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Causes of Male and Female Infertility: An Anthropological Perspective

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Abstract: Infertility is a multidimensional problem with social, economic and cultural implications affecting approximately 8-10% of couples. In the present study a total of 635 infertile females and 523 males from three infertile centers who are taking medical counseling were screened. A validated questionnaire has been administered to collect the data pertaining to the causes of infertility, period of infertility and life styles besides anthropometric measurements. Clinical investigations were also carried out to the sample. The period of infertility was divided into five infertile age groups i.e. 1-2 years, 3-4 years, 5-9 years, 10-14 years and >15 years. In 1-2 years of male infertile group, 43.29% of Oligospermia; 47.91% of Azoospermia and 66.66% of pre mature ejaculation. In 1-2 years of infertile female group, tubal blocks were around 36.95% and 3% of hormonal deficiency were observed. In >15 years period of male infertile age group, 4.74% of Oligospermia; Azoospermia with4.16% and pre mature ejaculation was 3.41%. Whereas, in >15 years period of infertile group ovulation defect (56%) and small size uterus (16%) were predominant. Both overweight (41.3%) and obesity (36%) has shown positive association with infertility in 5-9 yrs and >15yrs groups. Our results show a strong association of infertility with body mass index. Infertility period increases, BMI also increases. A majority of educated and higher income groups sought medical counseling to resolve the infertility related problems. Because of high medical expense, the lower income group people are unable to afford the opportunity of resolving the problems through medical counseling 96% of males were found to be habituated to drinking (24%), smoking (33%) and both (39%) habits. In conclusion it is stated that infertility can be treated and managed with medication, minor surgical operations, laparoscopic procedures, hormonal therapy and maintenance of healthy life style.

Keywords: Infertility. Body mass index. Hormonal deficiency Male infertility, Ooligospermia, Azoospermia. Life style.

INTRODUCTION

Infertility is the inability of a couple to achieve pregnancy within 12 months of unprotected intercourse (WHO, 2013). Infertility is worldwide problem affecting people of all communities, though the cause and magnitude may vary with geographical location and socioeconomic status. It is estimated that globally 60-80 million couples suffer from infertility every year, of which between15-20 millions are in India alone (Pasi *et al.,* 2011). Considering

the current population statistics of India this would extrapolate to a humongous burden to the society.

Infertility is quite common, with approximately one out of eight couples reporting the inability to conceive after one year of trying (Lotti & Maggi, 2018, Chandra *et al.*, 2013 and Kelley *et al.*, 2019). Infertility is not merely a health problem; it is also a matter of social injustice and inequality (Kumar, 2007). 20-30 % of infertility cases are due to male infertility, 20-35% is due to female infertility, and 25-40% is due to combined problems in both parts (ART, 2016). 20% remaining unexplained (Peterson *et al.*, 2007).

Infertility may result from a wide range of abnormalities one or both of which exist. However, infertility is not much different in people and it can have a variety of causes (Palihawadana, 2012). This study examines the following points: primary causes of infertility, such as genetic factors, hormonal disorders, genetic disorders, congenital defects or reproductive system diseases; secondary factors, including lifestyle related factors, such as obesity, diet, smoking, alcohol consumption and chemical environments, and secondary factors related to human infertility such as unsafe methods of childbirth and post-partum period as well as symptoms of sexually transmitted diseases. Although many people still think of infertility as a "woman's problem", up to half of all cases of infertility involve problems with the man. The exact cause of male infertility is still unknown in more than 50% of cases (Dada and Gupta, 2004).

