and timely advice.

I would like to express my sincere gratitude to our sir Dr. M. M. Angadi for his valuable suggestions and encouragement.

I am extremely thankful to **Mrs. Vijaya Sorganvi,** and **Mohd. Shannawaz**, Statisticians for their valuable help in statistical analysis of data.

I express my sincere thanks to all my lecturers **Dr G.V.Kulkrani, Dr Veena Algur and Ms Vidyavati Ugran** for their good wishes.

I am very grateful to my postgraduate colleagues, **Dr. Rohith M, Dr. Kriti Bhat, Dr. Rashmi Hullalli, Dr. Tanuja Pattankar** , **Dr. Laxmi Tellur and Dr. Sandeep Yankanchi** and my seniors **Dr. Shashank KJ, Dr. Sindhu and Dr. Rashmi B.M.** for their constant support.

I am thankful to all the non-teaching and clerical staff members of the Department of Community Medicine, Shri. B.M. Patil Medical College, Vijayapur for their co-operation.

I am greatly indebted to my parents, **Mr. V.S. Patil** & **Mrs. Vatsala.V. Patil** for their constant encouragement, inspiration and sacrifices, without which I would not be where I am today. I am also obliged to my sister, **Dr. Veena Ganesh**, my brother-in-law, **Mr. Ganesh HR,** my brother **Mr. Praveen Patil**, my younger sister **Laxmi Patil** and my in-laws for their love and support.

I owe much of the success of my dissertation to my husband **Dr.Vilas.I. Hiregoudar** and to my lovely son **Vihaan.**

Finally, I extend my heartfelt gratitude to all the respondents who spent their valuable time to answer the questionnaire with patience.

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LIST OF ABBREVIATIONS USED

WHO	: World Health Organization
NFHS	: National Family Health Survey
DLHS	: District Level Health Survey
ANM	: Auxiliary Nurse Mid-wife
ASHA	: Accredited Social Health Activist
AWW	: Anganwadi Worker
BMI	: Body Mass Index
ICPD	: International conference on population and development
ART	: Assisted Reproductive Technology
QOL	: Quality of life
SPSS	: Statistical Package for social sciences
CI	: Confidence Interval
SD	: Standard Deviation
FPI	: Fertility Problem Inventory
NGO	: Non-Governmental Organization

ABSTRACT

Introduction: Infertility is a public health problem affecting people worldwide from all the communities with various causes. It has an impact on their physical, mental and social well- being. It affects approximately 8-10% couples worldwide. The various psychosocial consequences affecting infertility are lowered self- esteem, marital conflict, sexual conflict, social conflict, depression, financial burden. In developing countries the consequences range from economic hardship to social isolation, violence and denial of proper death rites. Infertility is thus an "ice berg" phenomenon where the majority of the couples are undiagnosed, they suffer from easily treatable conditions but most of them don't seek treatment. Various socio-cultural practices like believing infertility as a curse, seeking healing from super natural powers is still predominant in the community.

The thrust areas in the research have been on the correlates of increased fertility and various methods to regulate it and the concept of infertility is neglected. However data from community based studies are scarce in India and available estimates are highly variable. Hence the present study is undertaken to know the prevalence and psychosocial consequences of infertility in a socio-economically backward area i.e., urban slum and rural area.

Objectives: 1. To determine and compare the prevalence of primary and secondary infertility in rural and urban field practice areas.

2. To assess and compare the socio – demographic factors and psychosocial consequences associated with infertility.

Material and methods: A cross sectional study was conducted in the rural and urban field practice area of a tertiary care hospital. Complete enumeration of all the houses

under RHTC and UHTC area was done to list all the eligible couple residing in the area and among them those at risk of pregnancy were identified so as to find out couples with either primary or secondary infertility. After obtaining the ethical clearance from the Institutional Ethical committee, the study was undertaken. A pretested, predesigned, semi-structured questionnaire and a validated "Fertility problem inventory scale" was used to assess the psychosocial consequences associated with infertility and impact was seen at four levels i.e., personal impact, sexual impact, marital impact and social impact.

Results: A total of 180 participants were included in the study. The prevalence of infertility in rural area was 7.6% and in urban slums it was 8.8%. Majority of the couples had duration of infertility less than 5 years. Visiting religious places was the most common socio-cultural practice (58%) among rural subjects and 42% among urban subjects. Only 38% of the participants sought treatment which was higher among rural residents compared to urban couples and majority waited for the spontaneous conception. Conflict within the marriage was highest among both rural and urban study subjects followed by decline in the sexual relationship, social stigma and personal impact.

Conclusion: Infertility affects the couples, not the individual hence the burden is on the family. The findings of the present study revealed that infertile couples have poor well- being on all the dimensions. They have negative feelings, low self-esteem, low social support. There is need of awareness generation among couples through health education activities and counseling of couples is required to decrease the stress and stigma.

Key words: Infertility, psychosocial, prevalence, consequences

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INTRODUCTION

"My infertility is a blow to my self-esteem, a violation of my privacy, an assault on my sexuality, a final exam on my ability to cope, an affront to my sense of justice, a painful reminder that nothing can be taken for granted. My infertility is a break in the continuity of life. It is above all, a wound to my body, to my psyche, to my soul."

Jorgenson.

1981, On Healing. Resolve Newsletter

Infertility is a public health problem affecting people worldwide from all the communities with various causes. It has an impact on their physical, mental and social well- being. If being a mother is synonymous with being a woman, then failure to become a mother constitutes not fully achieving the status of woman. The significance of this for women who do not have children cannot be underestimated.[1]

World Health Organisation (WHO) defines infertility as "the inability of a sexually active couple to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. The epidemiological definition (for monitoring and surveillance) put forth by WHO is women of reproductive age group (15-49years) at risk of becoming pregnant (non-pregnant, sexually active, not using any contraception and not lactating) who report trying unsuccessfully for a pregnancy for two years or more. It may be primary infertility which refers to couples who have never conceived, whereas secondary infertility refers to couples who are unable to conceive after two years of unprotected intercourse following previous pregnancy and not using any contraceptives. [2]

Infertility is a global health issue, affecting approximately 8-10% couples worldwide. It was ranked the 5th highest serious global disability among the population under the age of 60. As per WHO, in the year 2012 one in every four couples in developing

countries had been found to be affected by infertility. The estimates for India was 3.9% (age standardized to 25-49 years) and 16.8% (age standardized to 15-49 years) [3]

The prevalence of infertility in various states in the year 2010 were as follows, Karnataka (5.8%), Uttar Pradesh, Himachal Pradesh and Maharashtra (3.7%), Andhra Pradesh (5%), Kashmir (15%). The researchers found that the levels of infertility was similar in 1990 and 2010, but the age pattern was reversed and even more pronounced for secondary infertility.[3]

Infertility is important not only in context of its physical entity but as a social milieu too. It can have serious implications on psychological, physical, economic and social well -being for both spouses, but more for women as motherhood is seen as a supreme achievement for a woman and demonstrates her physical and psychological adequacy. [4]

Fertility is affected by many different cultural, environmental and socio-economic factors. It has been characterised as creating a form of chronic stress that can give rise to a variety of psychological difficulties. More recently published evidence suggest that stress itself may influence the outcome of infertility treatment.[5] Poverty, poor access to maternal health care and illegal abortions all contribute to the high prevalence of infertility. Early marriage leads to early child bearing which is associated with an increase in the incidence of complicated deliveries thereby increasing the risk of infection and subsequently infertility especially when there is poor access to good maternal services. [6]

Infertility has been the source of pain, anxiety and shame. It leaves couples unfulfilled as they are unable to realize their goals of child bearing. It is accepted as a basis for divorce and whether as a cause or effect. Often the women are blamed for the infertility and it could lead to polygamy. In some studies interviewers were told that, even if the man had married ten woman who could not conceive, people will say

that it was his destiny to marry an infertile woman without considering the fact that he could be the cause.[6]

The various psychosocial consequences affecting infertility are lowered self-esteem, decline in marital and sexual relationship, social conflict, depression, financial burden. The relationship between the woman and their in-laws is usually strained. Large number of childless women experience emotional harassment in their marital homes like ostracism from family celebrations, taunting, stigmatization, negative attitude, beating, withholding of food and health care. [7]

In developing countries the consequences due to infertility range from economic hardship to social isolation, violence and denial of proper death rites. Many families depend on children for economic survival especially in old age. [8]

Studies have shown that infertility causes tension among couples affecting their sexual and marital relationships. In addition to the pressure on infertile couple from relatives, friends and the community, they also suffer from stress from the investigations, treatment procedures and also from the frustration of treatment failure. When the cause cannot be demonstrated then specific treatment to the infertility is not possible which is very difficult for the couples to accept and it may lead to seek alternate treatment. The management of infertility places a heavy financial burden on the couples.[9]

Another emotional reaction to infertility is depression. This can even lead to less communication or more argument with their partner, function poorly on the job, have severe anxiety and agitation. The feeling of depression compounded by the loss of control over one's life that many infertile couples' experience. The inability to meet one of their most important goal is devastating to the infertile individual.[10]

An additional strain in the relationship may be the changes in the couple's sex life. Several authors have noted that infertile couples have sexual difficulties.[11] There

is strain in relationships with family and friends. They may isolate themselves from their family and friends because they consider infertility a private problem that they are uncomfortable sharing. They may also feel misunderstood when they do share their feelings. They assume and believe that no one else can understand the true intensity of their emotional pain, unfortunately they are often right.[12]

In any society being a parent is as a normal assumption of adult life.[13]The crisis of infertility makes the couple undergo a chain of emotional changes which can be harmful to them.[14] Women especially feel anxious and stressed each month when trying to conceive. Every month upon the beginning of a new menstrual cycle, a woman is reminded of yet another failure.[15] Feelings of anger, frustration, aggression often accompany diminished self- image, self –esteem.[16].

Infertile couples stop attending family celebrations, such as baby showers, religious functions, where other family members may bring their children with them. The couple may feel left out and stop associating with those who have children, friends who are pregnant may also be avoided because they are a reminder that others can get pregnant with ease when these couple are trying hard. The infertile woman's loss of relationship can deprive her of social support, which can compound feelings of isolation and depression.[12]

Another consequence of infertility is loss of physical health along with mental health. The couple may spend more time in the infertility clinic for tests and treatment. Although they are not really sick, they may begin to identify with the sick role and begin to feel that their physical health is compromised.[17]

Infertility is thus an "ice berg" phenomenon where the majority of the couples are undiagnosed and they suffer from easily treatable conditions but most of them don't seek treatment. Various socio- cultural practices like believing infertility as a

curse, seeking healing from super natural powers is still predominant in the community.

The thrust areas in the research have been on the correlates of increased fertility and various methods to regulate it and the concept of infertility is neglected. Both in South Asian regions and in developing countries infertility has been neglected as a public health problem and as a subject for social science research.[18]

Community based surveys and hospital based surveys provide information on estimates of infertility. The main challenges in estimating actual burden of infertility are the paucity of population based studies and the varying definitions used in the few high- quality studies available. Hence the present study was undertaken to know the prevalence of infertility in a socially backward area i.e., urban slum and rural area.

OBJECTIVES

- To determine and compare the prevalence of primary and secondary infertility in rural and urban field practice areas.
- To assess and compare the socio – demographic factors and psychosocial consequences associated with infertility.

REVIEW OF LITERATURE

Infertility is perceived as a problem across all cultures and societies. It varies from country to country and from cohort to cohort.[19] Socio-cultural context is an important consideration in the meaning of and responses to infertility. [20] Before 1994, infertility was a neglected issue in population and health policy debates. But during the International Conference on population and development (ICPD), called for 'Program of Action' where the goal was to achieve reproductive health for all by the year 2015. According to this the reproductive health care includes safe delivery, prevention, appropriate treatment of infertility and abortion in accordance with national laws. [21]

The eighteenth World Health assembly requested implementation of a program of reference services and studies on the health aspects of infertility. WHO Scientific group on the Biological Components of Human Reproduction also identified the need for research into the incidence and causes of conditions that impair reproductive capacity. The indicator of the infertility is the women, whether the infertility is due to failure of the women to conceive or of the man to impregnate her. Infertility in the population as a whole is referred to in terms of prevalence rates. [22]

Definition of infertility: The operational definitions are based on those drawn up by the WHO scientific group on the epidemiology of infertility. According to this two types of infertility are defined, Primary infertility is defined as the lack of conception despite cohabitation and exposure to the risk of pregnancy (in the absence of contraception) for a period of two years or more. Secondary infertility is defined as the failure to conceive following a previous pregnancy despite cohabitation and exposure to the risk of pregnancy (in the absence of contraception, breastfeeding or post-partum amenorrhea) for a period of two years or more. [2]

Prevalence of infertility

Due to lack of uniformity in existing definitions of infertility, comparing the prevalence between countries over time has become problematic. Demographers tend to define infertility as childlessness in a population of women of reproductive age, while the epidemiological definition is based on 'trying for' or 'time to' a pregnancy, generally in a population of women exposed to the risk of conception. There is considerable variation in terms of the duration of 'trying for pregnancy', the age of the women sampled and their marital or cohabitation status. This leads to inconsistencies in determining the numerator and denominator used to calculate the prevalence of infertility. [23]

Global scenario:

Worldwide more than 70 million couples suffer from infertility, the majority being residents of developing countries. Negative consequences of childlessness are being experienced to a greater degree in developing countries when compared to western societies. [24]

A report compiled by WHO from Asia and Latin- America indicated that the prevalence of infertility in these regions fell within the globally expected range of 8-12% which was thus lower when compared to African Countries. [18] As reported by Larsen *et al.*, prevalence of infertility in Sub Saharan Africa ranged from 10% (Togo) to 25% (Cameroon and Central Africa Republic) in women aged 20-44 years. [25] Rustein and Shah reported prevalence of infertility was 3.3% in Mozambique and 13% in Kenya in women aged 25-49 years. [25]

Philippoy OS reported that the prevalence of infertility in Western Siberia was 3.8%.[26] Abbas A *et al.*, showed the prevalence of primary infertility in Yazd province of Iran to be 3.9%.[27] A population based study conducted by Oakley L *et al.*, in UK reported the prevalence of infertility to be 2.4%.[28]

Boivin *et al.,* in the year 2007 showed that the 12 month prevalence rate ranged from 6.9% to 9.3% in less developed countries. Substantial geographical differences in the prevalence were noted and these differences were largely explained by the different environmental, cultural and socio-economic influences. [29]

A cross sectional population based survey of 443 women aged 30-49 years residing in Huelva, Southern Spain, conducted by Cabrera Leon A *et al.,* showed the prevalence of primary and secondary infertility to be 6.1% and 11.3% respectively. [30]

Indian Scenario:

Infertility is rising at a rapid rate; nearly 30 million couples in the country suffer from it making the incidence rate to be 10%. Considering the current population statistics of India this would extrapolate to a humungous burden to the society. [31]

As reported in the 1981 census of India infertility prevalence ranged from 4-6% [32] and according to the WHO estimates the overall prevalence of primary infertility in India varied between 3.9 to 16.8% and secondary infertility around 8%.[25] NFHS 3, (2008) survey showed approximately 4% of the Indian women were infertile of which about 1.8% live in rural India and most of the women belonged to a lower socio-economic status. [18]

According to DLHS survey Karnataka, women who had primary and secondary infertility constituted 5.9% and 1.7 % respectively of ever married women between 15-49 years. Infertility in rural area was 6.1% as compared to urban area which was 5.5%.[33]

In a study conducted by Mittal *et al.,* at Ambala, Haryana the prevalence of primary infertility was 6.1% and secondary infertility was 5.7% in the urban field practice area of a tertiary care hospital.[34]

Singh AJ *et al.,* reported that out of the 4453 eligible couples the prevalence of infertility was 2.9% and among the infertile couples the percentage of primary infertility was 46.5% and secondary infertility was 53.5%.[35]

Shivaraya and Halemani 2007 in their study found the rate of childlessness in India was around 2.5%. For the women in the age group 30-49 years it was around 5.5% and 5% for the women in the age group 45-49 years i.e., 4.9 million and when combined with secondary infertility it was around 17.9 million. [36]

A study conducted in Delhi showed one in 6 couples in the metros have trouble in conceiving on their own and they require infertility treatment. [37] Cates *et al.*,reported that the prevalence of primary and secondary infertility rates from the multi-centric WHO study one each at Mumbai, Chandigarh and Delhi showed the prevalence as 3% and 8% respectively. [38]

Shamila S *et al.,* in their study the prevalence of infertility in Kanyakumari was 43.8%, 47.95% in Tirunevelli and 36.3% in Tiruvanantapuram. The prevalence of primary infertility is more when compared to secondary infertility. [39]

NFHS 1992, reported the levels of childlessness in Haryana and Assam to be 1.4% and in Andhra Pradesh it was 4.4%.[40]As reported by Mulgaonkar the prevalence of infertility in the slums of Mumbai was found to be 4.5%.[41]

Urban Rural differences in prevalence of infertility:

Chhabra S et *al.,* in Maharashtra, reported that among 1000 infertile study participants 53% were from rural area and 47% were from urban area. [42]

A study conducted by Amiri M *et al.,* in Iran reported the prevalence of infertility was more in rural areas which was 5.8% and in urban areas it was 4.2%. The results showed significant association between fertility status and encouraging divorce and remarriage. [43]

According to DLHS 2008 Karnataka, prevalence of infertility in rural area was 7.7% (primary infertility 6.1% and secondary infertility was 1.6%) and in urban areas it was 7.3%(primary infertility was 5.5% and secondary infertility was 1.8%). The prevalence in various districts were as follows, Vijayapur 4.8%, Bagalkot 11.2%, Belgaum 7.7%, Gulbarga 5.9%, Bidar 3.5% and in Raichur 10.6%.[33]

Levels of general marital childlessness were apparently higher in rural India (13, 18 and 16% in 1981, 1991 and 2001 respectively) as compared to urban India (11, 15 and 16% in 1981, 1991 and 2001 respectively). [44] In a study conducted at Kanyakumari the prevalence of infertility was more in urban areas when compared to rural areas.[39]

Psychosocial consequences of infertility:

In any society where child bearing defines a woman's identity and motherhood of great social significance infertility leaves unhealed scars traumatizing the couple socially and emotionally. The population in developing and under-developed countries hold different attitudes regarding infertility. In such countries it may be linked to an act of God, punishment for sins of the past, prolonged use of contraceptives, distinct dietary habits and the result of witchcraft, whereas in developed countries people view it as a result of exposure to various biological and other related factors. [31]

Psychosocial consequences: International studies:

The available literature demonstrates that it is the women who bear major burden of infertility. [45] This burden may include blame for reproductive failing, emotional distress resulting in anxiety, depression, frustration, grief, and fear, [46] marital stress leading to abandonment, divorce, or polygamy; stigmatization and community ostracism; and in many cases bodily taxing, even life threatening forms of

medical intervention. In most of the developing countries, an infertile women's suffering is exacerbated by strong pronatalist norms mandating motherhood. [47]

The prestige and status of women within family often is related directly to their fertility and hence childlessness can sometimes lead to loss of status. [48] Besides the strain of the personal failure, sometimes a tragedy, the infertile couple is often exposed to a variety of family and social pressures. [49] Children are considered as a necessity for care and maintenance in old ages. Even in the developed countries where social support system is very strong, children are expected to provide much of the care for the aging parents. [50]

A number of studies have found that the incidence of depression in infertile couples presenting for infertility treatment is significantly higher than in fertile controls, with prevalence estimates of major depression in the range of 15% -54%.[51-54] Anxiety has also been shown to be significantly higher in infertile couples when compared to the general population, with 8%-28% of infertile couples reporting clinically significant anxiety. [54,55]

In a study by Monga M *et al.*, 83% of the couples were feeling societal pressure to conceive. The marital adjustment test scores for the infertile women were significantly lower than the scores of the controls (p=0.001), while no difference was noted in men. A trend towards lower quality of life scores was noted in women (p=0.09) but not in the infertile men. They had lower total international index of erectile function scores (p=0.05) and intercourse satisfaction scores (p=0.03).[9]

A descriptive case series of 400 women with secondary infertility attending tertiary care hospitals in Karachi, Pakistan reported that around 68% of the women had marital dissonance due to their infertility. The respondents had been threatened for divorce (20%), husbands remarrying (38%) or to be returned to their parents' home (26%) by their in laws or husbands. The women reported that they were being

physically abused and 60% of the women facing verbal abuse suffered severe mental stress.[4]

Sultan S *et al.*, their study supported that depression, anxiety, aggression, was more among infertile couples when compared to fertile couple. The prediction that infertile couple will be more likely to report lower level of self-esteem, marital satisfaction, and sexual satisfaction than fertile couple has also been supported by the findings of the study. The mean scores of index of self -esteem among infertile couple was 38.2 when compared to fertile couple which was 31.2. The mean scores for index of marital satisfaction in infertile couple was 30.5 when compared to fertile couple which was 22. The mean scores for index of sexual satisfaction in infertile couple was 29.2 and for fertile couple was 24.2. The difference with respect to aggression scores for infertile and fertile couples was 69 and 62 respectively. Similarly for the Beck's depression scores for infertile couple and fertile couple was 17.5 and 11 respectively.[56]

The findings from the study by Coryell *et al.*, showed that among infertile couples, who never suffered from any psychopathology within a period of four years, 12% of the sample had an onset of major depressive episodes. It is apparent from the study that depression is not necessarily part of the past history of infertile couples but it is the result of infertility. The results demonstrated that infertile males had lower self-esteem, lower sexual and personal quality of life compared with the male partners of couples without infertility. Women who did not experience a pregnancy loss or other fertility barriers had significantly higher life satisfaction and significantly lower levels of depression than women who had experienced a loss or had not conceived.[57] Infertility has an impact on interpersonal, personal, social, religious expectations hence it can bring a sense of failure, loss and exclusion. It may affect the marital relationship; partners may blame each other as being defective or unwilling. These

couples may be excluded from important family functions and events like birthdays, weddings, christenings it is like both due to social and personal feelings. [25]

Infertility is stressful and it increases due to societal pressures, various visits to hospitals, diagnosis, treatment failures, and financial burden. It is a vicious cycle where infertility causes stress and stress may be one of the many reasons for infertility. According to WHO standards for sperm concentration, motility and morphology, males who had experienced more than two stressful life events before undergoing infertility treatment were more likely to be below WHO standards. [58]

L Lechner et *al.*, reported 4% prevalence of infertility and these women experienced more health complaints, more anxiety and depression symptoms and increased grief when compared to general population. Mean scores for health complaints was 6.2 among women and 2.5 among men, mean anxiety scores was 7.9 (women) and 4.4 (men), mean depression scores was 6 for women and 3.6 for men and mean grief scores was 46.4 for women and among men it was 25.4.[59]

Hakim A *et al.*, reported the prevalence of infertility in Pakistan was around 22%, where the primary infertility constitutes 4% and secondary infertility 22%. The various psycho social consequences of secondary infertility revealed that around 68% of women had marital conflicts, 20% of them were threatened with divorce , 38% of the husbands were remarried, 26% of them were forced to return to their parents' house by their in-laws or husbands. Many women were being physically and verbally abused by their husbands and in-laws leading to severe mental stress. [60]

Sami *et al.*, reported that 69% of secondary infertility women were blamed by their in-laws, followed by husbands (38%). One third of the women were blamed to be unlucky to the husbands and to the entire family. It affects the self-esteem of the women. [4]

Zubia Mumtaz *et al*., reported that more than 65% of the women said that joint family residence added to the burden and sufferings of infertility, creating hurdles in development of a relationship between the couple and a lack of privacy and ability to make decisions regarding treatment options or adoption. Around 75% of them reported that their marital bond is weakened due to infertility. They also reported that they were not welcomed in special occasions like celebrations of the birth of the baby, wedding and some don't let their children near them. The infertile male reported that, their partners said them whatever they face as a societal stigmatization but men did not face any stigma in the society. Around 56% of the men had re marriage, even then if the couple did not have children more than 30% of them did not undergo semen analysis. [61]

As reported by Sumera Ali *et al.*, in their study, majority of the women i.e., around 91% told that female infertility is not the ground for divorce and 59% considered that male infertility is a ground for divorce. Around 57% of the participants told that female infertility is a valid reason for the husbands to get remarried. The majority of the men (70%) had the attitude of remarrying. On inquiring who they thought was being blamed for infertility in the society, most of the respondents answered it was usually the woman (86%).[62]

Infertile women expressed less satisfaction (mean scores 32.5) on the measures of marital, sexual satisfaction than their husbands (mean scores 29.19) which was statistically significant and infertility distress was more among women (mean scores 2.52) than men (mean scores 2.1) even when the cause of infertility is due to male factor and it was statistically significant. The mean scores for self- esteem was 2.5 for women and for men 2, the scores for guilt or blame was 2.8 for women and men (1.9) which was statistically significant. The scores were higher for women even when it was female factor infertility, both male and female factor infertility and

only male factor infertility was diagnosed as reported by Lee TY *et al.,* in a study which was conducted at Tiwan.[63]

Bell *et al.,* researched on the impact of infertility on various psychosocial variables. They found that infertile couple were more prone to sexual dysfunction, emotional disturbance, impaired social adjustment and decline in their marital relationship. Among the 179 female infertile participants 61% of them reported that it was their mutual decision to seek treatment, 36% reported that it was their own decision and 3% of them reported that it was their partners decision. The scores on marital satisfaction prior to, through and after infertility treatment indicated that infertility was associated with decreased marital satisfaction.[64]

As reported by Greil *et al.,* majority of the infertile couple responded that they do not regularly interact with their partner regarding their infertility status. Around 86% of the women experienced it as a catastrophic role failure, while 14% of the men tend to see infertility as a distressing event but not as a disaster. Most of the couples considered that infertility problem is of their wives only and many of them strongly believed it as a reason for their conflict. The wives reported that most of the time they read about infertility persistently, and were often willing to do whatever it would take to shed the label of infertility off them. [46]

The study on the infertile women's scores on measure of depression, anxiety and hostility were considerably higher than the scores among a large normative sample as described by J Wright.[64] J Downey and M McKinney in a study, which compared infertile and fertile women, who were undergoing usual gynaecological care it was found that 11% of the total infertile women met the criteria for an existing major depressive episode as compared with 3.9% for the fertile women. [64]

Abbey *et al.,* conducted a research to examine the effects of stress connected with infertility on couples' perceived quality of life. Three factors were examined in

this research; self-esteem, internal control and interpersonal conflict. The stress linked with infertility was anticipated to have a direct depressing effect on husband's and wife's quality of life. For both fertility problem was significantly stressful and was negatively linked with perceived internal control, self-esteem, quality of life and it was positively and considerably associated with interpersonal inconsistency. [45]

Berg B *et al.,* used a sample of 104 infertile couples to study the patterns of distress in the couples. Couples were separated to find out which partner suffers more distress which showed 22% of the women and 18% of the men were distressed. [64]

Papreen *et al.,* in 2000 explored the perceived causes of infertility, treatment seeking pattern and the penalty of being childless, mainly for women, amongst Muslim population in urban slums of Dhaka, Bangladesh. In detail interviews were conducted among 60 males and 60 females. Both the groups perceived that infertility was caused due to evil spirits and physiological deficiencies in women, whereas the causes of infertility among male population was considered as physiological and psychosexual problems. Herbal medicines and traditional healers were the main option of treatment for females while for males, remarriage was considered to be the remedy. Childlessness has emotional effects, social consequence, role failure for both males and females and especially women often suffer more due to stigmatization.[65]

Fido *et al.,* 2004 examined the psychological distress amongst the Kuwaiti women with infertility problems and they also explored the causes of infertility. Hospital anxiety and depression scale was used to inspect the psychological conditions of 120 infertile women and 125 healthy pregnant women. The results showed that the infertile women had higher scores on hostility, anxiety, self-blame, tension and suicidal ideation parameters.[66]

A cross sectional study was conducted among 1406 couples who were consecutively referred patients undergoing fertility treatments in Denmark in the year

2000, were severe depressive symptoms was reported among 12% of the women and 4% of the men. There was no significant interaction for gender indicating that men and women did not differ in how severe depressive symptoms were associated with infertility distress. [67]

Psychosocial consequences – Indian studies:

Infertility has much stronger negative consequences in developing countries compared to those in Western societies. It has extreme social and psychological consequences. They suffer from physical, mental abuse, neglect, abandonment, economic deprivation, social ostracism, remaining absent from social activities and traditional ceremonies. [68]

A descriptive study was conducted among 500 infertile couple among whom 27.8% couples developed marital disharmony, 23% of them reported sexual conflict , shock in women was 29% and in men it was 27.2%, depression in women was 32% and in men it was 23%, social isolation in 13% of the women and 8% of the men, threat of divorce was among 8% of the women. Around 5% of them had sympathy towards spouses, sense of guilt, self- blame was among 29% of males and 31% of females and 11% of them had suicidal tendencies. [69]

India is characterized by pronatalist norms and social values that favour higher fertility. Females in India are almost universally married and married early. Newly married girls in India are often given blessing by elders to beget large families, hence childless or lack of male child invites prejudice and ill will. Along with lack of industrialization, low educational standard, limited mass communication, cultural factors such as universal and early marriage and childlessness as a social disgrace are important factors affecting population explosion in India.[44]

A study conducted by Dhaliwal LK *et al.,* among 120 infertile couple (30 each among unexplained infertility, anovulation, tubal factor and male factor groups) and 30 fertile couple as controls were evaluated for psychological assessment. Anxiety was significantly greater among the partner with infertility. Psychological components were found to play significant role in infertility of unknown aetiology especially among men.[70]

Geentanjali R *et al.,* in their study at Prakasham district of Andra Pradesh, to assess the marital relationship in the context of infertility showed more guiltiness and anger among the men when compared to women. Many couples' felt tremendous guilt and shame and most of them blamed their wives for their condition. Domestic violence was also more among infertile women. [71]

In a study done at West Bengal India, by Nirmalya Manna *et al.,* prevalence of primary infertility was 2% and 0.11% had secondary infertility. Among the infertile subjects 72% of males and 88% of females had ever visited any health care facility and only 60% of the women were accompanied by their partners. Around 96% of the women and 76% of the men discussed their infertility problems with their relatives & friends. [72]

A study conducted at Pondicherry showed that emotional intelligence, gender, and infertility are significant influencers and predictors of marital satisfaction as t he t values are significant at 5 and 1 respectively. Marital dissatisfaction was more among infertile couple and it was even more among women, when compared to men. [73]

Psychological violence

Zubia Mumtaz *et al.,* reported that infertility was a highly stigmatized condition to women when compared to men. Majority of the women reported verbal,

emotional and physical abuse from their husbands. They tend to be more abusive in cases of female factor infertility and also even more for male factor infertility . A common form of emotional abuse was that the wife was expected to arrange her husband's remarriage. [61]

A cross sectional descriptive study was conducted by Zohre Sheikhan *et al.*, were 400 women with the average age of 30.50 ± 6.16 years participated in the study; of whom, 35% experienced domestic violence among which physical violence (5.3%), emotional violence (74.3%) and sexual violence (47.3%). Domestic violence was significantly associated with unwanted marriage, number of IVFs, drug abuse, emotional status of the women, smoking and addiction or drug abuse of the spouse, mental and physical diseases of the husband ($p< 0.05$). [74]

Pasi AL *et al.,* reported that out of the 33,632 married women of age 15-49 years, 2993(8.3%) were infertile. A significant association between infertility and gender based violence was noted. Out of 2023 infertile women, 78% had experienced physical or sexual violence and among 21,699 women who had children only 6.1% had experienced violence. [7]

As reported by Usha Ram, 5% of childless women aged 15-29 years were divorced/separated/deserted compared to less than 3% among those with children and among 30-49 years old, over 29% of infertile women were divorced/separated/deserted as against about 8% among those with children. Domestic violence perpetrated by their husbands and /or in-laws was over 23% among women who were infertile when compared to women (21%) who had children. [44]

A study on gynaecological morbidities in the slums of Baroda has observed in focus group discussions and case studies that emotional harassment was experienced by majority of the infertile women. [75]

Socio cultural practices:

Molock has showed that different cultures have the following three ways to deal with infertility: i. some accept social solutions, such as divorce, polygamy and the adoption, ii. many use medical techniques and medical plants, while in some cultures, resorting to spiritual people and pilgrimage places are chosen.[76]

Sudha G *et al.,* reported in their study that many couples resorted to magico-religious practices like invocation to god (30%), wearing stones, threads ”Taviz”(17%), performing tantric rites (Pujas) (14%) and prophecy of astrologers in 18.8% .They also found that 16% of couples had marital disharmony as a result of infertility. 22.80 % of males and 31.80% of females with infertility had depression.[69]

Couples seek varied traditional methods and religious practices, including visits to temples, abstaining from visiting a place where a woman has delivered a child, observing tantric rites, wearing charms, participating in rituals and visiting astrologers as reported by Desai S *et al.,*[77]

Treatment seeking pattern

After getting married some couples wait for years, others seek assistance within months. Many times it is only women, who seek advice, as there is family pressure. There is ignorance about causes of infertility. Advice seeking is not limited to regular health systems, they go through various treatment seeking modes to avoid the adverse consequences of childlessness, use varied traditional methods and religious practices, including visits to temple, abstaining from visiting a place where a woman has delivered a child, observing tantric rites, wearing charms, participating in rituals and visiting astrologers.[42]

All infertile couples do not seek treatment. An estimated 51% of the couples with primary infertility and 22% with secondary infertility seek treatment. Among

those seeking treatment, 85 to 90% are treated with conventional medical and surgical therapy as reported by Chabbra S *et al.,*[42]

Findings from DLHS survey on infertility and treatment seeking pattern in India, showed that a very high proportion of women (83%) sought treatment for infertility from any source of medicine and among them majority sought allopathic treatment where majority have availed it from private sector, as treatment was not available in most of the government sectors in India. [40]

More recent studies have identified allopathic as the first treatment option. Couples also follow religious practices with such treatment, either simultaneously or subsequently. Either before or when it does not work, they seek other methods, such as Ayurveda, homeopathy, unani and other traditional methods, or visit holy places and spiritual healers. While assisted reproductive technology centres are the first ones to be visited by some, others seek assistance from religious people or quacks. [42]

In a study conducted at rural areas of Bangalore, 60% of the men and 72% of the women had sought treatment for infertility. Allopath was the most preferred treatment among the couples followed by traditional healers. 55% of the males and 68% of the females had extensive infertility investigations .Most common reason for not approaching the health care facility was economic hardship in couples' with primary infertility and among secondary infertility cases majority waited for spontaneous conception. [78]

Mulgaonkar *et al.,* reported that when allopathic treatment does not work, women seek other methods as a last resort such as Ayurveda, homeopathy, unani and other traditional methods, or visit holy places and spiritual healers. Most couples' sought treatment after trying to conceive for one to four years. [41]

Mallika A *et al.,* in their study reported that high costs sometimes results in discontinuation of treatment or resort to unqualified practitioners. Traditional beliefs

about women being possessed by evil spirits also inhibit women from seeking appropriate treatment. The public health system does not offer access to adequate preventive, curative and counselling services. Though infertility treatment is theoretically available at government facilities, effective treatment is often difficult to access as there is little coordination between gynaecologists, infertility specialists, surgeons and laboratory technicians. Services are available in the private sector but are of varying quality and costs. [79]

Infertility diagnosis and treatment services are very scarce in Andhra Pradesh. It was found that one quarter of childless couples had not sought any treatment for their infertility. The majority of the couples' were illiterate and had a low standard of living. Many of them lack knowledge about the opportunities for diagnosis and treatment of infertility. [40]

Niharika Tripathi reported in her study regarding the treatment seeking behaviour among women with infertility. In rural area it was 80% and in urban area it was around 87%. Overall, 82% of women with primary infertility sought treatment and 65% of them consulted allopathic doctors. Among those women with secondary infertility, 75% went for treatment and among them 64% went for allopathic treatment. More women in urban areas, those who have more years of schooling, those women who belonged to better off families, those having 5-14 years of marital duration and those whose age at consummation of marriage was more than 18 years had sought treatment than their counterparts. Majority of women in the age group 25-39 years sought treatment more when compared to other age group. Some of the women also sought treatment from traditional healers/ religious or faith healing, mostly from rural areas. [80]

Zubia Mumtaz *et al.*, In this study they reported that almost all male participants underwent investigation after 5 years of infertility but the female partners

underwent investigation very early some even reported that it was as early as 3 months after marriage. [61]

A study reported by Sumera Ali *et al.*, the mode of treatment preferred was from hakeems, faith healers among 75% of the participants as more than 30% of them believed that their infertility status is due to supernatural powers of evil spirit and 40% of them believed that black magic is the cause for which they strongly believed that seeking treatment won't help them.[40]

According to a study conducted in Ranga Reddy district of Andhra Pradesh, a large majority sought allopathic treatment first, and tried other sorts like prayer, rituals and traditional treatments when it did not work or cost too much. For a minority of women, there was a risk of divorce and husbands marrying a second wife to have children. Two-thirds of the women experienced violence from their husbands, 13 % thought this was partly due to their childlessness. [40]

Kriti Mishra at Gorakhpur in her research with the objective to know the married women's views on reproduction and childlessness where majority of them reported that having a baby was very crucial for personal and family obligations and it was imperfect families without kids. Around 46 % of the women responded that children play significant role in making excellent attachment between spouses. In urban areas women said children not only make the relations between husband and wife more passionate but also prevent them to be bored by each other. Major proportion believed that to have children is a respectable position in society and at in laws house, they avoid social functions because people avoid them, many answered that it was the unique feeling for their womanhood. Several participants expressed that for performing funeral, cremation, and death related rituals especially a son is imperative. [81]

A comparative study was conducted to analyse the relationship among infertile couples' regarding infertility and psychosexual disorders in selected hospitals of Shahdara, Delhi. They collected data from 175 subjects and the study results showed that amongst the males, premature ejaculations (66%) was the most common problem followed by erectile dysfunction (15%), decreased libido (11%) and orgasmic failure 8%. Amongst females dyspareunia (58%), decreased libido (28%) and organismic failure (14%) were the most common problems. [82]

A community based study was conducted at rural areas of Bangalore, by Shilpa *et al.,* the prevalence of infertility was 8%. Females had high level of psychological distress(56%) when compared to males. Predominant psychosocial factors among males with primary infertility were financial loss /problems in 17%, lowered life satisfaction in 15%, reduced job performance in 13%, loss of social status in 10%, social isolation in 9.7% and marital distress in 9.7%. Predominant psychosocial factors among females with primary infertility were lowered life satisfaction in 58%, loss of social status in 48%, social isolation in 48%, 44% complained of financial problems, 47% had marital distress and 45% had reduced job performance. Among males with secondary infertility 12% had financial problems and 6% had marital distress. Among females with secondary infertility 20% had lowered life satisfaction, 18% had reduced job performance, 14% complained of financial problems, 12% had loss of social status and 14% had marital distress.[78]

Considering the magnitude of infertility and its consequences on couples' life, the feeling of disbelief and denial, feeling of frustration, anger and anxiety, there seems to be a huge unmet demand for appropriate management of these problems. Childlessness causes couples to perceive a sense of loss in relationship, in health status, prestige, self-esteem, self-confidence, security and perceived loss of something of symbolic value.[39] In addition to the above-mentioned problems, family and social

problems such as in marital relations and conflicts such as second marriage, separation and divorce were of important problems, which make the psychological counselling services very important. [83]

A systematic review of quantitative studies to assess marital relationship in infertility which included 18 studies showed that male factor infertility did not have a negative marital impact, while infertile women showed significantly less marital satisfaction compared to fertile women which was associated with their socio demographic factors & treatment experience. Other factors such as sexual satisfaction, age, educational status were significantly associated with the quality of marital relationship.[84]

A study conducted at Nagnur, Karimnagar, Andra Pradesh reported that infertile women in the sample approached more than 1 type of practitioners first followed by reference to the specialist centres(88%) and some directly approached specialist centres(12%). All the infertile women had at one time practiced faith healing and home remedies. The FertQOL scores showed a mean of 17.3, 16.1, 15.9 and 16.5 on the domains of emotional, mind body, relational and social dimensions with a narrow confidence interval of 0.8, 1.04, 1.1 and 1 respectively, implying a congruence of impairment of QOL uniformly among the sample of infertile women. Marital adjustment scores were impacted more in the infertile group with means scores on the domains of cohesion, consensus and satisfaction being 2.6, 12 and 11.89 and in the controls being 4.43, 12.35 and 14.68 respectively. A binomial logistic regression analysis performed on the scores revealed a Nagelkerke R score of 0.725 and a Cohen's D of 0.86, close to one, suggesting a strong effect size of infertility on marital adjustment.[85]

MATERIAL AND METHODS

Study place: The present study was conducted at Rural Health Training Centre and Urban Health Training Centre, which are the field practice areas of Department of Community Medicine of Shri B.M.Patil Medical College, Hospital and Research Centre. Vijayapur.