Male infertility is a multifactorial disease process with a number of potential contributing causes. Male infertility cases are due to deficient sperm production of unknown origin, environmental and nutritional factors. Lifestyle risk factors like cigarette smoking, alcohol consumption, chronic stress, and nutritional deficiencies has been associated with decreased sperm count, alterations in motility, and an overall increase in the number of abnormal sperm (Kulikauskas,*et al.*,1985, Decellis *et al.*,1996 and Sharpe,2000). In fact, in about 20 to 30 per cent of the time, a man's low fertility is the main obstacle to conception. A variety of disorders ranging from hormonal disturbances to physical problems and psychological problems can cause male infertility. The sperm's role in male infertility; however, similar arguments can be made about other contributing elements. For example, the male genital tract (Lotti and Maggi, 2015, seminal fluids (Bieniek & Drabovich, 2016 and Jodar *et al.*, 2017), hormonal regulation (Holdcraft &Braun, 2004 and Dohle&Smit, 2003), non-germ line testicular cells (Zhou *et al*, 2019 and Procopio *et al*, 2017), and his genetic constitution can all contribute to male infertility (Krausz *et al*, 2018). Finally,on how investing in the identification of new male infertility mechanisms will improve the treatment outcomes and lives of women in the future.

The number and quality of sperm decrease in male smokers; sperm mobility is reduced and the number of sperms with abnormal appearance increases. Smoking may make the sperm unable to fertilize eggs (Jaiswal *et al.*, 2015). Alcohol consumption in men reduces sperm count; and motility and number of normal morphology sperm in them (Sabarre *et al.*, 2013).In contrast, in chronic alcoholics, there is good evidence for impairment of spermatogenesis and reductions in sperm counts and testosterone levels (Villalta *et al.*, 1997 and Muthusami, 2005). A significantly reduced testosterone to estradiol ratio has been observed among overweight or obese men (BMI>25) when compared with men with lower BMI. Men with higher BMI have also exhibited altered quantity and quality of sperm (Magnusdottir *et al.*, 2005 and Kort *et al.*, 2006).

However, it appears that the woman is consistently held responsible for a couple's infertility, and she is often punished psychologically and socially as a consequence (Dyer *et al.*, 2005). For women, problems with fertilization arise mainly from either structural problems in the Fallopian tube or uterus or problem releasing eggs. Infertility may be caused by blockage of the Fallopian tube due to malformation, infections such as Chlamydia and or scar tissue. For example, endometriosis can cause infertility with the growth of endometrial tissue in the Fallopian tubes and or around the ovaries, Endometriosis is more common in women in their mid- twenties and older, especially when postponed childbirth has taken place (Lessy, 2000). Other factors that can affect a woman's chances of conceiving include being overweight or underweight or her age as female fertility declines after the age of 30 (Are You at Your Optimal, 2015 and Shoukd I Freez my Eggs, 2015).

Polycystic ovary is one of the common reasons of ovulation disorder in women of childbearing age (Tsai *et al.*,2013). Usually 30%-70% of women with PCOS are obese. PCOS is an androgen excess mode with insulin resistance which makes pregnancy difficult. The role of obesity in pregnancy focuses on the physiology of fat body and metabolic disorders (Jaiswal *et al.*, 2015).Overweight and obesity in women with PCOS exacerbates the severity of androgen and disorders metabolic profile (Christofani *et al.*, 2014).

Obesity also plays a significant role in reproductive disorders, particularly in women. It is associated with anovulation, menstrual disorders, infertility, difficulties in assisted reproduction, miscarriage, and adverse pregnancy outcomes. Obese women, especially women with abdominal fat hardly become pregnant and have low chance of infertility treatment. In women with a body mass index (BMI) >25, compared with BMI <25, Obesity brings out many problems such as social, psychological, demographic, and health problems (Zeynep Özcan Dağ, 2015).

In any society where child bearing defines a woman's identity and motherhood of great social significance, infertility leaves unhealed scars traumatizing the women socially and emotionally. In the light of above background the present study is intended to cover all aspects of male and female infertility by considering samples in infertility centers to examine the extent of infertility in Tirupati town of Chittoor district, Andhra Pradesh.