Study population: Eligible couple where women is in the reproductive age group 15-49 years.

Study design: Cross sectional study

Study technique: Interview technique

Study Period: April 2015 – March 2016

Sample size: Complete enumeration of all the houses covered under RHTC and UHTC was done to list all the eligible couples residing in the area those women at risk of pregnancy were identified so as to find out couples' with either primary or secondary infertility. Couples without infertility were considered for the denominator to calculate the prevalence of infertility.

Inclusion criteria:

1. All Couples where wife is in the reproductive age group between 15-49 years and at risk of pregnancy (sexually active, not using any contraception, not pregnant or not lactating).
2. Couples who are residents of the locality(minimum duration of 6 months)

Exclusion criteria:

1. Those who are seriously ill
2. Couples who are not co-operative and not willing to participate in the study.

Methodology:

After obtaining ethical clearance from the Institutional Ethical Committee the study was conducted in rural and urban field practice area of Shri B. M. Patil Medical College, Hospital and Research centre. Medico social workers of RHTC and UHTC, Anganwadi workers and ASHA workers were involved in the study. Objectives were explained to them.

The purpose and overview of the study was explained at the time of the interview, and interviewers were informed that their participation was entirely voluntary, their anonymity would be assured, they could withdraw from the study at any time and the information that they will be providing would be used solely for the purpose of the study. Confidentiality about data and findings were assured to the participants and their consent was taken.

A total of 1800 houses were accessed in rural field practice area catering a population of 12000 and 1200 houses were accessed in the urban field practice area catering a population of 10000. House to house survey was done covering all the participants coming under the field practice area so as to completely enumerate the eligible couples. Among them, women who were exposed to the risk of pregnancy were considered (as denominator to calculate the prevalence) and couples' with inability to conceive despite cohabitation and exposure to the risk of pregnancy (in the absence of contraception) for two years or more (as per WHO Epidemiological definition) were included and considered to have primary infertility and those with inability to conceive despite cohabitation and exposure to risk of pregnancy (in the absence of contraception, post-partum amenorrhoea) following previous pregnancy for a period of two years or more were considered to have secondary infertility.[2]

Prevalence of infertility in women is defined as the percentage of women of reproductive age (15-49 years) **at risk of becoming pregnant** (not pregnant, sexually

active, not using contraception & not lactating) who report trying for a pregnancy for two years or more.

Prevalence of Infertility [86] =

$$\frac{\text{Number of women of reproductive age (15- 49) at risk of becoming pregnant Who report trying unsuccessfully for a pregnancy for two years or more}}{\text{Total number of women of reproductive age } \textbf{at risk of becoming pregnant}} \times 100$$

These couples were included in the study after they fulfilled inclusion criteria. Data regarding socio-demographic, psycho social factors were collected. Data regarding medical conditions associated with infertility were also collected which were based on the investigation reports that were available with the couples at the time of survey. The questionnaire was pilot tested among 10 couples each in rural and urban field practice areas to check the feasibility who were then included in the main study.

Evaluation of psychosocial factors:

Study tool: A validated "Fertility Problem Inventory scale" [87] was used to assess the psychosocial consequences of the infertile study subjects after pretesting.

It assessed 4 impact areas like personal impact, sexual impact, marital impact and social impact. The original validated English version was translated into local language Kannada by language experts.

Scoring procedures:

The personal impact scale used 5 questions and assessed feelings of lack of control, missing something in life, inability to meet life goals, or feeling defective. The responses were scored from never (0) to very often (10) during the past four weeks with higher scores representing higher impact. Total scores determined by sum of 5 questions divided by 50 and multiplied by 100.

The sexual impact scale used 5 questions and assessed satisfaction with the partner, feeling that not attracted towards the partner, failed at sex, always thinking about having a child, feeling whether they are different from others because of infertility problem. Responses were made on a five point scale from very negative effect (0) to very positive effect(4) and the total score was determined by the sum of all questions divided by 20 and multiplied by 100.

The marital Impact scale used 7 questions about quality time spending with the partner, frequency of disagreement, satisfaction with the partner, stability of the relationship, closeness towards the partner. Responses were made on a 5- point scale, from very negative effect to very positive effect and the total score was determined by the sum of all questions divided by 28(total score) multiplied by 100.

The social impact scale used 25 questions on family members, friends, relatives, people working together, neighbours asking about the infertility status, giving unwanted advice, not understanding the depth of their problems, insensitive comments. Questions also included how often they have avoided social gatherings, holidays, being around family and friends due to infertility problems.

Measurement of height [88]

For the measurement of height, study subjects were made to remove the footwear and stand with heels together and toes apart and head positioned so that the line of vision was perpendicular to the body (Frankfurt line) against the wall. The arms were hung freely by the sides, with the head, back, buttock and heels in contact with the wall. A wooden scale was brought down to the topmost point on the head and marking was made on the wall. Measurement was taken using measuring tape in centimetres (cm). Height was recorded to nearest 0.5 cm.

Measurement of weight [88]

The weight was measured in kilograms (kg) using standardized bathroom weighing machine with the study subject standing erect on centre of platform, with the body weight evenly distributed between both the feet together and toes apart without footwear with accepted clothing and looking straight ahead. The weight was recorded to nearest 0.5 kg.

Body Mass Index (BMI) [88]

In this study, BMI classification proposed by the WHO Western Pacific Regional Office in collaboration with IOTF (International Obesity Task Force) steering committee (2000) for Asian people was used. It is also called as Quetlet Index and was used to assess obesity and is computed by

BMI=Weight (in kg) / Height (in metre) ^{2} [88]

It is classified as BMI <18.5 (Under -weight), 18.5-22.9 (Normal), 23.0-24.9(At risk obesity), 25.0-29.9 (Obese I) and > 30 (Obese II).

Statistical analysis:

The data was compiled in Microsoft Excel-2010 work sheet and analysed using Statistical Package for Social Sciences (SPSS) version 16.0 software.

The data was presented in the form of tables and graphs wherever necessary. All characteristics were summarized descriptively. For continuous variables, the summary statistics of N, mean, standard deviation about the arithmetic mean (SD) were used. For categorical data, the number and percentage were used in the data summarized.

Chi-square test was applied to know the association between the categorical variable. 't' test was used to test the statistical difference between the mean scores. Linear regression analysis was done to know the relationship between the dependent variable with selected predictors.

Study variables

- Age : Age was recorded in completed years as revealed by the subjects
- Type of family:[89]
  - Nuclear family: It consists of a married couple and their children while they are still regarded as dependents.
  - Joint family: It consists of number of married couple and their children live together in the same household. All men are related by blood and women of household are their wives, unmarried sisters and their family kinsmen.
  - Three Generation family: It is a family where representatives of three generation are living together. Young married couple continue to stay with their parents and have their own children as well.
- Education : [89]
  - Illiterate : Not able to read, write and understand in any language
  - Primary school: Studied up to 7^{th} standard
  - High school: Studied up to 8^{th} standard to SSLC
  - PUC/Diploma : Studied up to PUC or any diploma
  - Graduate and above: Studied up to graduation and above
- Occupation : [89]
  - Unemployed : people who are not employed
  - Unskilled : Watchman, Peon, Domestic servant etc
  - Semi-skilled : Factory, workshop, labourer, shopkeeper etc
  - Skilled : Clerk, typist, Station master, Salesman etc
  - Professional: Engineers, teachers, doctors, managers etc.

- Socio-Economic status: [90]
  - Self- reported per capita monthly income was recorded. Modified BG Prasad's classification was used to assess the social class of the study subjects.
  - Correction factor = $\frac{\text{Current Index value}}{\text{Base Index value (100)}}$

    = 261 /100 = 2.61
  - Multiplication factor = Correction factor X 4.63 X 4.93
    - = 2.61 X 4.63 X 4.93
    - = 59.57
  - This MF obtained is multiplied with the income limits of B G Prasad's classification 1961. Socio-economic classes obtained were as follows:

Socio-economic class	**B.G.Prasad's classification(1961)**	**Modified B G Prasad classification(June2015)**
Upper	Rs 100 & above X MF	5958 & above
Upper middle	Rs 99- 50 X MF	2979-5957
Lower middle	Rs 49-30 X MF	1787-2978
Upper lower	Rs 29-15 X MF	894-1786
Lower	Rs <15 X MF	Below 894

- Habits :
  - Tobacco consumption: Yes/No
  - Yes: Person who at the time of the data collection smokes/uses tobacco in any form either daily or occasionally for the past one year. (Smoke form – cigarettes, bidis etc. Smokeless form – plug, loose leaf, chemo, tambak, gutkha etc)

- No: Person who at the time of the data collection does not smoke or use tobacco in any form either daily or occasionally for the past one year.

❖ Alcohol consumption: Yes/No

- Yes: Person who at the time of the data collection drink of any alcohol daily or occasionally for the past one year.
- No: Person who at the time of the data collection does not drink of any alcohol daily or occasionally for the past one year.

❖ Irregular menstrual cycles[91]

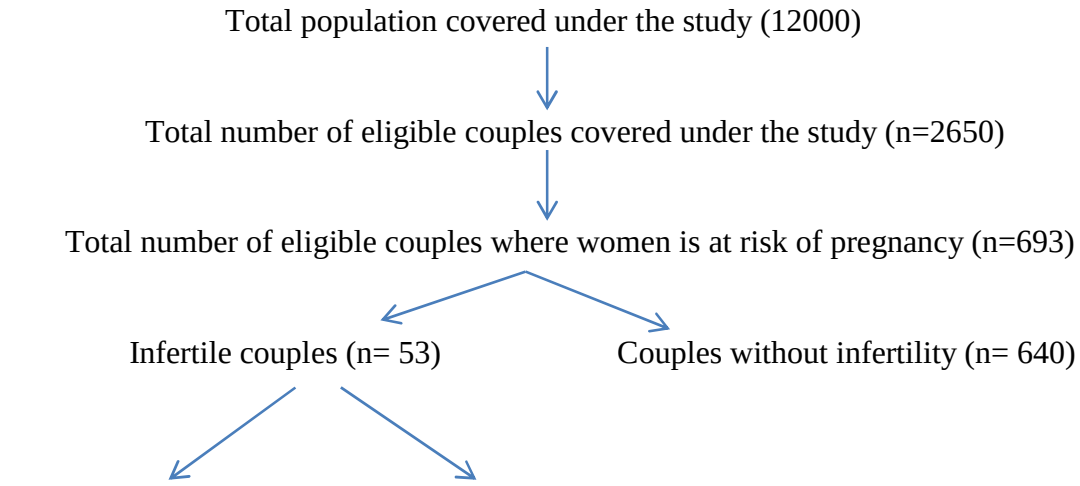
- Oligo-menorrhoea: It denotes infrequent, irregularly timed episodes of bleeding usually occurring at intervals of more than 35 days.
- Poly-menorrhoea: It denotes frequent episodes of menstruation, usually occurring at intervals of 21 days or less.

❖ Psychological violence/abuse: Is a form of abuse characterized by a person subjecting, or exposing another person to behaviour that may result in psychological trauma, including anxiety, depression. It may include insulting the person, threatening the person to take away something that is important to them, ignoring, isolating the person or excluding them from meaningful events or activities.

RESULTS

A community based cross sectional study was conducted in the RHTC & UHTC. A total of 1800 houses were covered in RHTC catering a population of 12000 & 1200 houses were covered at UHTC catering a population of 10000.

Prevalence of Infertility in Rural area:



Prevalence of primary infertility =

Number of women of reproductive age (15- 49) at risk of becoming pregnant Who report trying unsuccessfully for a pregnancy for two years or more

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Total number of women of reproductive age **at risk of becoming pregnant**

X 100

Prevalence of primary infertility = 37/693 = **5.33%**

Prevalence of secondary infertility =

Number of women of reproductive age (15- 49) at risk of becoming pregnant Who report trying unsuccessfully for a pregnancy for two years or more Following a previous pregnancy

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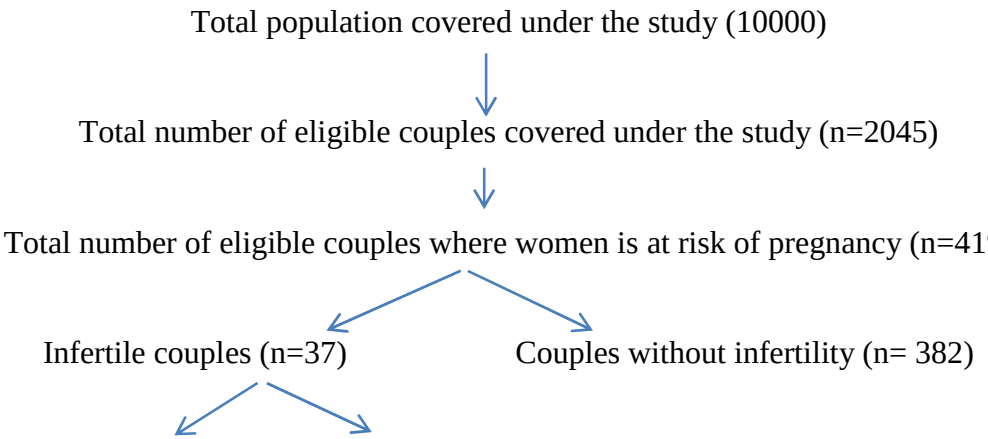
Total number of women of reproductive age **at risk of becoming pregnant**

X 100

Prevalence of secondary infertility = 16/693 = **2.3%**

Prevalence of infertility in urban area:



Prevalence of primary infertility =

Number of women of reproductive age (15- 49) at risk of becoming pregnant
Who report trying unsuccessfully for a pregnancy for two years or more
---
X 100

Total number of women of reproductive age **at risk of becoming pregnant**

Prevalence of primary infertility= 24/419 = **5.7%**

Prevalence of Secondary Infertility =

Number of women of reproductive age (15- 49) at risk of becoming pregnant who report trying unsuccessfully for a pregnancy for two years or more Following a previous pregnancy
---
X 100

Total number of women of reproductive age **at risk of becoming pregnant**

Prevalence of Secondary infertility= 13/419 = **3.1%**

Figure 1: Prevalence of primary and secondary infertility in rural and urban area

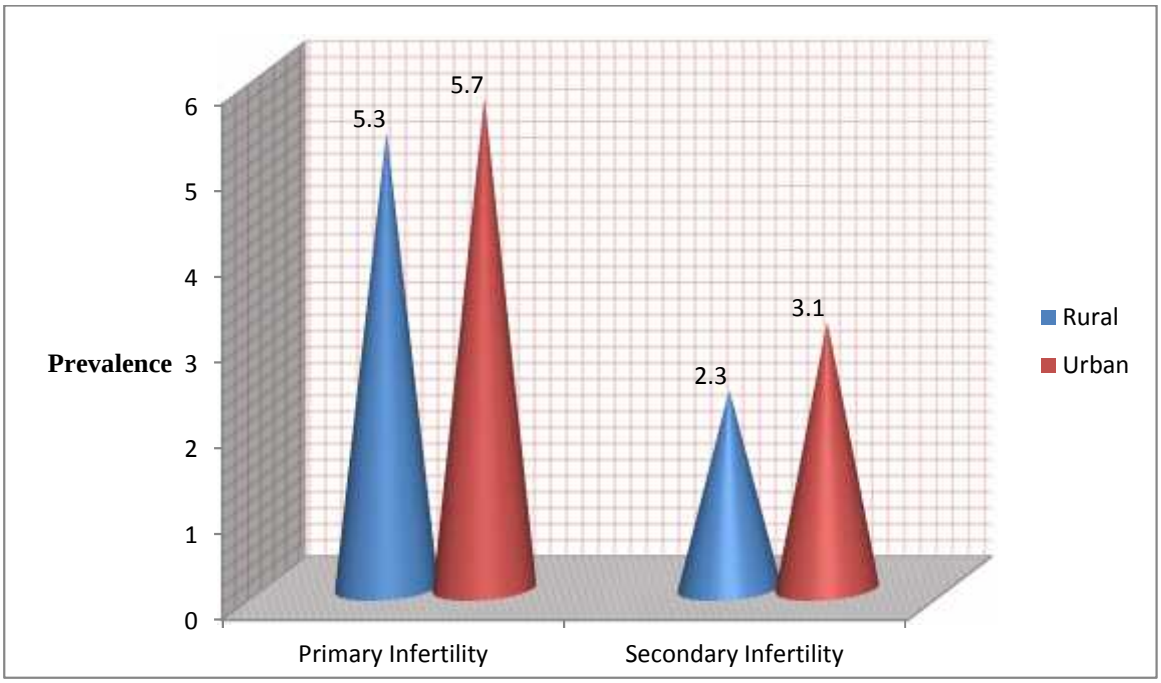
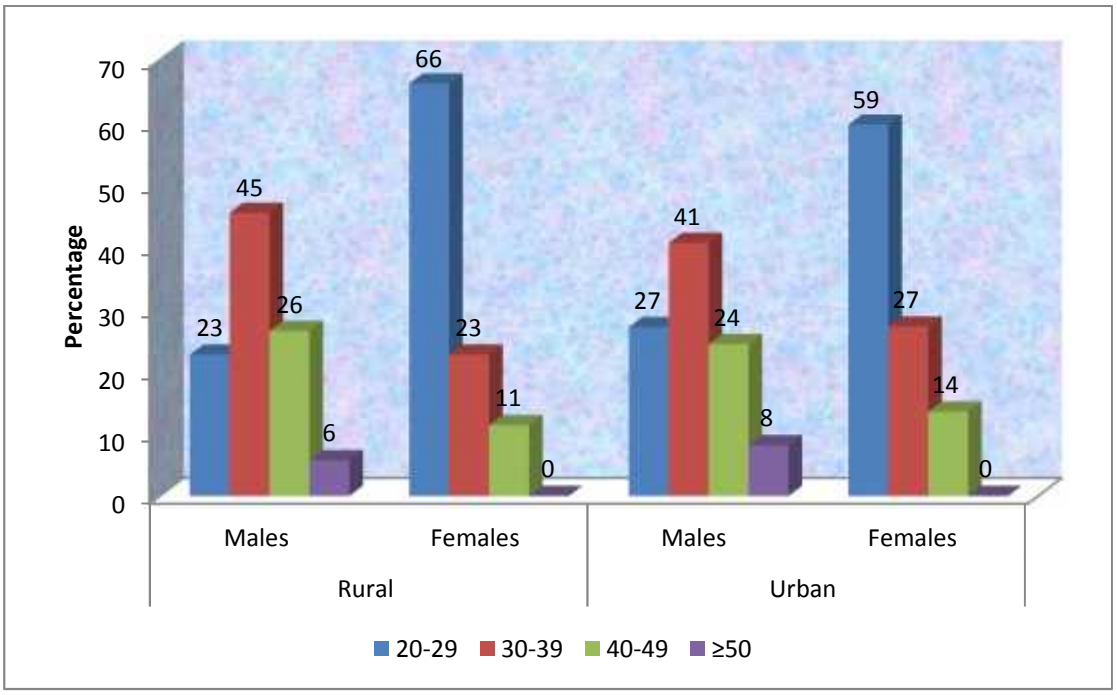
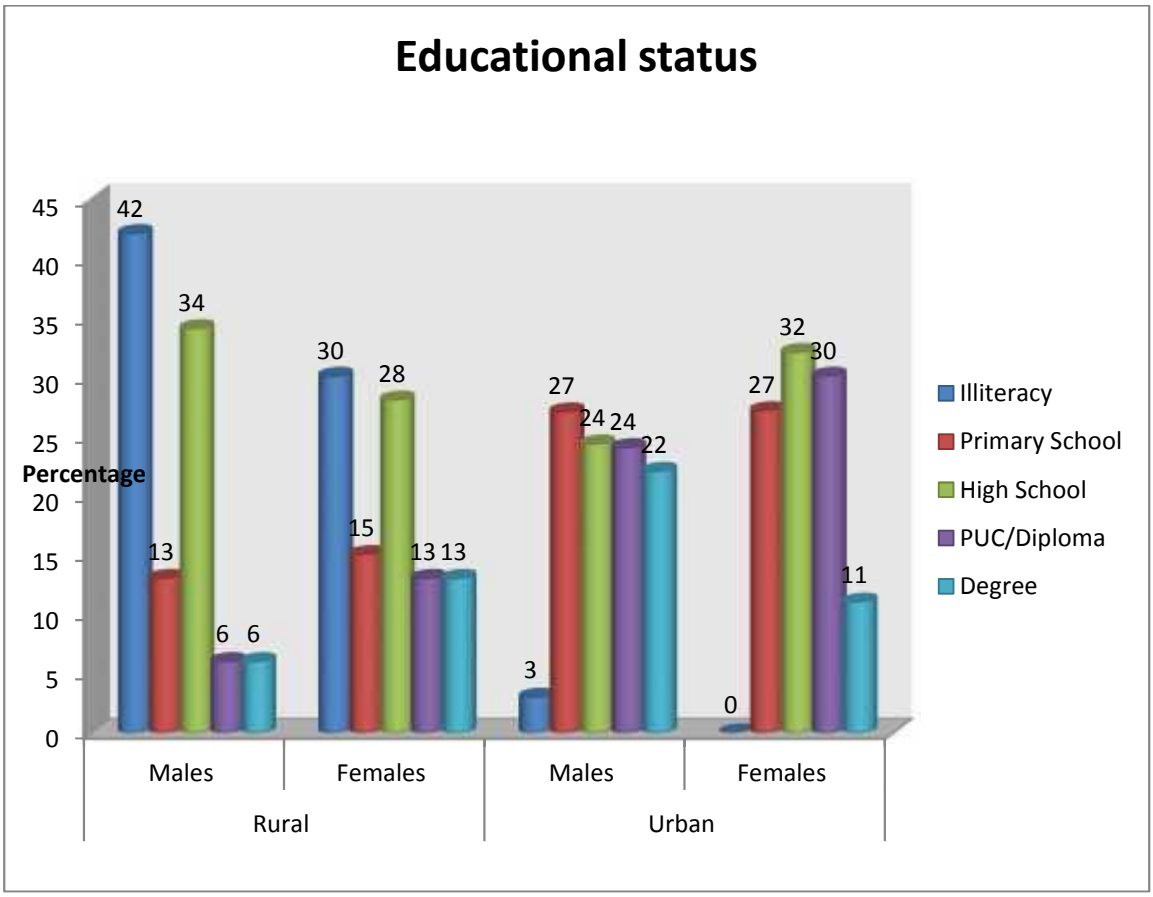


Figure 2: Age distribution of infertile study participants



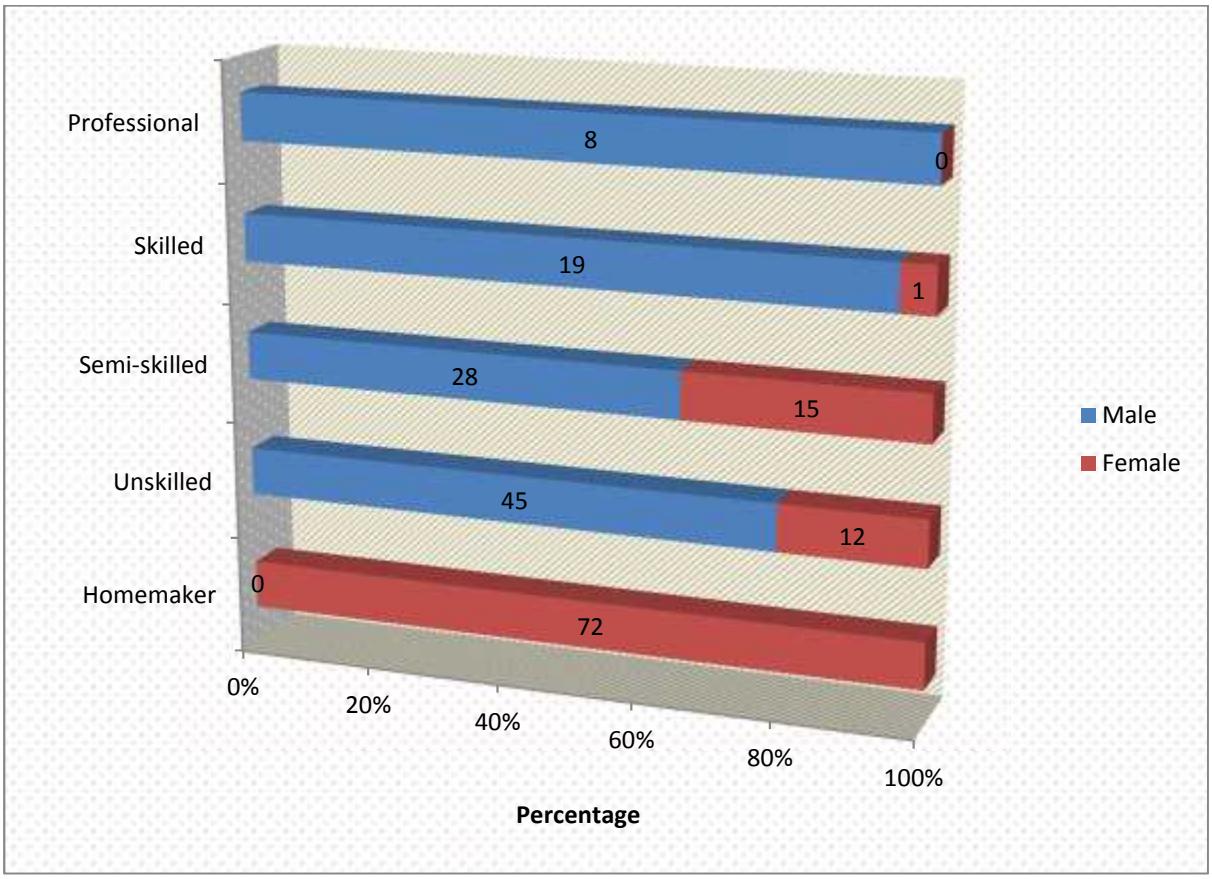
The above graph describes that, among rural males majority were in the age group 30-39 (45%) years followed by 40-49 years (26%). Age distribution of women showed 66% of them belonged to age group 20-29 years followed by 23% in the age group 30-39 years. Similarly in urban areas 41% of the males were 30-39 years followed by 20-29 years (27%). Among women 59% were in the age group 20-29 years followed by 30-39 years (27%).

Figure 3: Distribution of subjects based on Educational Status



It is disheartening to say that 42% of the male participants and 30% of the female participants were illiterate in rural area, surprisingly it was also observed that none of the female participants were illiterate in urban area and only 3% male participants were illiterate. Among rural residents 34% of the men and 28% of the women had completed their education up to high school. Among urban participants the distribution according to educational status was as follows: primary school (27% males & 27% females), high school(24% males & 32% females), PUC/Diploma(24% males & 30% females) , graduation(22% males & 11% females).

Figure 4: Distribution of subjects according to Type of Occupation



The above graph shows that major proportion of the women were home makers (72%), and all the male respondents were involved in one or the other work. Majority of the men were unskilled workers (45%), semi-skilled workers (28%), skilled 19% and the remaining 8% were professionals. Among working women, 15% were semi-skilled workers, 12% were unskilled workers and remaining 1% were skilled workers.

Table 1: Distribution of infertile women based on Socio-demographic variables

Variables		Rural Frequency (%)	Urban Frequency (%)
Religion	Hindu	50(94)	28(75)
	Muslim	03(06)	09(25)
Type of family	Joint	26(49)	13(35)
	Nuclear	23(43)	18(49)
	Three generation family	04(8)	06(16)
SES	Class I	06(11)	0
	Class II	10(19)	07(19)
	Class III	23(43)	15(41)
	Class IV	09(17)	12(32)
	Class V	05(10)	03(8)
Duration of infertility	< 5 years	18(34)	17(46)
	5-9 years	19(36)	11(30)
	10-20 years	15(28)	07(19)
	>20 years	01(2)	02(5)
Family history of infertility	Yes	06(11)	05(14)
	No	47(89)	32(86)
History of consanguineous marriage	Yes	20(38)	10(27)
	No	33(62)	27(73)
Total		53(100)	37(100)

The above table shows that major proportion of the infertile women belonged to Hindu religion both in rural (94%) & urban slum (75%). Comparatively Muslim women were more from urban area (25%) and only 6% were from rural area. Major proportion of the study subjects belonged to joint family (49%) followed by nuclear family (43%) in rural area whereas nuclear type of family (49%) was more among urban residents.

Around 43% and 41% of the participants belonged to class III SES in rural and urban areas respectively. All women belonging to upper socio-economic status were residents of rural area. 36% of the subjects from rural area had duration of infertility 5-9 years and 46% had duration of infertility < 5 years in urban area. Family history of infertility was among 16% and 14% of the women in rural and urban areas respectively. History of consanguineous marriage was among 38% in rural and 27% in urban residents.

Table 2: Association of socio-demographic variables of Primary Infertility women with area of residence

Variables		Rural (n=37) Frequency (%)	Urban (n=24) Frequency (%)	χ^2	P value
Age	20-29 30-39 40-49	31(84) 4(11) 2(5)	15(62) 5(21) 4(17)	3.74	0.154
Religion	Hindu Muslim	34(92) 03(8)	19(80) 05(20)	2.07	0.15
Type of family	Joint Nuclear	23(62) 14(38)	09(37) 15(63)	3.55	0.06
Educational status	Illiterate Primary school High school PUC Degree	11(30) 5(14) 10(27) 5(13) 6(16)	0 7(29) 6(25) 8(33) 3(13)	11.8	**0.01**
Type of occupation	Home-maker Employed	31(84) 6(16)	14(58) 10(42)	4.87	**0.02**
SES	Class I Class II Class III Class IV Class V	05(13) 06(16) 15(41) 07(19) 04(11)	0 07(29) 08(33) 06(25) 03(13)	4.8	0.3
Duration of infertility	< 5 years 5-9 years 10-20 years	17(46) 14(38) 6(16)	10(42) 7(29) 7(29)	1.52	0.46
Family history of infertility	Yes No	05(14) 32(86)	03(12) 21(88)	1.3	0.90
History of consanguineous marriage	Yes No	15(41) 22(59)	06(25) 18(75)	1.56	0.212
Total		37(100)	24(100)		

Age distribution shows that majority of the participant's belonged to the most fertile age group i.e., 20-29 years both in rural (84%) and urban slum (62%). The age distribution in relation to area of residence was not statistically associated. 92% and 80% belonged to Hindu religion in rural and urban area respectively. In rural area 62% of them belonged to joint family & 38% belonged to nuclear family whereas in urban area 63% belonged to nuclear family and remaining 37% belonged to joint family.

Majority of the women in rural area were illiterates (30%) and 27% of them had completed their high school followed by PUC/Diploma (33%) and those who had completed their primary school were 14%. Among urban women majority had completed PUC/Diploma (33%) followed by primary school (29%). This distribution was significantly associated. ($p<0.05$)

84% of the women in rural area were housewives and remaining 16% were employed. In urban areas more than 40% of the women were employed and around 58% were home makers and this distribution was statistically associated. ($p<0.05$).Couples with duration of infertility < 5 years constituted 46% and 42% in rural and urban area respectively. Women with family history of infertility were almost similar in rural and urban area (14% and 12%). History of consanguineous marriage was more in rural area (41%) when compared to urban area which was around 25%.

Table 3: Association of Socio-demographic variables of Secondary Infertile women with area of residence

Variables		Rural(n=16) Frequency (%)	Urban(n=13) Frequency (%)	χ^2	P value
Age	20-29 30-39 40-49	4(25) 8(50) 4(25)	7(54) 5(38) 1(8)	3.03	0.22
Religion	Hindu Muslim	16(100) 0	09(69) 04(31)	5.71	**0.01**
Type of family	Joint Nuclear Three generation family	03(19) 09(56) 04(25)	4(31) 3(23) 6(46)	3.27	0.19
Educational status	Illiterate Primary school High school PUC Degree	05(31) 3(19) 5(31) 2(13) 1(6)	0 3(23) 6(46) 3(23) 1(8)	5.03	0.28
Type of occupation	Housewife Unskilled Semi -skilled	12(75) 1(6) 3(19)	8(62) 5(38) 0	6.2	**0.04**
SES	Upper Class Lower Class	13(81) 3(19)	7(54) 6(46)	2.52	0.11
Duration of infertility	< 5 years 5-9 years 10-20 years >20 years	1(6) 5(31) 9(56) 1(6)	7(54) 04(31) 2(15) 0	9.86	**0.02**
Family history of infertility	Yes No	1(6) 15(94)	2(15) 11(85)	0.64	0.42
History of consanguineous marriage	Yes No	5(31) 11(69)	4(31) 9(69)	0.77	0.97
Total		**16**(100)	**13**(100)		

Age distribution of women with secondary infertility showed that 25% of the women belonged to age group 20-29 and 40-49 and half of the participants were in the age group 30-39 in rural area. Whereas 54% of the women in urban area were in the age group 20-29, 38% of them in the age group 30-39. All the women with secondary infertility in rural area were Hindus by religion whereas in urban area 69% were Hindus and remaining 31% belonged to Muslim religion and it was found to be statistically significant. ($p<0.05$)

Major proportion of the couple belonged to nuclear family (56%) in rural area and in urban area it was three generation family (46%). Illiteracy was observed only among rural women (31%) , 19% had completed their primary school, 31% had completed high school, 12% had completed PUC/Diploma and 6% were graduates. Among urban women 46% had completed high school, 23% of them had completed primary school, PUC/diploma and 8% were graduates.

Around 75% and 62% of the women were housewives in rural and urban area respectively. Unskilled workers were around 38% in urban slums and 6% in rural area and 19% were semi-skilled workers from rural area. This distribution was statistically associated. ($p<0.05$)

Majority of the couples belonged to upper class 81% in rural area & 19% belonged to lower class. Among urban residents 54% belonged to upper class and 46% belonged to lower class. Highest number of couples (56%) had duration of infertility 10-20 years in rural area, followed by 5-9 years among 31% of women, 6% each with duration of infertility < 5 years and > 20 years. whereas 54% of them had < 5 years duration of infertility in urban area followed by 5-9 years among 31% and 15% had 10-20 years of infertility and this distribution was statistically significant ($p<0.05$).

Table 4: Distribution of infertile males according to addictive habits

Variables	Rural(n=29)	Urban (n=22)	Total	χ^2	P value
	Frequency (%)	Frequency (%)	Frequency (%)		
Tobacco	18(62)	9(41)	27(53)	2.25	0.13
Alcohol	11(38)	13(59)	24(47)		
Total	29(100)	22(100)	51(100)		

Addictive habits were among 55% and 59% of the rural and urban males respectively. Among which more men in the rural area had the habit of tobacco consumption (62%). Similarly in urban area alcohol consumption was higher i.e., 59% when compared to tobacco consumption. Tobacco consumption history among females was also asked which showed very less number (2 in rural and 1 in urban) hence not included in the table.