MATERIAL AND METHODS

This is a cross-sectional descriptive study in which 635 infertile females and 523 infertile males were selected by convenience sampling and were evaluated. The study materials belong to infertile males and females from all communities of different socio-economic milieu who sought medical assistance in three private infertility Centers available in Tirupati town for treatment. These centers have adequate infrastructural facilities for all kinds of clinical investigations of infertility either of male or female. The purpose and overview of the study was explained at the time of the interview, and interviewees 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 purposes of the study. They were also told that the researcher would assume responsibility for the safekeeping of the data, and that they could request deletion of their data at any point. The exclusion criteria are any physical illness which prevents them from conceiving and suffering from any neurological or psychiatric illness.

A validated questionnaire has been administered to collect the data pertaining to the causes of infertility, period of infertility, life styles besides anthropometric measurements. Clinical investigations were also carried out to the sample. The Anthropometric measurements like height, weight from infertile males and females were recorded following the procedures of Weiner and Lourie (1969) and WHO (1995). In this paper we followed the BMI classification proposed by the WHO Western Pacific Regional office in collaboration with IOTF (2000). The results thus achieved have been critically analyzed and presented.

RESULTS

A total of 635 infertile females and 523 infertile males were studied and the sample is arranged according to period of infertility. Distribution of infertile females according to the nature of disorders and period of infertility was shown in table 1. In a total of 635 infertile females chiefly, ovulation defects (50.07%) dominate over other disorders like tubal blocks (32.91%), small size uterus (13.70%) and hormonal deficiencies (3.31%). Percentage of all disorders was more in the initial period of infertility.

Distribution of the sample according to the nature of disorders and period of infertility was shown in table 2. In a total of 523 infertile males, mainly oligospermia (68.45%) dominates over other disorders like azoospermia (9.17%) and pre mature ejaculation (22.37%). Percentage of all disorders was more in the initial period of infertility.

Table 3 shows the relationship between the period of infertility with weight, height and the BMI in females. It is evident from the table that when the period of infertility increases, the mean weight increases, whereas the mean height decreases. It is clear from the table that when the infertility period increases, BMI also increases. .Higher percentage of females (52.445%) with BMI 26.45 ± 2.6 is present in1-2 years of infertility period. In 15+ years of infertility period low percentage of females (3.94%) with BMI 35.40 ±4.0 are present.

Relationship between the period of infertility with weight, height and the BMI of infertile males was shown in table 4. It is evident from the table that when the period of infertility increases the mean weight increases whereas the mean height decreases. It is clear from the table that when the infertility period increases, BMI also increases. Higher percentage (48.94%) with BMI 25.42 ± 2.1are present in 1-2 years of infertility period. In 15+ years of infertility period low percentage was observed (4.40%) with high BMI (28.66 ±3.6). It shows that when the infertility period and BMI increases, the percentage of infertile individuals decreases. As a result of this it shows that there is a possible association with obesity and infertility.

Distribution of sample according to type of habits was shown in table 5. On the basis of smoking and alcohol habits among the infertile males, it is observed that more percentage (39.19%) of males is infertile when they have both the habits of smoking and alcohol. But when consider the habit of smoking and alcoholism alone, the infertility in smokers is 32.50% and among alcoholics it is 23.90%. It proves that there is a strong association between infertility and smoking and alcoholic habits.

DISCUSSION

Infertility seems to be a multidimensional health issue which occurs not only due to health problems, but with a number of potential contributing causes. It may be a result ovulation problems, tubal blockage, age-related factors, uterine problems, hormone imbalance and the choices imposed by the modern lifestyle, like the higher average age of people who get married, stress, non-conducive legal framework for assisted reproduction, etc. (Roupa *et al.*, 2009) in case of females. The majority of male infertility cases are due to deficient sperm production of unknown origin.

In the present study 53.45% ovulation defects and 58.85% tubal block cases are seen more in 1-2 year period of infertility. Endometriosis is a non cancerous condition and may

cause adhesions between, fallopian tubes thereby preventing the transfer of the egg to the tube thus causing infertility. The above evidence presented support with other findings that tubal and peritoneal factors of importance in infertility include endometriosis (Tomassetti *et al*, 2006). Hormonal imbalance is an important cause of anovulation. Women with hormonal imbalance will not produce enough follicles to ensure the development of an ovule. In our study, 47.61% of hormonal deficiency cases in 1-2 year period of infertility were observed. A similar pattern has been reported in other studies that hormonal imbalance is an important cause of anovulation. Women with hormonal imbalance will not produce enough follicles to ensure the development of an ovule (Gohill *et al*., 2001). Besides this small size uterus with 41.37% in 3-4 years of infertility is noticed in our study. The same was reported by other studies that congenital abnormalities, such as septate uterus may lead to recurrent miscarriages or the inability to conceive (Rao, 1977).

Lifestyle and dietary choices, Pesticide residues, and xenoestrogens all may adversely affect spermatogenesis (Steven *et al*., 2000).Azoospermia is identified in approximately 1% of all men and 10% to 15% of infertile males (Cocuzza *et al*., 2013). With a population of approximately 3 billion people at reproductive age, a gross estimate indicates that approximately 10 million men worldwide are azoospermic. From the present study it is clear that the percentage of azoospermic males is (9.17%), these findings are in good agreement with other studies (Patel Mital *et al*., 2012 and Rajvi Mehta *et al*., 2006) and shows the regional variation From this it is evident that the proportion of oligospermia affected males decreases (4.74%) as the period of infertility increases (15+ years). The findings from the other studies may suggest that abnormally low sperm counts adverse impact of factors in adulthood or as the result of a developmental problem. The evidence for declining sperm counts in recent decades mean that the environmental/lifestyle impact on spermatogenesis is an important health issue (Sharpe R.M., 2010).

Ovarian dysfunction could be caused by weight loss and excessive weight gain with body mass index (BMI) greater than 27 kg/m2 (Imani *et al*, 1998). Excess weight has also been found to have effect on treatment efficacy and outcomes of assisted reproductive technique. Estrogen is produced by the fat cells and primary sex organs and thus, state of high body fat or obesity causes increase in estrogen production which the body interprets as birth control, limiting the Chances of getting pregnant (Wasiu Eniola *et al*., 2012). The present analyses indicate that the infertility has stronger association with body size especially with the period of infertility. Age factor plays an important role in female infertility, the longer the period of infertility the more the number of obese individuals. The results show that BMI greater than 29.5 is equally associated with an increased risk of infertility. These findings are in good agreement with other studies that high body fat or obesity causes

menstrual dysfunction and subsequent infertility, increased risk of miscarriage and decreased effectiveness of ART, limiting the chances of getting pregnant (Pasquali, 2007; ASRM, 2009).

It is clear from the study that when the infertility period and BMI increases, the percentage of infertile individuals decreases. As a result of this, the present analysis indicates that there is a possible association with obesity and infertility. Age factor plays an important role in male infertility, the longer the period of infertility the more the number of obese individuals. In 15+ years of infertility period low percentage was observed (4.40%) with high BMI (28.66 ± 3.6). These findings are in good agreement with other studies that a retrospective analysis of data from 390 men suggested that high BMI was associated with reduced sperm concentration and motility (Hammoud *et al.*, 2008).

It is observed from the present study that more percentages of males (39.19%) are infertile when they have both the habits of smoking and alcohol. A similar pattern has been reported in other studies that Cigarette smoking has been association with adverse effects on fertility, although this is not widely recognized (Roth *et al.*,2001). There is strong evidence of the adverse effects of smoking on fertility operating through a range of pathways in both the general and infertile population. In males, smoking negatively affects sperm production, motility and morphology and is associated with an increased risk of DNA damage (Zenzes *et al.*, 1999 and Kunzle *et al.*,2003). Alcohol is a known teratogen (Raddall, 1987 and Chaudhuri,2000) and its consumption has been reported to decrease fertility, although the level of consumption associated with risk is unclear. Alcohol consumption at the extreme level is known to be dangerous to the unborn child (Astley *et al.*, 2000, Goransson *et al.*,2003 and Krulewitch *et al.*,2005). In contrast, in chronic alcoholics, there is good evidence for impairment of spermatogenesis and reductions in sperm counts and testosterone levels.