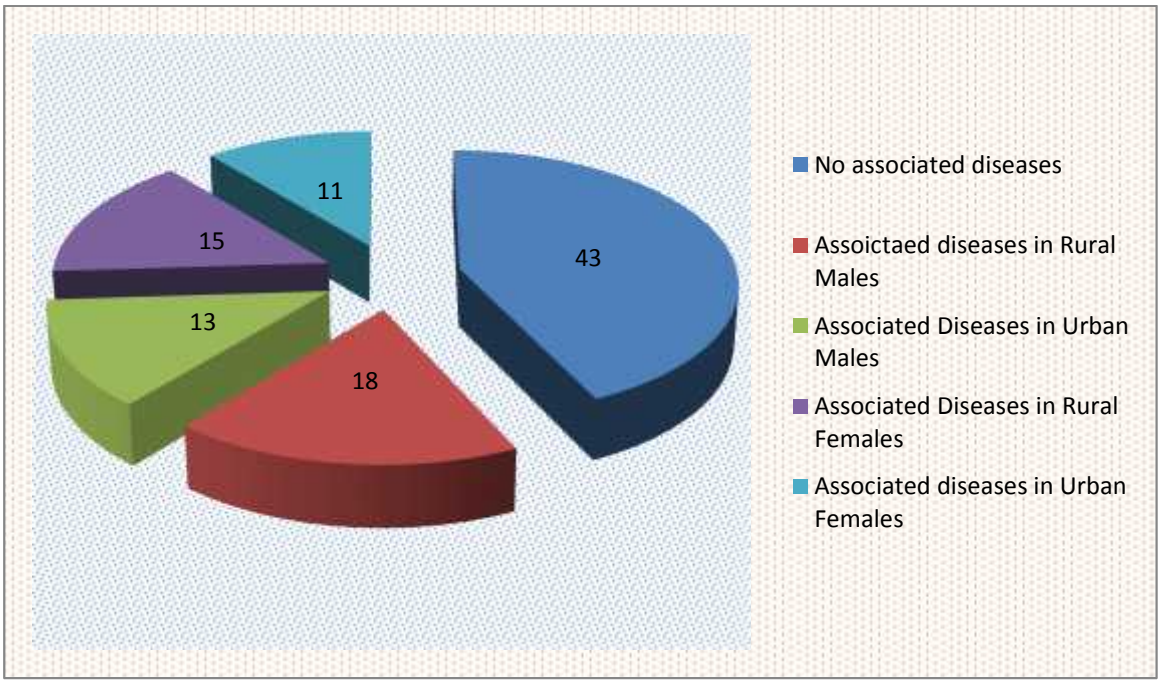
Table 5: Distribution of study subjects based on BMI

BMI		Males			Females		
		Rural	Urban	Total	Rural	Urban	Total
Under-weight	**<18.5**	0	0	0	6(11)	9(24)	15(17)
Normal	**18.5-22.9**	18(34)	11(30)	29(32)	22(42)	19(51)	41(45)
At risk of obesity	**23-24.9**	26(49)	17(46)	43(48)	17(32)	05(13)	22(24)
Grade I obesity	**25-29.9**	08(15)	09(24)	17(19)	5(9)	03(8)	8(9)
Grade II	**>30**	1(2)	0	1(1)	3(6)	0	3(3)
Total		53(100)	37(100)	90(100)	53(100)	37(100)	90(100)
		χ^2=1.85 P>0.05			χ^2=9.91 P>0.05		

The above table highlights that majority of the males in rural and urban area were at risk of obesity i.e., 49% and 46% respectively. 15% of the rural males and 24% of the urban males had grade I obesity and 2% of the rural males had grade II obesity. This distribution showed no association.

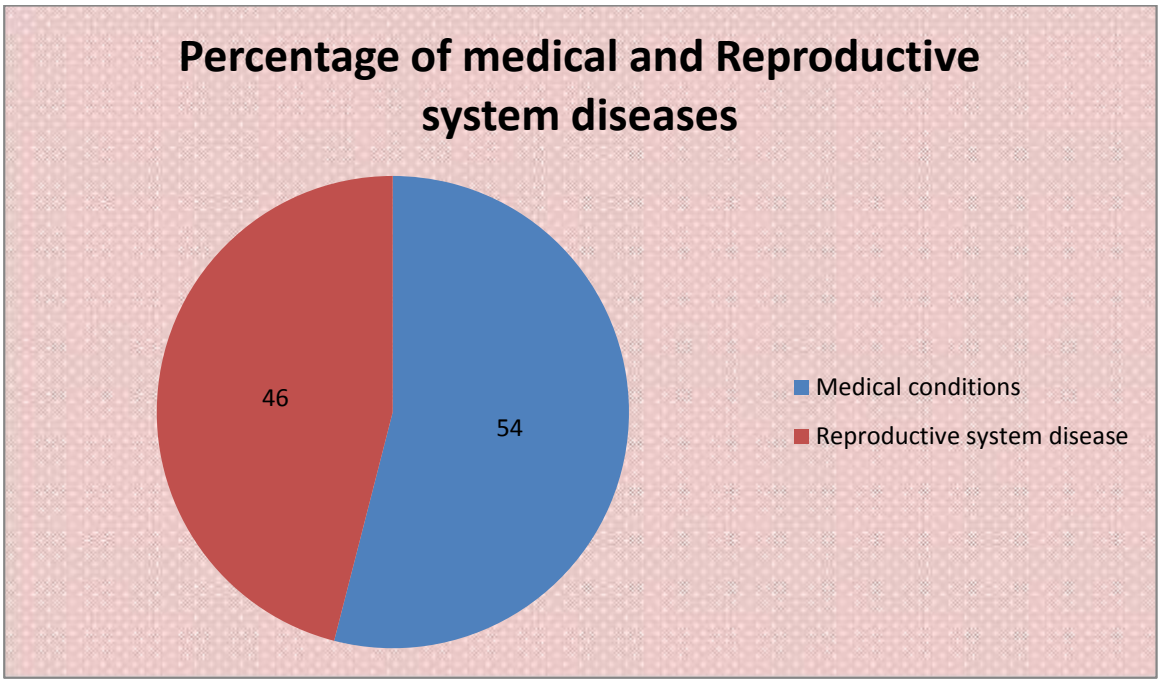
Among rural women 11% were under-weight, 32% were at risk of obesity, 9% of them had grade I obesity and 6% had grade II obesity. Similarly in urban area, 24% of them were under-weight, 13% were at risk of obesity and 8% of them had grade I obesity. This distribution was not found statistically significant.

Figure 5: Proportion of study subjects with co-morbid conditions



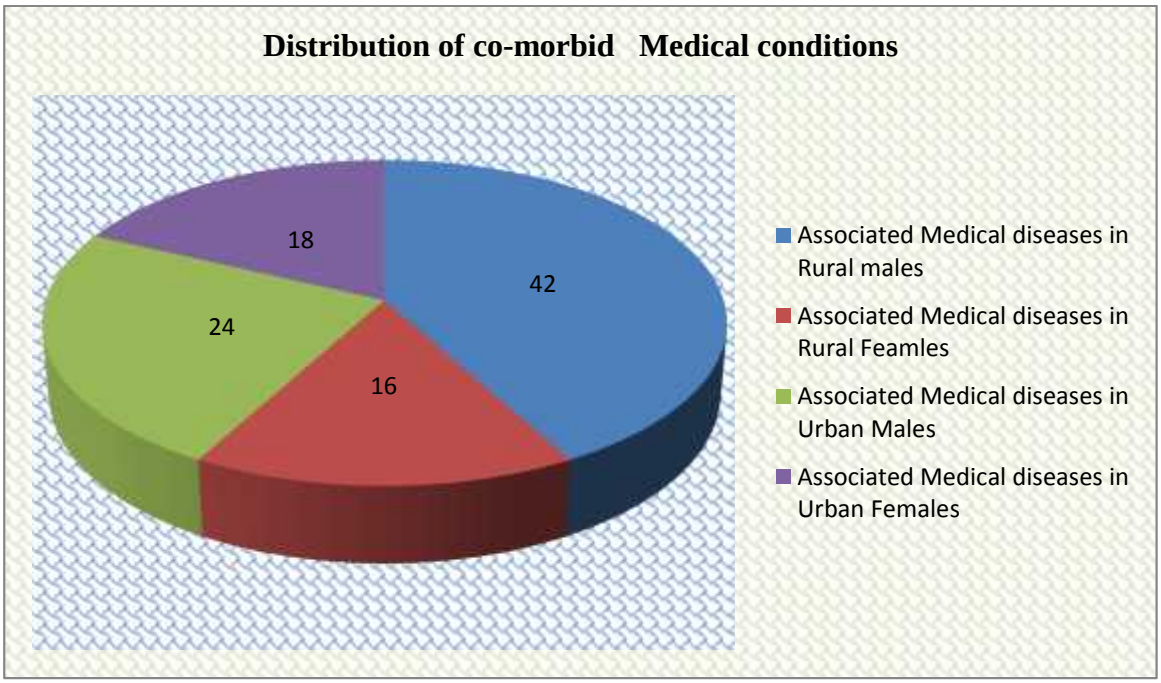
More than 50% of the study participants had one or the other associated medical and reproductive system diseases, among which major proportion were rural males(18%) followed by rural females(15%), urban males (13%) and 11% among urban women.

Figure 6: Proportion showing distribution of medical and Reproductive system diseases



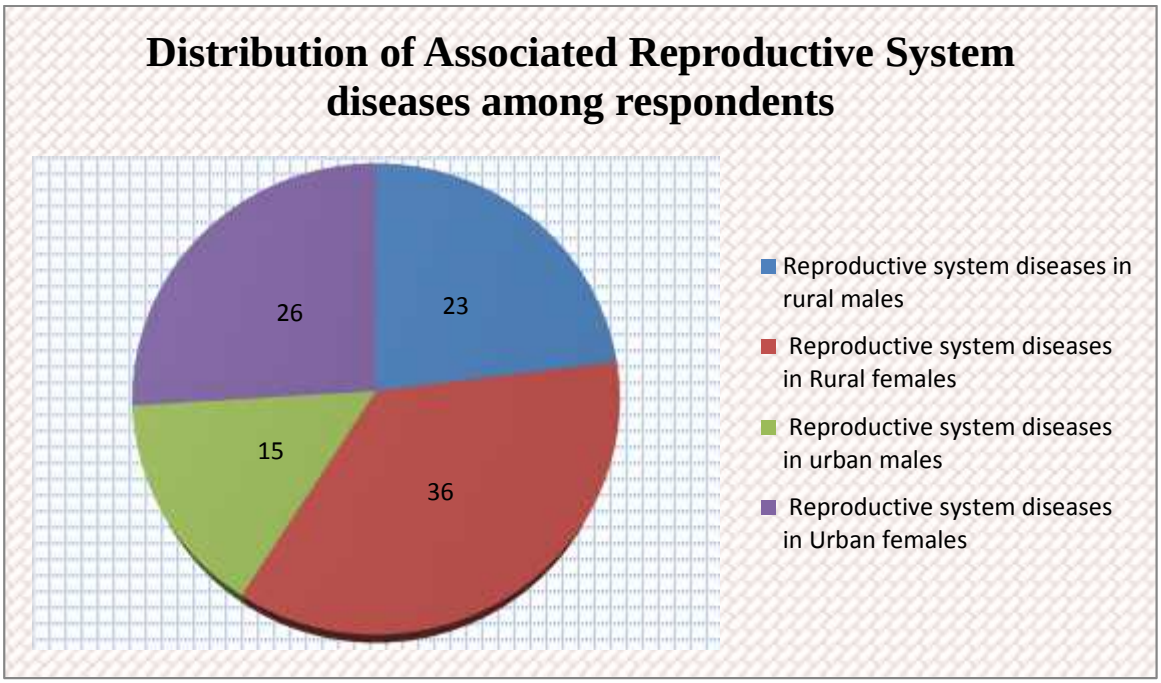
This graph represents the overall co-morbid conditions of the respondents. Among them 54% of them had medical disorders and 46% of them were having reproductive system diseases.

Figure 7: Distribution of co-morbid medical disorders among respondents



With respect to the distribution of diseases among males and females, it was seen that major proportion of males from rural area (42%) had medical disorders followed by urban males (24%), urban females (18%) and the least were rural females (16%).

Figure 8: Diseases of the reproductive system diseases among respondents



It is highlighted from the above graph that proportion of reproductive system diseases was highest among rural females (36%) followed by urban females (26%), rural males (23%) and urban males (15%).

Table 6: Medical conditions prevailing among couples with infertility (n=55)

Variables	Rural			Urban		
	Males n (%)	Females n (%)	Total n (%)	Males n (%)	Females n (%)	Total n (%)
Diabetes	11(20%)	3(5%)	14(25%)	7(13%)	4(7%)	11(20%)
Hypertension	5(9%)	2(4%)	7(13%)	4(7%)	5(9%)	9(16%)
Hypothyroidism	7(13%)	3(5%)	10(18%)	3(5%)	1(2%)	4(7%)
Tuberculosis	4(7%)	2(4%)	6(11%)	0	0	0
Asthma	1(2%)	1(2%)	2(4%)	1(2%)	0	1(2%)
Total	28(51%)	11(20%)	39(71%)	15(27%)	10(18%)	25(45%)

*multiple responses

It is shown from the above table that diabetes was the most common associated disease among the study participants i.e., 25% among rural (20% males and 5% in females) and 20% among urban residents (13% males and 7% were females). Hypertension was among 13% and 16% of rural and urban residents respectively. Hypothyroidism was present among 18% of the rural dwellers whereas 7% of the urban study subjects had it. Tuberculosis (11%) was reported only among rural study participants. Complaints of asthma were among 4% and 2% of the rural and urban participants respectively.

Table 7: Diseases of the Reproductive system among Infertile males (n=18)

Variables	Rural Frequency (%)	Urban Frequency (%)	Total Frequency (%)
Urethral discharge	4(22%)	1(6%)	5(28%)
Ulceration of genitalia	2(11%)	1(6%)	3(17%)
Vesicles	3(17%)	2(11%)	5(28%)
Oligospermia	2(11%)	4(22%)	6(33%)
Total	11(61%)	8(44%)	19(105%)

*multiple responses

The above table enumerates that urethral discharge (22%) was the common complaint among rural subjects followed by vesicles (17%), ulceration of genitalia and oligospermia (11%). Whereas oligospermia was the most common abnormality among urban subjects (22%).

Table 8: Diseases of Reproductive system among Infertile women (n=29)

Variables	Rural Frequency (%)	Urban Frequency (%)	Total Frequency (%)
PID	5(17%)	5(17%)	10(34%)
PCOD	4(14%)	2(7%)	6(21%)
Fibroid	5(17%)	4(14%)	9(31%)
Abnormal vaginal discharge	5(17%)	1(3%)	6(21%)
Total	19(65%)	12(41%)	31(106%)

*multiple responses

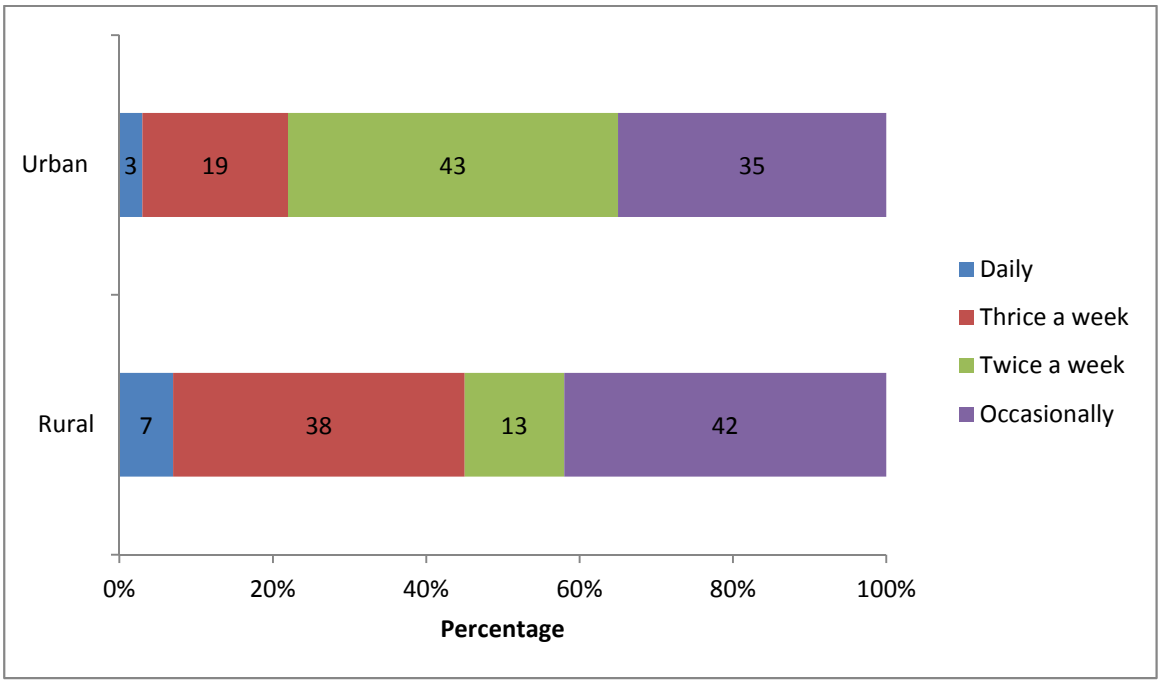
The distribution of pelvic inflammatory disease, fibroid and abnormal vaginal discharge was around 17% for the rural women. The urban women had complaints of PID around 17% and 14% with fibroid.

Table 9: Menstrual Irregularity among infertile women (n=15)

Variable	Rural Frequency (%)	Urban Frequency (%)	Total Frequency (%)
Oligomenorrhea	6(40%)	5(33%)	11(73%)
Polymennorhea	3(20%)	1(7%)	4(27%)
Total	9(60%)	6(40%)	15(100%)

Among women with menstrual irregularity 73% of them had oligomennorhea, of which 40% were rural residents and the remaining 33% were residing in urban areas. Polymennorhea was found to be present in 20 % of the rural women and in 7% of urban women.

Figure 9: Distribution of Infertile couple according to frequency of intercourse



In rural area 42% of the couple reported that their frequency of intercourse is occasional, 38% of them said that it's thrice a week, 13% said it's twice a week and the remaining 7% said it's daily. In urban areas 43% of them reported that it's twice a week, occasionally was among 35% of the couple, 19% said it's thrice a week and for the remaining 3% it was daily.

Table 10: Distribution of study subjects according to knowledge about fertile period

Variables		Rural Frequency (%)	Urban Frequency (%)	Total Frequency (%)
Knowledge about fertile period	Yes	04(4)	08(11)	12(7)
	No	102(96)	66(89)	168(93)
	Total	106(100)	74(100)	180(100)

$\chi^2 = 3.4$ p value > 0.05

Knowledge about fertility period was very less among participants but comparatively it was higher among urban people (11%) when compared to rural participants (4%). No association was found with area of residence.

Table 11: Distribution of infertile couples according to various Socio - Cultural practices

Socio–Cultural Practices*	Rural Frequency (%)	Urban Frequency (%)	Total
Visiting religious places	103(58)	74(42)	177(100)
Wearing taviz/threads	9(45)	11(55)	20(100)
Astrologers	27(55)	22(45)	49(100)
Rituals	49(79)	13(21)	62(100)
Others	16(100)	0	16(100)

*multiple responses $\chi^2=2.21$ $p<0.0001$

Almost all participants practiced one or the other method of cultural practices like visiting religious places (58% among rural and 42% among urban), wearing threads/taviz was higher among urban residents (55%), visiting astrologers was among 55% & 45% of the rural and urban subjects respectively, practicing rituals was seen among 79% of the rural participants and the practice of not cutting the hair of the first child until they have second child was seen among rural secondary infertile couple. This distribution was found to be statistically significant.($p<0.0001$)

Table 12: Association between treatment seeking pattern and area of residence

Variables		Rural Freq (%)	Urban Freq (%)	Total Freq (%)	χ^2 p value
Availed health care facility	Yes	40(58)	29(42)	69(100)	χ^2 =20.9
	No	66(59)	45(41)	111(100)	**0.001**
If yes which(n=69)	Allopathic	21(30)	23(33)	44(63)	χ^2=28.2
	Ayurveda	08(12)	4(6)	12(18)	**0.0001**
	Homeopathy	1(1)	2(3)	3(4)	
	Traditional healers	10(15)	0	10(15)	
If no why *(n=111)	Economic hardship	11(10)	12(11)	23(21)	χ^2=17.3
	Wait for spontaneous conception	32(29)	33(30)	65(59)	**0.002**
	Distance	2(2)	0	2(2)	
	Not willing	11(10)	0	11(10)	
	Ignorance	15(14)	03(3)	18(16)	

*multiple responses

It was surprising to see that among those who have availed health care facility majority i.e., 58% were rural participants. Majority visited allopathic doctors i.e., 64% (30% from rural and 34% from urban area) followed by Ayurveda doctors i.e.,18%(12% from rural and 6% from urban).