CONCLUSION

Maintaining a healthy lifestyle, getting regular checkups with the doctor and maintenance of normal body weight can avoid fertility problems. The need for health care should relate to the cultural realities of specific locations; where infertility is a pervasive and serious concern it should be addressed through health care programs. The medical and socio-economic support of infertile women is important requirements for resolving the problem. Female infertility can surely be treated with medicines, minor surgical operations, laparoscopic procedures, hormonal therapy and prevention of preconception failure. The review is helpful to all the scientific, medical researchers who can put efforts to put end to female infertility. Male adiposity and lifestyle habits were associated with increased infertility in males. Increased

adiposity could produce other biological changes in men that reduce their fertility. If such changes occur and are reversible, weight loss may improve their chances of conception. Most lifestyle factors are theoretically modifiable a structured programme of education, support and access to specialist health professionals should back counseling to encourage and facilitate appropriate lifestyle changes. This will facilitate the provision of optimum health care to couples attempting to become pregnant, improving their chances of success and minimizing the need for costly and invasive infertility treatment. The study is helpful to all the scientific, medical researchers who can put efforts to put end to male and female infertility.

Table 1
Distribution of infertile females according to period of Infertility and nature of disorders

Period of Infertility (in Years	*Nature of Disorders*							
	Ovulation Defect		*Tubal Blocks*		*Small size Uterus*		*Hormonal deficiency & Others*	
	No	*%*	*No*	*%*	*No*	*%*	*No*	*%*
1-2	170	53.45	123	58.85	30	34.45	10	47.61
3-4	90	28.30	50	23.92	36	41.37	2	9.52
5-9	19	5.97	16	7.65	9	10.34	2	9.52
10-14	25	7.86	15	7.17	8	9.19	5	23.81
15*	14	4.40	5	2.39	4	4.59	2	9.52
Total (635)	318	50.07	209	32.91	87	13.70	21	3.31

Table 2
Distribution of infertile males according to nature of disorders and period of infertility

Period of Infertility (in years)	*Nature of Disorders*					
	Oligospermia		*Azoospermia*		*Pre mature ejaculation*	
	No	*%*	*No*	*%*	*No*	*%*
1-2	155	43.29	23	47.19	78	66.66
3-4	103	28.77	14	29.16	20	17.09
5-9	48	13.40	3	6.25	7	5.89
10-14	35	9.77	6	12.5	8	6.83
15*	17	4.74	2	4.16	4	3.41
Total (523)	358	68.45	48	9.17	117	22.37

Table 3
Distribution of the sample by Mean weight, height and Body Mass Index (BMI) of infertile females

Period ofinfertility (in years)	*No of females*		*Mean Weight±S.D*	*Mean Height±S.D*	*BM I± S.D*
	No	*%*			
1-2	333	52.44	62.5± 6.1	153.7± 9.4	26.45± 2.6
3-4	178	28.03	68.0± 7.3	153.3± 10.0	28.93 ± 3.1
5-9	46	7.24	73.5± 5.7	152.5± 8.7	31.60 ± 2.4
10-14	53	8.35	79.5 ± 5.9	151.9± 9.1	34.46 ± 3.7
15+	25	3.94	80.5± 5.0	150.8± 8.8	35.40 ± 4.0

Table 4
Distribution of the sample by mean weight, height and Body Mass Index (BMI) of infertile males

Period ofinfertility (in years)	*No of males*		*Mean Weight±S.D*	*Mean Height±S.D*	*BM I± S.D*
	No	*%*			
1-2	256	48.94	74.5± 8.7	171.3± 7.2	25.42± 2.1
3-4	137	26.20	75.0± 10.4	169.7± 8.6	26.04± 2.8
5-9	58	11.09	78.0± 6.2	170.4± 10.6	26.89± 1.7
10-14	49	9.37	77.5 ± 6.8	168.5± 6.8	27.29 ± 3.0
15+	23	4.40	80.5± 5.5	167.7± 7.6	28.66 ± 3.6

Table 5
Distribution of the sample according to smoking and alcoholic habits

Type of habit	*No*	*%*
Smoking	170	32.50
Alcoholism	125	23.90
Smoking& Alcoholism	205	39.19
Normal	23	4.39
Total	523	100.00

References

American Society for Reproductive Medicine (ASRM) (2009). Fertility fact, Female Risks.

ART (2016). Fact sheet (*https://www..eshre.eu/guidelinee-and gal/art-sheet.aspx*)..EuSoc Hum Rep Embryol.2014.Archieved 4.

Astley SJ, Bailey D, Talbot C and Clarren SK. (2000). Fetal alcohol syndrome (FAS) primary prevention through fas diagnosis, II. A comprehensive profile of 80 birth mothers of children with FAS. Alcohol Alcohol, 35, 509–519.

Bieniek J. M., Drabovich A.P (2016). Lo K.C. Seminal biomarkers for the evaluation of male infertility. *Asian J. Androl;* 18:426–433.

Chandra A., Copen C.E., Stephen E.H. (2013). Infertility and impaired fecundity in the United States, 1982-2010: Data from the National Survey of Family Growth. *Natl. Health Stat. Rep.* 1–18.

Chaudhuri JD. (2000). An analysis of the teratagenic effects that could possibly be due to alcohol consumption by pregnant mothers. *Indian J Med Sci,* 54, 425–431.

Christofani J, Bianco B, Santos G, Adami F. (2014). Bariatric surgery influences the number and quality of oocytes in patients submitted to assisted reproduction techniques. *Obesity.* 22(3): 939-942.

Cocuzza M, Alvarenga C, Pagani R. (2013). The epidemiology and etiology of azoospermia. *Clinics,* 68(S1), 15-26.

Dada R and Gupta N. (2004). CYqmicrodeletions Azoospermia factor candidate genes and spermatogenetic arrest. *Journal of Biomolecular Techniques,* 15, 176-183.

De Celis R, Pedron-Nuevo N, Feria-Velasco A. (1996). Toxicology of male reproduction in animals and humans. *Arch Androl,* 37, 201-218.

Dyer SJ, Abrahams N, Mokoena NE, Lombard CJ, vander Spuy ZM (2005). Psychological distress among women suffering from couple infertility in South Africa: a quantitative assessment. *Hum Reprd.* 20(7): 1938-1943.

Gohill BC, Rosenblum LA, Coplan JD, Kral JG (2001). Hypothalamicpituitary-adrenal axis function and the metabolic syndrome X of obesity. CNS Spectr. 6(7): 581-586.

Goransson M, Magnusson A, Bergman H, Rydberg U and Heilig M. (2003). Fetus at risk, prevalence of alcohol consumption during pregnancy estimated with a simp levels and reproductive function. le screening method in Swedish antenatal clinics. Addiction, 98, 1513–1520.

Hammoud AO, Gibson M, Petersen CM, Meikle AW & Carrell DT. (2008). Impact of male obesity on infertility, a critical review. *Fertil Steril,* 90, 897–904.

Holdcraft R.W., Braun R.E. (2004). Hormonal regulation of spermatogenesis. *Int. J. Androl.;* 27: 335–342.

Imani B, Eijkemans MJ, ER te Velde, Habbema JD, Fauser BC, Clin (1998). Predictors of Patients Remaining Anovulatory during Clomiphene Citrate Induction of Ovulation in ormogonadotropic Oligoamenorrheic Infertility Endocrinol. *Metab.* 83(7):2361-2365.

IOTF, Steering Committee. (2000). The Asia – Pacific perspective, Redifining Obesity and its treatment. Melbourne, International Diabetes Institute.