59% of the participants were waiting for spontaneous conception (29% and 30% in rural and urban area respectively).This was the common answer among those who have not availed any health care facility. Ignorance was high among rural participants. This distribution was found to be statistically significant.($p<0.001$)

Table 13: Association between socio demographic factors and treatment seeking pattern (n=69)

Variables		Availed health care facility		P value
		Yes	No	
Sex	Males	28(41)	62(56)	**0.04**
	Females	41(59)	49(44)	
Age	20-29	17(24)	62(56)	**0.001**
	30-39	35(51)	26(23)	
	40-49	15(22)	19(17)	
	>50	02(3)	04(4)	
Educational status	Illiterate	13(19)	26(23)	0.45
	Primary school	18(26)	17(15)	
	High school	19(28)	35(32)	
	PUC	11(16)	22(20)	
	Degree	08(11)	11(10)	
Type of family	Joint	32(46)	46(41)	0.20
	Nuclear	33(48)	49(44)	
	Three generation	04(6)	16(15)	
Type of infertility	Primary	52(75)	70(63)	0.08
	Secondary	17(25)	41(37)	
	Total	**69**(100)	**111**(100)	

The above table highlights that 59% of the females have availed health care facility, and among males it was 41% and this was found to be statistically associated ($p<0.05$). More than 50% of the participants aged 30-39 have availed health care facility. Age group was significantly associated with treatment seeking pattern ($p<0.05$). Educational status was not statistically associated in availing health care facility. Subjects with primary infertility availed health care facility more (75%) compared to secondary infertility (25%). Statistical association was not found with respect to type of family or type of infertility.

Table 14: Distribution of infertile females according to Psychological violence

Variables		Rural Freq (%)	Urban Freq (%)	Total	χ^2 p value
Psychological violence	Yes	11(48)	12(52)	23(100)	χ^2=1.56
	No	42(63)	25(37)	67(100)	0.211
If yes* type(n=23)	Emotional	09(39)	12(52)	21(91)	χ^2=3.88
	Verbal	06(26)	01(4)	7(30)	**0.04**
If yes By whom*(n=23)	Within family	05(22)	10(43)	15(65)	χ^2=3.65
	Neighbours	07(30)	03(13)	10(43)	0.302
	Relatives	09(39)	09(39)	18(78)	
	Others	06(26)	04(17)	10(43)	

*multiple responses

Among those women who underwent psychological violence major proportion were from urban area i.e., 52% but statistical association was not found with area of residence. Emotional type of domestic violence was more in urban area (52%) and verbal abuse was more among rural residents (26%) and it was found statistically significant. The main perpetrators were relatives i.e., 78% (39% each in rural and urban area), around 65% were from within the family (22% for rural women and 43% for urban), even the psychological violence was reported by 43% of the neighbours (30% in rural and 13% in urban area) and psychological violence by other persons like at work place was seen among 26% and 17% of the rural and urban women respectively.

Table 15: Mean score comparison of psychosocial consequences (scale) among rural and urban participants

	Rural		Urban		CI		
Scales	Mean	±SD	Mean	±SD	P value	Lower	Upper
Personal Impact	44.3	±22.5	38	22.7	0.07	-0.4	13.1
Sexual Impact	55.9	±28.4	51.4	23.3	0.26	-3.4	12.4
Marital Impact	60.3	±24.8	61.5	26.2	0.74	-8.8	6.3
Social Impact	38.8	±20.9	41.3	18.3	0.42	-8.4	3.5

The mean scores of personal impact scale was 44.3±22.5 and 38±22.7 among rural and urban infertile couples respectively, and there was no statistically significant difference between the scores ($p>0.05$).

Similarly the mean scores of sexual impact scale was higher (55.9±28.4) among rural infertile couples when compared to urban infertile couples which was 51.4±23.3, but the difference was not statistically significant.

The mean marital impact scores was almost similar for both rural and urban infertile couples which was 60.3±24.8 and 61.5±26.2 respectively.

The scores for social impact scale were slightly higher (41.3±18.3) among urban infertile couples when compared to rural infertile couples (38.8±20.9) and the difference was not statistically significant. ($p>0.05$)

Table 16: Mean score comparison of psychosocial consequences (scale) among Primary and Secondary infertile participants

Scales	Primary Infertility		Secondary Infertility		Confidence Interval		
	MEAN	SD	MEAN	SD	p value	LL	UL
Personal Impact	49.8	20.8	24.7	16.4	<0.001	19.0	31.3
Sexual Impact	63.7	23.5	33.6	20.0	<0.001	23.1	37.2
Marital Impact	70.3	21.3	40.7	21.2	<0.001	23.0	36.3
Social Impact	45.9	17.8	27.1	18.0	<0.001	13.1	24.4

The mean scores of personal impact scale was 49.8±20.8and 24.7±16.4 among primary and secondary infertile couples respectively, and the difference found to be statistically significant (p>0.05).

Similarly the mean scores of sexual impact scale was higher among participants with primary infertility (63.7±23.5) compared to secondary infertile participants which was 33.6±20 and the difference found to be statistically significant.

Scores found to be highest for marital impact scale among both primary and secondary infertile couples and the difference found to be highly significant.

The scores for social impact scale were also higher (45.9±17.8) among couples with primary infertility when compared to secondary infertility (27.1±18.0) and the difference found to be highly significant. (p>0.05)

Table 17: Mean score comparison of psychosocial consequences (scale) among Male and Female participants

Scales	Males		Females		CI		
	mean	SD	mean	SD	p Value	LL	UL
Personal Impact	32.3	14.6	51.2	25.4	<0.001	-25	-12.8
Sexual Impact	46.7	20.3	61.4	29.8	<0.001	-22.2	-7.2
Marital Impact	54.6	22.2	67.0	26.8	<0.001	-19.6	-5.1
Social Impact	35.2	16.6	44.4	21.8	<0.002	-14.9	-3.5

The above table highlights that the mean scores were higher for women, among which marital impact was highest (67± 26.8) and 54.6±22.2 for men. The mean scores for personal impact scale was 51.2±25.4 for women and 32.3±14.6 for men, for sexual impact scale 61.4±29.8 and 46.7±20.3 and for the social impact it was 44.4±21.8 for women and 35.2±16.6 for men. The difference found to highly significant ($p<0.0002$).

Table 18: Regression analysis of Personal Impact scale as dependent variable with selected predictors

Variables		B co-efficient	P value
Area	Rural * Urban	* -6.32	* 0.066
Age #		-1.04	**0.0001**
Gender	Male* Female	* 11.04	*** **0.001**
Religion	Hindu * Muslim	* 6.282	* 0.209
Education	Illiterate Primary High school * PUC Degree	1.444 1.411 * 16.77 6.282	0.717 0.731 * **0.04** **0.001**
SES	Class I Class II Class III* Class IV Class V	20.416 9.261 * -3.190 6.893	**0.000** **0.005** *** **0.043** 0.258
Type of infertility	Primary* Secondary	* -25.130	* **0.0001**
Treatment	Yes * No	* 20.802	*** **0.0001**

*reference category # continuous variable

Higher scores were among the rural residents when compared to urban. With the increase in the age among infertile couples the personal impact scores is decreasing and is statistically significant. Females and those belonging to Muslim religion showed higher impact. As the educational status is increasing the personal impact scores have been found to be increasing which is statistically significant.

With the increase in the Socio-economic status the personal impact score was found to be higher with high statistical significance. Also, this score was seen to be higher among primary infertility participants when compared to secondary infertility cases and it was found to be statistically significant. Among the participants who have availed health care, less personal impact scores was found and it was highly significant.

Table 19: Regression analysis of Sexual Impact scale as dependent variable with selected predictors

Variables		B co-efficient	P value
Area	Rural *	*	*
	Urban	-4.545	0.257
Age #		-1.594	**0.0001**
Gender	Male*	*	*
	Female	14.72	**0.0001**
Religion	Hindu *	*	*
	Muslim	11.45	**0.04**
Education	Illiterate	-1.31	0.81
	Primary	2.7	0.62
	High school *	*	*
	PUC	10.07	0.09
	Degree	9.52	0.15
SES	Class I	36.94	**0.001**
	Class II	-1.34	0.79
	Class III*	*	*
	Class IV	7.98	0.09
	Class V	3.25	0.63
Type of infertility	Primary *	*	*
	Secondary	-30.1	**0.001**
Treatment	Yes *	*	*
	No	20.52	**0.002**

*reference category # continuous variable

Scores are higher for rural participants. Age group was inversely related to the mean scores and is statistically significant. Females have significantly higher impact scores. Muslims showed higher impact scores compared to Hindus, as the educational status is increasing the sexual impact scores have been found to be increasing which is statistically significant.

The sexual impact score for socio economic class I was found to have high statistical significance. Also, this score was seen to be higher among primary infertility when compared to secondary infertility cases and it was found to be statistically significant. Among the participants who have availed health care had less social impact scores and it found to be highly significant.

Table 20: Regression analysis of Marital Impact scale as dependent variable with selected predictors

Variables		B co-efficient	P value
Area	Rural *	*	*
	Urban	1.170	0.74
Age #		1.258	**0.001**
Gender	Male*	*	*
	Female	12.38	**0.001**
Religion	Hindu *	*	*
	Muslim	9.180	0.09
Education	Illiterate	-9.76	0.06
	Primary	-3.88	0.47
	High school *	*	*
	PUC	3.17	0.58
	Degree	2.507	0.69
SES	Class I	9.323	0.25
	Class II	-4.65	0.92
	Class III*	*	*
	Class IV	4.67	0.33
	Class V	0.415	0.95
Type of infertility	Primary *	*	*
	Secondary	-29.64	**0.001**
Treatment	Yes *	*	*
	No	19.53	**0.002**

*reference category # continuous variable

The above table highlights that the mean scores are higher among urban residents but is not statistically significant. Age is directly proportional to the mean impact scores and is statistically significant.

Females have significantly higher impact and are statistically significant. Also, this score was seen to be higher among primary infertility when compared to secondary infertility cases and it was found to be statistically significant. Among the participants who have availed health care had less social impact scores and it was found to be highly significant.

Table 21: Regression analysis of Social Impact scale as dependent variable with selected predictors

Variables		B co-efficient	P value
Area	Rural *	*	*
	Urban	2.43	0.42
Age #		-0.67	**0.001**
Gender	Male*	*	*
	Female	9.23	**0.002**
Religion	Hindu *	*	*
	Muslim	10.00	**0.02**
Education	Illiterate	-7.61	**0.05**
	Primary	0.425	0.91
	High school *	*	*
	PUC	8.23	0.05
	Degree	13.8	**0.004**
SES	Class I	22.5	**0.001**
	Class II	5.27	0.18
	Class III*	*	*
	Class IV	4.78	0.19
	Class V	5.11	0.337
Type of infertility	Primary *	*	*
	Secondary	-18.74	**0.001**
Treatment	Yes *	*	*
	No	19.29	**0.001**

*reference category # continuous variable

Social impact was higher among the urban residents. Age is directly proportional to the mean impact scores and is statistically significant. Females have significantly higher impact and are statistically significant. Muslims showed higher impact scores compared to Hindus, as the educational status is increasing the social impact scores have been found to be increasing which is statistically significant.

The social impact score for socio economic class I was found to have high statistical significance. Also, this score was seen to be higher among primary infertility when compared to secondary infertility cases and it was found to be statistically significant. Participants who have availed health care had less social impact scores and it was found to be highly significant.

DISCUSSION

Rural urban differences in prevalence of infertility:

The results of the present study show that the overall prevalence of infertility in rural and urban area was 7.6% & 8.8% respectively. The study done by different authors also reported the variance in the prevalence of infertility in rural and urban areas like,

Shamila S *et al.,* reported that the proportion of infertile participants were more from urban area than rural area in all the three study areas of Kanyakumari (60% urban and 40% rural), Tirunelveli (66% rural and 34% urban) and Thiruvanantapuram (68% rural and 32% urban).[39] A study conducted at Nagpur in the year 2013, showed among 240 infertile cases and controls majority of the infertile couples were urban residents. [68] Chhabra S *et al.,* in Maharashtra reported that 53% of the infertile participants were from rural areas & 47% were from urban areas. [42]

Our results are in variance with the study conducted by Amiri M *et al.,* in Iran where the prevalence of infertility was found to be more in rural areas (5.8%) compared to urban areas (4.2%.) It indicates that there is no much gross difference of prevalence of infertility between the rural and urban areas. [43]

The prevalence of infertility in rural areas in our study is in line with the DLHS 2008 Karnataka report, where it was 7.7% (Rural) and in urban (7.3%) which is slightly on the lower side compared to our study this might also indicate that there is rise in the prevalence of infertility in urban areas which is of great concern. [33]

Slightly higher side of prevalence in the urban area may be due to the fact that our study was conducted in a socio-economically background urban slum where undergoing treatment is a huge burden on the economic conditions of the family when

compared to rural residents. This also shows that prevalence of infertility varies according to social, cultural and economic background.

Prevalence of primary and secondary infertility:

The results of the present study (primary infertility 5.3% in rural and 5.7% in urban) and (secondary infertility 2.3% in rural and 3.1% in urban) correlates with the DLHS 2008 survey Karnataka, where primary infertility(6.1% rural and 5.5% urban) to be higher than the secondary infertility (1.6% in rural and 1.8% in urban).[33]

In a study conducted at Ambala, Haryana. Prevalence of primary and secondary infertility was 6.1% and 5.7% respectively in urban field practice area of a tertiary care hospital which is higher when compared to our study. [34]

Even though there is no much difference in the prevalence of primary infertility there is increase in the levels of secondary infertility in both rural and urban area which can be attributed to the fact that first child matters a lot and less importance is given to the second child hence seeking treatment is also less, in turn leading to high prevalence of secondary infertility.

Socio- demographic profile of the participants:

Age group

It was found that majority of the participants belonged to age group 20-29 years (44%) in both rural and urban areas. Similar results were observed by Paul CA *et al.,* in Mysore, where majority of them belonged to this age group (56%). [24] A study done by Sudha G *et al.,* also observed that 42% of the women were below 25 years of age. [69]. This age pattern indicates that as the age advances the proportion of people seeking treatment and having children might also be one of the reason.

Religion

Our study observed that majority of the couples' belonged to Hindu religion. As reported by Manna *et al.,* in West Bengal, major proportion of the infertile couples belonged to Hindu religion (82%).[72]

In NFHS-2, infertility rate was higher among women belonging to Hindu religion (2%) and other religious groups which comprises of Sikh, Buddhist/ Neo Buddhist, Jain, Jew, Zoroastrian/ Parsi and no religion (2.02%). It was comparatively lower among Christian (1.9%) and Muslim (1.6 %)[18]

However in NFHS-3, infertility rate was high among Christian (2%) followed by Hindu (1.8%), others (1.7%) and Muslim (1.7%). Among women belonging to different castes, those belonging to scheduled tribe has higher infertility rate in both rounds of survey i.e. 2.6 and 2.3% respectively compared to those belonging to scheduled caste and others category.[18]

The higher proportion of Hindus in our study may be because of their predominant inhabitation in this region and also this variation can be attributed to the differences in the way of living, customs, traditions and habits.

Type of family

In our study 46% of the couples belonged to nuclear type of family which is similar to study conducted by Shamila S *et al.,* [39] This could be due to the fact that change in the generation, thinking of living independently and self- decision. This it-self may lead to stress to manage multiple tasks and which is one of the reason affecting fertility.

Literacy status

Majority of the participants had education till high school (30%) which is similar to study conducted by Nicole JW *et al.,* on consequences of infertility in developing countries where they found 39% had education till high school. [92]

Manna *et al.,* (2014) reported that high infertility rate was observed among illiterates (20%) whereas only 2% of them were graduated.[72] Our study revealed that comparatively illiterates where more from rural area highlighting the fact that illiteracy is still predominant among rural residents.

Socio economic status

In the present study majority of couples with infertility belonged to class III socioeconomic status (42%) in both rural and urban area. Similar findings were reported by Maha A *et al.,* where most of the infertile couples (57%) belonged to class III socioeconomic status. [93]

Mittal *et al*., reported that infertility was most prevalent among participants belonging to class III SES [34] and also in a study conducted by Abbas A *et al.,* on the epidemiological and etiological aspects of infertility in Yazd province of Iran where 50% belonged to middle socioeconomic status. [27]This reflects that middle class families cannot afford the expenditure for the treatment of infertility.

Type of Occupation

Our results showed that maximum number of male participants in rural areas were daily wage workers and majority of them were doing one or the other business in urban areas. Among the female participants higher proportion were housewives (36%) in both rural and urban area.

Shamila S *et al.,* in their study among infertile women, 23% of them were employed and remaining were home- makers. Among those working majority were working at lower positions (72%).[39]

In a study conducted by Patel M *et al.,* at Indore 38% of the study subjects were academicians, advocates, accountants, bank workers, 8.5% were businessman and 7.4% were labourers and drivers.[94]

Hence contradicting the fact that working women were 20% more likely to be infertile compared to non-working women stated in NFHS data [18] but our study was a community based study and conducted in the socio-economically backward urban slums and in rural areas we didn't find any significant association in relation to type of occupation.

Duration of infertility

Around 39% of the couple had 2-5 years of duration of infertility. The distribution was similar among rural and urban participants, where major proportion of the respondents had infertility less than < 5 years followed by 5-9 years of infertility. Similar results were obtained by Shamila S *et al.,* [39]

Study conducted by Obuna JA *et al.,* on Clinical Presentation of Infertility in an Outpatient Clinic of a Resource Poor Setting, South-East Nigerian also showed maximum number of infertile couples had 1-5 years (46%) of infertility. [95]

This may be due to the fact that as the duration of married life increases some couples may seek treatment for infertility or some may conceive spontaneously which might be the reason for the same.

Family history of infertility and history of consanguineous marriage

In our study 12% and 33% of the participants had family history of infertility and history of consanguineous marriage respectively. When compared between rural and urban participant's family history of infertility (54%) and consanguinity (67%) was more among rural participants. Similar results were reported by Samiha M *et al.,* [39]

This difference might be due to the fact that, in this region socio - cultural practices are still predominant among rural residents when compared to urban dwellers.

Addictive habits

The addictive habits were present among 55% and 59% of the rural and urban males respectively. Among which, majority of the men in the rural area had the habit of tobacco consumption (62%). Similarly in urban area, alcohol consumption was higher (59%) when compared to tobacco consumption.