Jaiswal D, Trivedi S, Agrawal NK, Singh K (2015). Association of polymorphism in cell death pathway gene FASLG with human male infertility. *Asian Pacific Journal of Reproduction.*; 4(2):112-115.

Jodar M., Soler-Ventura A., Oliva R. (2017). Semen proteomics and male infertility. *J. Proteom;* 162: 125–134.

Kelley A.S., Qin Y., Marsh E.E., Dupree J.M. (2019). Disparities in accessing infertility care in the United States: Results from the National Health and Nutrition Examination Survey, 2013-16. *Fertil. Steril.;* 112:562–568.

Kort H, Massey J, Elsner C, Mitchell-Leef D, Shapiro D, Witt M, Roudebush W. (2006). Impact of body mass index values on sperm quantity and quality. *J Androl,* 27, 450–452.

Krausz C., Cioppi F (2018). Riera-Escamilla A. Testing for genetic contributions to infertility: Potential clinical impact. *Expert Rev. Mol. Diagn.;* 18: 331–346.

Krulewitch CJ. (2005). Alcohol consumption during pregnancy. *Annu Rev Nurs Res,* 23,101–134.

Kulikauskas V, Blaustein D, Ablin RJ. (1985). Cigarette smoking and its possible effects.

Kumar D. (2007). Prevalence of female infertility and its socio-economic factors in tribal communities of Central India. *Rural and Remote Health.* 7, 456.

Kunzle R, Mueller MD, Hanggi W, Birkhauser MH, Drescher H and Bersinger NA. (2003). Semen quality of male smokers and nonsmokers in infertile couples. *Fertil Steril,* 79, 287–291.

Lessy BA (2000). Medical management of endometriosis and infertility; 1089-95.

Lotti F., Maggi M. (2015). Ultrasound of the male genital tract in relation to male reproductive health. *Hum. Reprod. Update;* 21: 56–83.

Lotti F., Maggi M. (2018). Sexual dysfunction and male infertility. *Nat. Rev. Urol.* 2018; 15:287–307s.20. [PubMed]

Magnusdottir E, Thorsteinsson T, Thorsteinsdottir S, Heimisdottir M, Olafsdottir K. (2005). Persistent organochlorines, sedentary occupation, obesity and human male subfertility. *Hum Reprod,* 20, 208–215.

Muthusami KR and Chinnaswamy P. (2005). Effect of chronic alcoholism on male fertility hormones and semen quality. *Fertil Steril,* 4, 19–924.

Palihawadana TS, Wijesinghe PS, Seneviratne HR (2012). Aetiology of infertility among females seeking treatment at a tertiary care hospital in Sri Lanka. *Ceylon Med J.*; 57(2):79-83.

Pasi AL, Hanchate M S, Pasha MA (2011). Infertility and domestic violence: Cause, consequence and management in Indian scenario. *Biomedical Research.* 22(2): 255-258.

Pasquali R, Patton L, Gambineri A. (2007). Obesity and infertility. Curr. Opin. Endocrinol Diabetes Obes. 14: 482-7.

Patel Mital, Jain Shefali, Jain Dinesh, Patel Bhavesh, PhanseNandini, Vyas Priti and Rathore Pragya. (2012). Prevalence of Different Factors Responsible for Infertility. *Research Journal of Recent Sciences,* 1(ISC-2011), 207-211.

Peterson BD, Gold L, Feingold T. (2007). The experience and influence of infertility, considerations for couple counselors. Fam J, 15(3), 251-257. in Indian scenario. *Biomedical Research.* 22(2): 255-258.

Procópio M.S., de Avelar G.F., Costa G.M.J., Lacerda S., Resende R.R., de França L.R. (2017). MicroRNAs in Sertoli cells: Implications for spermatogenesis and fertility. *Cell Tissue Res.;* 370:335–346.