As reported in a study by Shilpa *et al.,* 60% of the infertile males had the habit of both alcohol consumption and tobacco smoking, 8% of them had the habit of tobacco consumption or smoking. [78]

The study conducted by Mohammad M *et al.,* revealed that the possibility of infertility in male smokers was 1.5 times as much as non-smokers (OR= 1.5).Smoking is a dangerous habit which can effect sperm quality and quantity and result in male infertility. Cigarette smoking is associated with reduced semen quality in terms of sperm density, total sperm count, total number of motile sperm and citrate concentration. [96]

Study conducted by Close CE *et al*., showed the relationship of current use of cigarettes and alcohol was related to the parameters of seminal fluid analysis, sperm penetration assay and sperm autoimmunity. Current cigarette smokers and heavy alcohol users showed greater numbers of leukocytes in the seminal fluid than did nonusers and is statistically significant. In addition, cigarette smokers had lower sperm penetration assay scores than non-smokers. Cigarette smoking continued to show a significant decrease in sperm penetration assay score ($p = 0.03$). [97]

Body mass index related to infertility

The present study highlights that grade I obesity was observed among 19% of the male participants and 9% of the female participants. Similarly 48% of the male subjects and 24% of the women were at risk of obesity.

According to NFHS 3, 2008 overweight and obesity among men and women was found more among the urban residents. [18] Rajashekar L *et al.,* reported that obesity was seen among 49% of the infertile participants. [98]

Results of the present study also observed that both under-weight and over-weight was high among the infertile study subjects. Studies have shown that male obesity was associated with increased incidence of low sperm concentration and low progressively motile sperm count. Thus BMI is an important contributory factor to male infertility. [99]

Janet WR *et al.* ,in their study showed that multivariate relative risks for infertility among females was 1.3 for BMI 24 to 25.9, 1.7 for BMI 26 to 27.9, 2.4 for BMI 28 to 29.9, it was 2.7 for BMI 30 to 31.9 and for BMI ≤ 32 it was 7. [100]

Sharma R *et al.,* said in their study that for women, being underweight and having extremely low amounts of body fat are associated with ovarian dysfunction and infertility.[58]

Hence both over weight and under-weight might be the contributing factor for infertility in our study population.

Co-morbid conditions among infertile couples

Around 57% of the participants reported one or the other co-morbid conditions. Among those participants with medical conditions, proportion of diabetes was found to be more in both rural (20%) and urban (13%) study subjects. This is similar to the results by Shilpa *et al.,* where 18% of the infertile participants had diabetes. [78]

17% of the rural women were suffering from pelvic inflammatory diseases, fibroid, PCOD and abnormal vaginal discharge. In urban women PCOD was among 7% and abnormal vaginal discharge among 3%. Similar findings were observed by Shilpa *et al.,* [78]

Menstrual irregularity was present among 17% of the rural women and 16% of the urban women. Among whom 73% of them had oligomennorhea, (40% from rural and 33% from urban.) Similarly in a study conducted by Samiha M *et al*., menstrual cycle irregularity was reported among 27% of the women with primary infertility and 37% of the women with secondary infertility. [39]

Menstrual irregularities was found in 37% of infertile females attending infertility clinic according to study done by JA Obuna on Clinical Presentation of Infertility in an Outpatient Clinic of a Resource Poor Setting, South East Nigeria. [95]

In a study conducted at an Endocrinological clinic about 8 to 10 new couples with infertility register every day and various causes detected were 15% of the participants had endocrinological abnormalities, 22% with semen abnormalities, 17% with ovarian failure, 9% hyperprolactinemia, 7% with tubal diseases. [58]

In our study past contraceptive history were nil among both rural and urban participants. Oral contraceptives were demonstrated to have positive effects on the prevention and management of endometriosis and pelvic inflammatory disease. [58]

The high proportion of respondents with co-morbid conditions may be probably due to un-healthy lifestyle, illiteracy and ignorance.

Health care seeking behaviour of the respondents

After getting married, some couples wait for years, others seek assistance within months. Many times it is only the women who seek advice, as there is family pressure. There is ignorance about causes of infertility and seeking advice is not limited to regular health systems. Women go through various treatment seeking modes to avoid the adverse consequences of childlessness. They use varied traditional methods and religious practices, including visits to temple, abstaining from visiting a place where a woman has delivered a child, observing tantric rites, wearing charms, participating in rituals and visiting astrologers. [42]

Our results showed that significant association was seen with respect to socio-cultural practices and place of living. Various practices like visiting religious places, performing rituals and visiting astrologers were comparatively on the higher side among rural subjects.

Wearing threads/taviz was more among urban participants as the Muslim population was predominant. In rural areas the couples with secondary infertility had the practice of not cutting the hair of first child unless they have the second child.

Despite their affiliation with modern treatment people still believe that the remedy for childlessness ultimately depends on God. As a result, in addition to biomedical treatment many couple return to or simultaneously pursue various traditional, spiritual or folk treatments.

Our findings showed that around 38% of the study subjects sought treatment for their infertility problem among which 58% of them were rural residents and 42% were urban residents. It was observed that allopathic was the most common treatment sought by infertile couples which are consistent with other study done recently.[41] Couples' also follow religious practices with such treatment, either simultaneously or subsequently.

Waiting for spontaneous conception (29% and 30% in rural and urban area respectively) was the common answer among those who have not availed any health care facility. Significant association was found with the area of residence and different reasons for not availing any health care services.

Significant association was found among different age group of males and females, where majority of the women belonging to age group 30-39 have availed health care facility. Couples' with primary infertility sought treatment more which is similar to other previous studies. [80]

Similarly Chabra *et al.*, reported in their hospital based study in Maharashtra that among 1000 infertile women, 53% of them were from rural area and the remaining were from urban area. [42] The results were totally different as reported by Niharika Tripathi where 80% and 86% of the infertile women sought treatment from rural and urban area respectively which is high when compared to our study. [80] The lesser proportion in our study may be due to the financial constraints of the study population as our study area is an urban slum and rural area where socio-economic conditions are yet to be improved.

Even though males are equally responsible for the infertility status, it is the woman who usually initiates the first contact with a physician and most of the help-seeking is undertaken by women may be in the form of traditional and modern biomedical health services,[42] as was revealed in the present study also.

The study showed that the minority of the infertile group depends purely on medical approach as a fertility seeking behaviour and most of them sought the spiritualists and traditional medicine beside medical option. It means that medical treatment alone is less often used by the respondents may be because of different perceptions of the causes of infertility or the lack of confidentiality at the treatment centres. [93] This indicates that female literacy should be given prime importance.

Psychological violence

Around 26% of the participants complained of psychological violence which is in line with a study conducted in India, where 20% of the infertile women reported psychological violence.[] The evidence demonstrated that rate of violence in India was comparatively higher than other developing countries.[101]

In our study emotional type of violence was more among urban women (52%). This observed difference between the rural and urban participants was significantly associated. The prevalence of domestic violence among Iranian infertile women has

been reported by Ardabily *et al.*, as 61% with the majority being psychological violence in origin. Moreover, the mentioned-study has also indicated that 14% of the women suffered from physical violence due to infertility. [102]

Results of studies in Africa and Asia including Kuwait, Turkey and Iran showed that infertile women by some means suffer from domestic physical violence, verbal violence and stigma by in-laws and people around them. [103]

Most of the infertile women in the study, reported psychological violence, where majority of the husband and relatives thought that only the women were responsible for the infertility status, largely by their husbands and relatives. [104]

Psychosocial consequences of infertility

Infertility can be described as a major crisis, which "entails not only a physical, psychic and emotional dimension, but undoubtedly a socio-cultural dimension." The experience of infertility is clearly different from individual to individual, varying by gender, personality, culture, personal and family history as well as the investment they project in their forward-looking child. [44]

Our study described the impact of infertility on various psychosocial variables and we found that much of the effect was seen on the marital relationship followed by sexual relationship, psychological distress and social stigma.

Urban residents showed higher scores for marital and social scales when compared to their rural counterparts. Subjects with primary infertility had higher impact levels when compared to subjects with secondary infertility. The scores were higher for females when compared to males and these results were consistent with the results of the earlier studies. []

Higher marital dissatisfaction could be due to the strong belief among the population that having children stabilizes family and increases marital satisfaction and especially people think about the family status which can be fulfilled especially by

childbearing and is considered very important and valuable. Here childless women stand at a risk of disrespectful treatment and stigmatization especially from relatives of the husband. Hence stigma may be more common among women and also among participants with primary infertility.

The scores were inversely proportional to the age group and duration of infertility. The mean scores of different scales by educational level showed that participants with higher education tend to have higher scores and it was found to be statistically significant. Similarly increase in the socio-economic status was significantly associated with the increase in the mean impact scores of personal, sexual and social impact scales.

A descriptive study was conducted among 500 infertile couple among whom marital disharmony was found among 28% of the couples which was highest when compared to sexual conflict (24%), personal conflict (27%) and social isolation (13%), which is similar to our results. Psychological distress was more among women when compared to men, which is similar to our results. [69]

In a study done at Taiwan, women expressed less marital satisfaction, sexual satisfaction (mean scores 32.5) than their husbands (mean scores 29) and it was found significant. Infertility related distress was more among women (mean score 2.5) than men (mean score 2.1) which was found to be statistically significant. [63]

Berg B *et al.*, studied on the patterns of distress among infertile males and females. They reported that 22% of the women were distressed when compared to males (18%).[64]

A comparative study was conducted to evaluate gender differences in the psychological responses of infertile couples attending an ART program in selected areas of China. The study results showed that women showed higher psychosocial distress than their partners. [55]

Our results are in variance with the study conducted in Iran, where social pressure stigma was higher among participants who lived in rural areas and with low socio-economic status.[105] Some women stayed away from children, pregnant women, infertile peers and refused to watch television programs concerning fertility and infertility. Some participants tried to reduce their communication and interactions with all to hide the issue of infertility. [105]

Comparatively our results depicted that, social stigma was slightly higher among urban residents which may be due to the fact that the study area was an urban slum where population density was high and attributing to the factor of high social interactions may result into high social stigma.

Lee T, Sun G 2000 carried out a research to find out the psychological responses of infertile Chinese couples. The participants were given sexual satisfaction and marital satisfaction questionnaire to measure gender differences in coping with infertility problem. Results showed that females experience more stress than males. [63] Their self-esteem, sexual and marital satisfaction was lower than that of males which was consistent with our results. [63]

The prevalence of psychological distress among women was 62%, with the level of distress showing a significant positive correlation with the age of the women, education and among the unemployed even though this trend was not statistically significant. Women with primary infertility presented with higher distress scores compared to secondary infertility and it was significant (0.004). Stratified by duration of infertility 66%, 22% and 12% of the women had been suffering from infertility ranging from 1-5 years, 6-10 years and > 10 years respectively. Duration of infertility showed a significant positive correlation with psychological distress scores (r=0.473. p=0.001, 95%CI=0.216-0.667). [106]

Even the psychological distress among the participants in our study was as high as compared to study conducted by Abbas Alhassan *et al.,*[106] whereas the mean scores were inversely proportional to the age group and duration of infertility because some might have taken some form of treatment or resorted to counselling resulting in decrease in the distress score among them or might have developed some coping mechanisms and might have got relief from the psychological impact of infertility in the present study as the scales measure the impact in the last 4 weeks. With respect to the correlation with educational status and also with the type of infertility it was similar to our results.

Drosdzol and Skrzypulec found with regard to education that participants who have a higher education are those with the highest fertility adjustment in all dimensions except acceptance of life without Children, but the differences are not significant. [107]

Our results revealed the similar relationship with the educational status where participants with higher educational status had higher scores for personal and social impact scales which correlates with the research conducted by Manuela F *et al.,*[108] Except for the marital impact other variables like personal, sexual and social impact scores were higher for the participants with higher socio economic status and it was significantly associated. Whereas our study results are contradictory to these foreign study [109] which may be probably due to the study population as this study was conducted in rural and urban slums where majority of the population were unaffordable to access the expensive services for infertility.

According to Ramenzanzadeh *et al.,* housewives may experience more psychological signs of psychological depression and anxiety more than those who work outside the home,[110] and the other finding had been found a similar trend of depression with age as well as educational status which is similar to our results. [111]

The type of infertility had a significant influence on the mean depression score among the study subjects with women presenting with primary infertility having more psychological signs of depression. [106]

The relation between age and infertility- relatedstress appeared to be sex- speci fic. Among women, age was inversely proportional to Fertility problem inventory (FPI) scores which was found to be statistically significant. In contrast, increasing age had no impact on FPI scores in men. Similarly higher education appeared to act as a buffer for women but not for men. Women with education beyond high school had significantly lower FPI scores than women with high school education or less($r=3.06$, $p<0.002$), among men there was no variation. Women scored significantly higher on scales of global stress ($F=174$ $P<0.001$), Social concern ($F=26.6$,$P<0.001$), Sexual concern($F=31$,$P<0.001$) and need for parenthood($F=17$,$P<0.001$) compared to men, [] which was similar to our study where women scored highest with respect to all scales.[5]

Fultz *et al.*, described in their study that women experience a more negative impact on their sexual relationship than men do, regardless of infertility diagnosis. Higher infertility- related stress among women also arose in part because women placed more importance than men on either experiencing or re-experiencing the role of parent. These anecdotal observations are attributed to different socialization experiences.[112]

Parveen *et al.*, 2008 designed a research to investigate the discrepancies in psychosocial adjustment of literate and illiterate infertile women of Pakistan. It was concluded that literate women have greater psychosocial adjustment as compared to the illiterate infertile women and also psychosocial adjustment was poor among employed and higher social class women.[64]

In research conducted by Amir *et al.,* effects of infertility duration and the difference in the effects of primary and secondary infertility were examined. As duration of infertility was increased it had less influence on marital adjustment, well-being and psychological distress [] which are similar to our results. [43]

A study conducted at Pondicherry demonstrated that infertility has a significant influence on marital satisfaction and especially females more commonly show decreased marital satisfaction when compared to their partners. [73]

It could be due to the fact that women were more likely to access social support than men, and are therefore more socially vulnerable, more likely to confront questions and conversations about children and they often feel stigmatized and engage in negative social comparisons when confronted by pregnancy among peers and family.

SUMMARY

- The present study was conducted in the rural and urban (slum) field practice area of a tertiary care centre. The total number of study subjects were 180 among which 106 were from rural and 74 from urban slum.
- Prevalence of infertility was higher among urban residents (8.8%) compared to rural residents (7.6%). Prevalence of primary infertility (5.3 rural and 5.7 urban slum) was on the higher side compared to secondary infertility (2.3 rural and 3.1 urban slum)
- Participants belonging to age group 20-29 years were higher in number, majority belonged to Hindu families (87%) and 46% of them resided in nuclear type of family. Education till high school (30%) was seen among majority of the participants. Around 36% of the women were home-makers & 30% of the participants were unskilled workers. More than one third of the couples belonged to class III socio-economic status.
- 39% of the couples had duration of infertility < 5 years and 33% of them had between 5-9 years.
- Family history of infertility was present among 12% of the infertile couple and history of consanguineous marriage was among 33% of the participants.
- Substance abuse was among 55% and 59% of the rural and urban males respectively. Among which more men in the rural area had the habit of tobacco consumption (62%). Similarly in urban area alcohol consumption (59%) was higher when compared to tobacco consumption.
- Around 57% of the participants reported one or the other associated medical (54%) and reproductive system diseases (46%). Medical disorders were more among men and Reproductive system diseases were more among women.

- Oligomennorhea (73%) was the most common menstrual irregularity for which majority had not sought any treatment.
- Knowledge about fertile period was very less among the participants which was around 11% for urban participants and 4% for rural participants.
- Visiting religious places was the most common cultural practice among both rural and urban residents. Another different cultural practice of not cutting hair of the first child until the birth of second child was seen among rural secondary infertile couples.
- Treatment seeking for infertility was seen only among 38% of the participants where males constituted only 11%.
- Emotional type of psychological violence was highest among the urban residents and the main perpetrators being within the family.
- Psychosocial consequences were seen at four different levels personal impact, sexual impact, marital impact and social impact. In rural area, marital impact was highest followed by sexual impact, personal impact and social impact.
- In urban area, marital impact was the highest, followed by sexual impact, social impact and least was the personal impact. The difference in the mean scores between rural and urban participants is not statistically significant.
- Subjects with primary infertility compared to secondary infertility and females compared to males had higher scores and this difference was found to be highly significant.
- For the personal impact scale, age was inversely proportional to the mean scores and educational status, socio-economic status was found to be directly proportional to the mean scores. Participants who had not sought any treatment had higher impact levels compared to those who had sought treatment.

- Regression analysis of sexual impact scores with selected predictors showed higher impact on those subjects in the lesser/younger age group, Muslims had higher impact levels compared to Hindus and participants who had not availed any health care facilities had higher impact levels whereas subjects from lower SES had lesser impact levels compared to higher SES.
- With respect to marital impact scale urban population had higher impact levels compared to rural counterparts but it was not statistically significant. Variables like age, gender, type of infertility, treatment seeking pattern showed statistical significance.
- The social impact analysis showed age and educational status was inversely proportional to the mean impact scores. Whereas women and those belonging to Muslim religion had higher impact levels when compared to males and Hindus respectively.

CONCLUSION

Infertility affects the couples, not the individual hence the burden is on the family. The findings of the present study revealed that infertile couples have poor well- being on all the dimensions. They have negative feelings, low self-esteem, and low social support. Infertility is not mere medical problem of the affected couples alone but is highly influenced by the social and psychological conditions. It has profound effect on people's lives and psyche.

The matter is not discussed openly, stigma is high and there is no proper knowledge about infertility and fertile period. Most of them think it as a result of past sins and practice unscientific methods to overcome the problem. Hence majority have not consulted any doctors.

Among those who have consulted health care services a significant proportion of male partners did not seek any treatment, even though males are equally responsible for the infertility status, this may be a reflection of male dominated society trying to stigmatise the female. Even the educational status is very poor indicating the first barrier towards motivating the couples to access health care services.

It is worth mentioning that during our study period we educated and counselled the couples and their family members regarding the common causes of infertility, fertile period, to decrease the stress and stigma, lifestyle modification and to seek treatment.

RECOMMENDATIONS

- Infertility has emerged as a serious health problem in India. Field based study should be encouraged to know the burden of infertility and its consequences.
- The provision of health education as an integral part of infertility management into reproductive health care programmes is needed.
- Efforts to raise awareness in the population about the causes of infertility are needed and facilities should be made available for early diagnosis and treatment of the same in the rural areas/urban slums. Further research needs to be undertaken involving appropriate investigations which are feasible at the primary health centre level.
- The importance of traditional health services in infertility management should be recognized as an important factor. Instead of high profile treatment, other treatment modalities like giving vitamin supplements can be encouraged which influence the fertility and also decrease the financial burden.
- Family traditions and poor SES may be one of the reasons for not seeking treatment. Integrated approach is strongly suggested for creating awareness. Health education activities or programmes regarding common causes of infertility, management of stress, counselling, Promoting healthy behaviours like changes in lifestyle including weight reduction, avoidance of consumption of alcohol and tobacco, which will have a positive influence on fertility and emotional support should be initiated.
- Stress can act in a dual manner where stress affects fertility and infertility leads to stress thus forming a vicious cycle. Still females are considered as the only cause of infertility. Hence awareness should be given that both couples are equally responsible hence males also should be encouraged to seek treatment.