Rajvi H. Mehta, Sanjay Makwana, Geetha M, Ranga RJ, Srinivasan SS Virk. (2006). Prevalences of oligozoospermia and azoospermia in male partners of infertile couples from different parts of India *Asian J Androl,* 8(1), 89-93.

Randall CL. (1987). Alcohol as a teratogen, a decade of research in review. *Alcohol,* 1, 125–132.

Rao M and Rao D. (1977). Cytogenetic studies in primary infertility. *Fértil. Steril.* 28: 209.

Roth LK and Taylor HS. (2001). Risks of smoking to reproductive health, assessment of women's knowledge. *Am J Obstet Gynecol,* 184, 934–939.

Roupa Z, Polikandrioti M, Sotiropoulou P, Faros E,Koulouri A, Wozniak G, Gourni M (2009). Causes of infertility in women at reproductive age. *Health Science Journal.* 3(2): 80-87.

Sabarre KA, Khan Z, Whitten AN, Remes O, Phillips KP (2013). A qualitative study of Ottawa university students' awareness, knowledge and perceptions of infertility, infertility risk factors and assisted reproductive technologies (ART). *Reprod Health J.*; 10(41):1-10.

Sharpe RM. (2000). Lifestyle and environmental contribution to male infertility. *British Medical bulletin,* 56, 630-642.

Sharpe RM. (2010). Environmental/Life style effects on Spematogenisis, *Phil Trans R Soc B,* 365, 1697-1712.

Shoukd I Freez my Eggs(2015). (*Https://www.pacificfertilitycentre/fertility-preser*

Steven Sinclair, ND, Lac, (2000). Male Infertility, Nutritional and Environmental Considerations. *Alternative Medicine Review,* 5(1), 28-38.

Tomassetti C, Meuleman C, Pexsters A, Mihalyi A, Kyama C, Simsa P, D'Hooghe TM (2006). Endometriosis,recurrent miscarriage and implantation failure: is there an immunological link? Reproductive BioMedicine Online. 13(1): 58-64.

Tsai YH, Wang TW, Wei HJ, (2013). Dietary intake, glucose metabolism and sex hormones in women with polycystic ovary syndrome (PCOS) compared with women with nonPCOS-related infertility. *Br J Nutr.* 109(1):2190-2198.

vation/myegg#assessment).Information on Egg Freezing.Retrieved March.

Villalta J, Ballesca JL, Nicolas JM, Martinez de Osaba MJ, Antunez E & Pimentel C. (1997). Testicular function in asymptomatic chronic alcoholics, relation to ethanol intake. *Alcohol Clin Exp Res,* 21, 128–133.

Wasiu Eniola O, Adebayo Adetola A and Taiwo Abayomi B. (2012). A review of female infertility: important etiological factors and management. *J. Microbiol. Biotech. Res.* 2(3): 379-385.

Weiner JS and Lourie JA. (1969). Human biology, A guide to field methods. IBP hand book No. 9, Black Well Scientific Publications, Oxford.

WHO(2013). Infertility (*http://www.who.int/reproductivehealth/topics/infertility/definitions.en/*) Who.int.2013-03-19.Retrieved 06-17. Practice Committee of the American Society for Reproductive Medicine(PCASRM) (2013).Fertil Steril, 99(1):63(Pub Med)

WHO. (1995). Physical status, Use and interpretation of Anthropometry. *WHO Tech Rep Ser,* 854.

Zenzes MT, Bielecki R and Reed TE. (1999). Detection of benzo(a)pyrenediol epoxide-DNA adducts in sperm of men exposed to cigarette smoke. *Fertil Steril,* 72, 330–335.

Zeynep Özcan Dağ, Berna Dilbaz (2015). Impact of obesity on infertility in women, *J. Turk Ger Gynecol Assoc.* 2015; 16(2): 111–117.

Zhou R., Wu J., Liu B., Jiang Y., Chen W., Li J., He Q., He Z. (2019). The roles and mechanisms of Leydig cells and myoid cells in regulating spermatogenesis. *Cell Mol. Life Sci;* 76: 2681–2695.