- Majority of infertile couples were suffering from one or more co-morbid conditions, in this context proper and timely intervention needs to be undertaken to tackle the problem.
- Female literacy and counselling helps them to overcome the psychological violence, brings confidence and it may help them to overcome the stigma.
- Legal adoptions should be made popular.

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ANNEXURE –I

PROFORMA

1. Name of HOF :
2. Number of family members:
3. Religion:
4. Occupation :
5. Type of family:
6. Annual Income:
7. SES:
8. No of eligible couples:
9. No of couples at risk of pregnancy
10. No of infertile couple
11. Previous Contraceptive history if any:

Name	Yes/no	If yes, which	Side effects/complications	Duration	Source of information	If No, why

Details of infertile couple

	Husband	Wife
Name		
Age		
Age at marriage		
Education		
Occupation		
Any co-morbid conditions Y/N		
If yes, which		
Any Reproductive system diseases Y/N		
If yes, which		
Tobacco/Alcohol		

Duration of married life:
Duration of infertility:
Type of infertility:
Family history of infertility
History of consanguineous marriage:
Menstrual history:
Age at menarche:
Frequency of menstrual cycles: Normal/Oligomenorrhea/Hypomenorrhea
If irregular: treatment taken: Y/N
Investigations: Report : if any
Coital history:
Frequency: Daily/thrice a week/twice a week/occasional
Difficulty in intercourse: Y/N
Knowledge about fertile period: Y/N
Anthropometry: Height: Weight: BMI:

Treatment seeking pattern:

	Husband	Wife
Treatment taken: Y/N		
If Yes, which		
If No, Why		

Socio cultural practices: Y/N

	Husband	Wife
Visiting religious places		
Wearing threads		
Astrologers		
Rituals		
Others		

Any H/O psychological violence among women:
If Yes, by whom
If Yes, Emotional/Verbal

Past obstetric history: For Secondary Infertility

Any abortion:
If yes,

Number of times	Where was the abortion conducted	Any Complications	Reason for abortion

Description of Psychosocial Measures Used to Evaluate the Impact of an Infertility

Personal Impact: Because of your fertility problems, how often have you felt (0 Never, 10 Very Often):

1. Not in control of your life?
2. That you might miss something important in life?
3. That you couldn't meet your life goals?
4. That you must have done something to deserve these problems?
5. Defective?

Total score determined by sum of 5 questions divided by 50 and multiplied by 100. Higher scores represent greater impact.

Sexual Impact: What effect have your fertility problems had on your sexual relationship? (0 Strongly Disagree, 4 Strongly Agree)

1. I find I've lost my enjoyment of sex because of our fertility problem.
2. I don't feel as attractive to my partner as before our fertility problem.
3. I feel any different from other members of my sex because of our fertility problems
4. I feel that I've failed at sex because I can't get my partner pregnant/or get pregnant.
5. During sex, all I can think about is wanting a (another) child.

Total score determined by sum of 5 questions divided by 20 and multiplied by 100. Higher scores represent greater impact.

Marital Impact: What effect has your fertility problems had on … (0 none of the time, 4 always)

1. How much you enjoy the time you spend with your partner? (reverse code)
2. How often you and your partner have disagreements and arguments?
3. How satisfied you are with your partner? (reverse-code)
4. How satisfied you are with your relationship in general? (reverse-code)
5. How stable your relationship is? (reverse-code)

6. How much you feel that you and your partner are a team? (reverse-code)
7. How close you feel to your partner? (reverse-code)

Total score determined by sum of 7 questions divided by 28 and multiplied by 100. Higher scores represent greater impact.

Social Impact

How often do you feel uncomfortable (0 Never, 10 Very often)

1. With family members because they ask when you and your partner are going to have a (another) baby?
2. With family members because they give you unwanted or unhelpful advice about having a (another) baby?
3. With family members because they minimize what you are going through to try to have a (another) baby?
4. With family members because they make insensitive comments about your fertility problems or getting pregnant?
5. With friends because they ask when you and your partner are going to have a (another) baby?
6. With friends because they give you unwanted or unhelpful advice about having a (another) baby?
7. With friends because they minimize what you are going through to try to have a (another) baby?
8. With friends because they make insensitive comments about your fertility problems or getting pregnant?
9. When your friends talk about their pregnancies or their children?
10. Around friends or family members who are pregnant or who have babies?
11. With co-workers because they know about your fertility problems?
12. Around babies or young children in your extended family?

How often do you feel that … (0 Never, 10 Very Often)

13. Your partner doesn't understand your feelings about having a (another) baby?
14. Your partner doesn't understand what trying to have a (another) baby is like for you?
15. You can't talk to your partner about having a (another) baby?
16. Your family doesn't understand what trying to have a (another) baby is like for you?
17. You can't talk to your family about your problems having a (another) baby?
18. Your friends don't understand what trying to have a (another) baby is like for you?
19. You can't talk to your friends about your problems having a (another) baby?
20. People avoid talking to you about your problems having a (another) baby?
21. You don't have anything in common with your friends who have not had fertility problems?

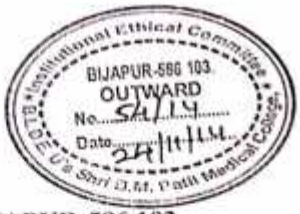
How often have you avoided … (0 Never, 10 Very Often)

22. Being around some of your friends because of your problems having a (another) baby?
23. Being around some members of your family because of your problems having a (another) baby?
24. Going to holiday gatherings because of your problems having a (another) baby?
25. Going to other social gatherings because of your problems having a (another) baby?

Total score determined by sum of 25 questions divided by 250 and multiplied by 100. Higher score represents greater impact.

ANNEXURE –II

ETHICAL CLEARANCE CERTIFICATE



B.L.D.E. UNIVERSITY'S
SHRI.B.M.PATIL MEDICAL COLLEGE, BIJAPUR-586 103
INSTITUTIONAL ETHICAL COMMITTEE

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this college met on 22-11-2014 *at* 3-30pm *to scrutinize the Synopsis of Postgraduate Students of this college from Ethical Clearance point of view. After scrutiny the following original/corrected & revised version synopsis of the Thesis has been accorded Ethical Clearance.*

Title Comparative study to determine the prevalence and psychosocial consequences of infertility in rural & urban field practice areas of Shri. B.M. Patil Medical College, Bijapur

Name of P.G. student Dr. Vidya, V. Patil.
Dept of Community Medicine

Name of Guide/Co-investigator Dr Rekha Kudgiri, Professor.
Dept of Community Medicine

for
DR.TEJASWINI. VALLABHA
CHAIRMAN
INSTITUTIONAL ETHICAL COMMITTEE
BLDEU'S, SHRI.B.M.PATIL
MEDICAL COLLEGE, BIJAPUR.

Following documents were placed before E.C. for Scrutinization
1) Copy of Synopsis/Research project.
2) Copy of informed consent form
3) Any other relevant documents.

ANNEXURE – III

INFORMED CONSENT FORM

B. L. D. E University Shri B.M. Patil Medical College, Hospital And Research Centre, Vijayapura

Department Of Community Medicine

CONSENT FORM

Title of the topic

Comparative study to determine the prevalence and psychosocial consequences of infertility in rural and urban field practice areas of Shri B.M.Patil Medical College, Vijayapur.

PG Student: Dr. Vidya.V.Patil

Guide: Dr Rekha Udgiri

1:PURPOSE OF RESEARCH: I have been informed that this study will help to assess the prevalence and psychosocial consequences of infertility in rural and urban field practice areas.

2:PROCEDURE: It is a Cross - sectional study. Study group will be comprised of eligible couples where woman is in the reproductive age group of 15-49 years. Detailed information will be collected on a predesigned, pretested proforma about socio-demographic profile & assessment of psychosocial consequences is by using a pretested validated standard questionnaire by oral questionnaire method, supplemented by physical examination to check height and weight.

3: RISK AND DISCOMFORTS: I understand determination of above mentioned procedure will not cause any discomfort to me and do not involve any risk to my health.

4: BENEFITS: I understand that my participation in the study may not have a direct benefit to me but will be useful in assessing the prevalence and psychosocial consequences of infertility in rural and urban field practice areas of Shri B.M.Patil Medical College. Vijayapur.

5: CONFIDENTIALITY: I understand that medical information produced by this study will become part of institutional records and will be subject to the confidentiality and privacy regulation of the said institute.

6: REQUEST FOR MORE INFORMATION:

I understand that I may ask more questions about the study at any time. Concerned researcher is available to answer my questions or concerns. I understand that I will be informed of any significant new findings discovered during the course of this study which might influence my continued participation. If during the study or later, I wish to discuss my participation in all concerns regarding this study with a person not directly involved, I am aware that the social worker of the Institute is available to talk with me. A copy of this consent form will be given to me to keep for careful re-reading.

7:REFUSAL OR WITHDRAWAL OF PARTICIPATION: I understand that my participation is voluntary and that I may refuse to participate or may withdraw my consent and discontinue participation in the study at any time without prejudice. I also understand that researcher may terminate my participation in this study at any time after she has explained the reasons for doing so.

I have explained to _____(Patient/Relevant guardian) the purpose of the research, procedures required and the possible risk and benefits to the best of my ability.

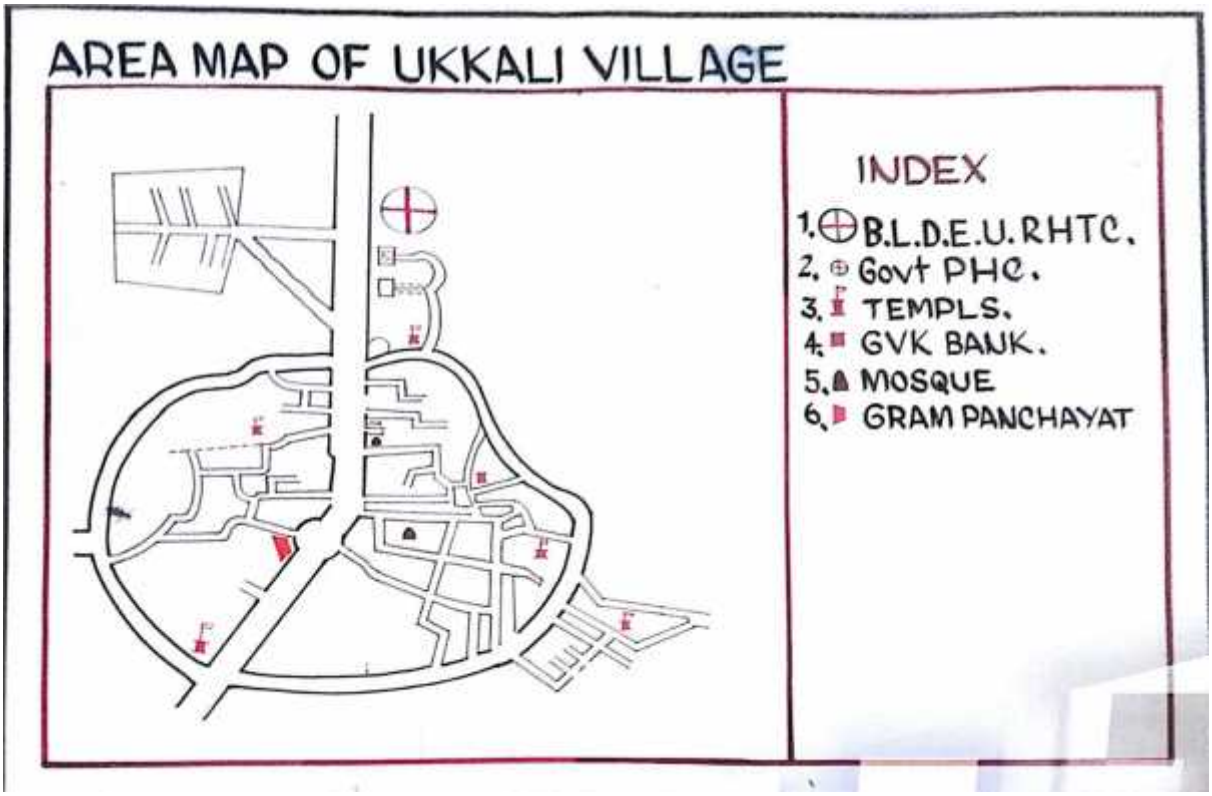
Investigator: Date:

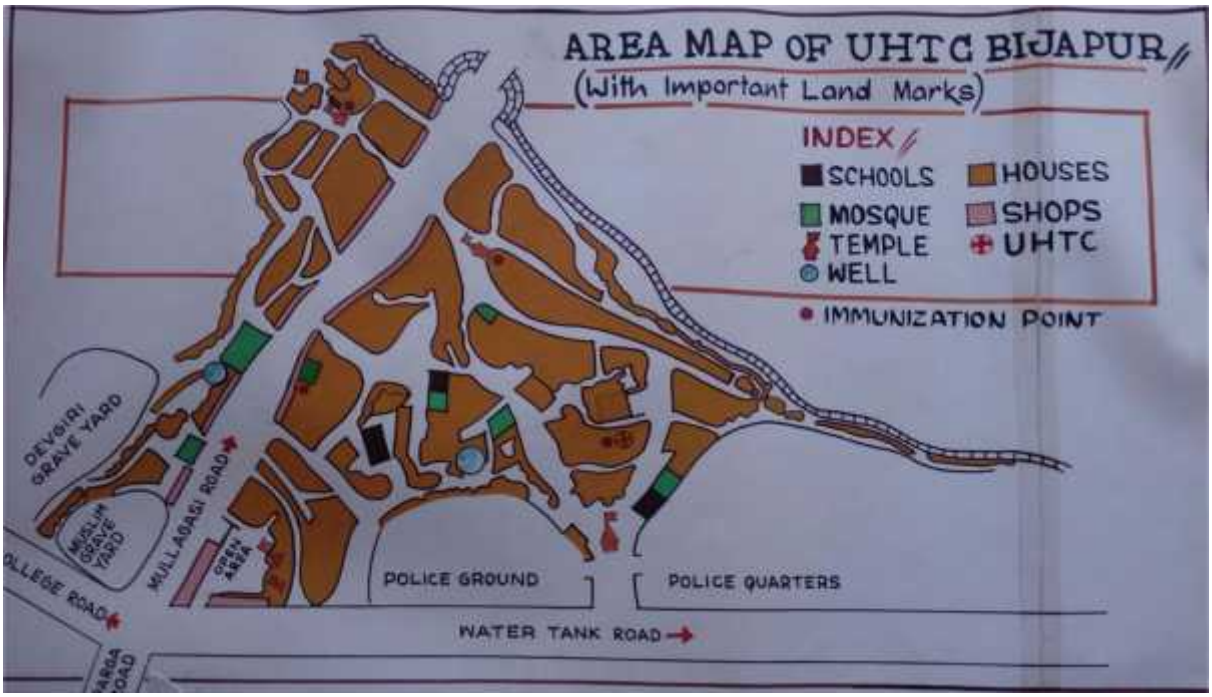
I confirm that Dr. Vidya .V. Patil has explained to me the purpose of research, the study procedure that I will undergo, and the possible risk and discomforts as well as benefits that I may experience in my own language. I have been explained all the above in detail in my language and understand the same. Therefore, I agree to give consent to participate as a subject in this research project.

Participant: Date:

ANNEXURE –IV

MAPS OF RURAL AND URBAN FIELD PRACTICE AREAS

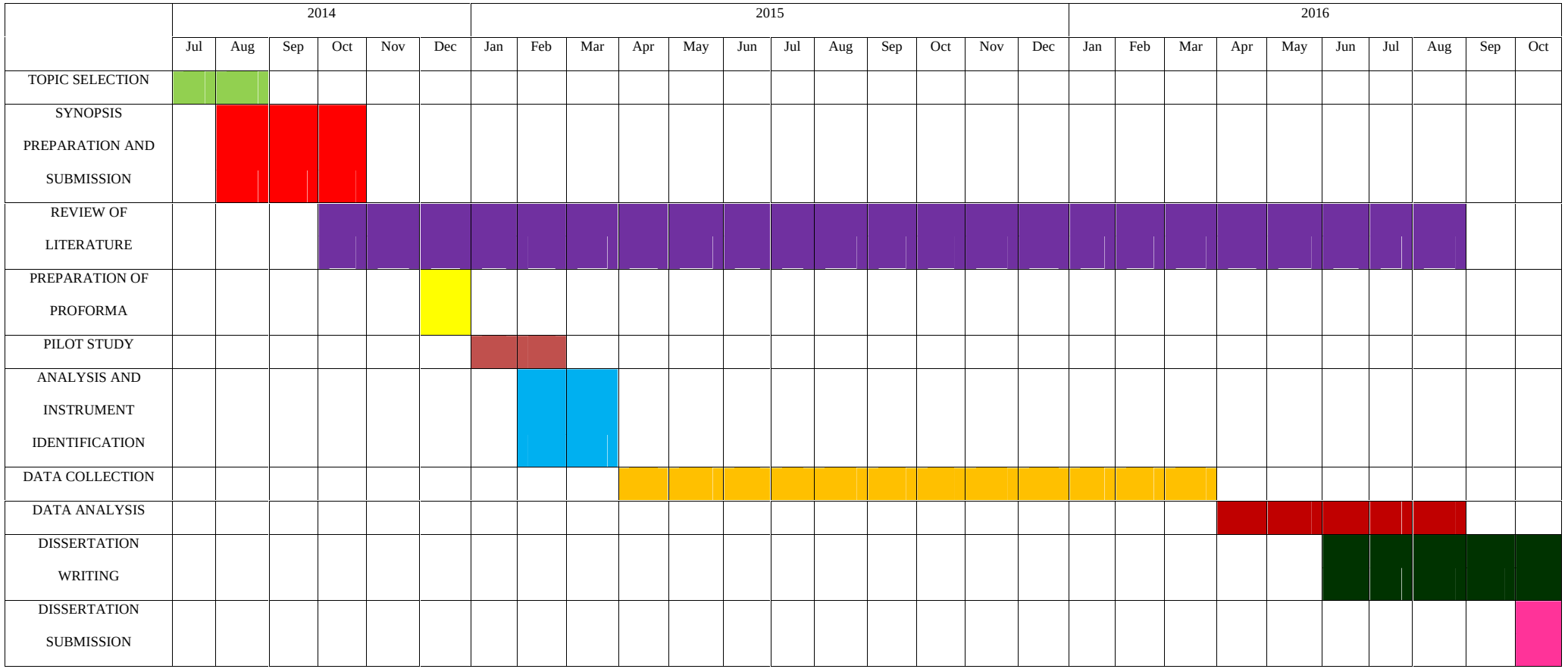




ANNEXURE –VI

PHOTOGRAPHS

GANTT CHART


2014
2015
2016
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
TOPIC SELECTION
SYNOPSIS PREPARATION AND SUBMISSION
REVIEW OF LITERATURE
PREPARATION OF PROFORMA
PILOT STUDY
ANALYSIS AND INSTRUMENT IDENTIFICATION
DATA COLLECTION
DATA ANALYSIS
DISSERTATION WRITING
DISSERTATION SUBMISSION