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Preliminary Screening of Risk Factors of Female Infertility at Hyderabad City of Sindh, Pakistan

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Abstract: This study was aimed to explore the epidemiological factors associated with female infertility at Hyderabad Sindh, Pakistan. To achieve the aim, a total of 60 infertile females and 47 healthy females who served as controls were selected. A standard questionnaire was applied by interviewing methods at the Australian Concept and Fertility Center Hyderabad. The participants were verbally informed regarding the procedure and aim of the study. All of them were asked about their personal lifestyle, medical history, infertility and menstruation history. Primary data was compiled by SPSS and a chi-squared test with 95% confidential interval was applied to calculate odds ratios. The student's t-test was used between infertile and fertile females to compare BMI. The majority of infertile females were housewives, obese and aged between 36-45 years and consumers of surface water. Moreover, we found the significant positive association of menstrual cramps and the passing of clots during the menstrual cycle, positive family history of infertility and the use of medications to regulate the menstrual periods. On the other hand, the personal history of miscarriages and the use of medications to relieve the menstrual cramps pain showed a non-significant positive association with female infertility. While taking tea or consumption of cold/fizzy drinks was found with a non-significant negative association towards female infertility.

Keywords: Infertility, Housewives, Menstruation Cramps, Obesity, Contraceptives

1. Introduction

Infertility rate has been increased all over the world due to changes in lifestyle, and it is said to be a third recent serious health condition following cardiovascular diseases and cancer. Infertility being a special defect of the reproductive system is quite different from other diseases, while, it is not life-threatening, but it has detrimental influence over the infertile patients along with their families in the society [1]. As per reports of the American Society of Reproductive Medicine Practice Committee, today the infertility is an alarming issue of our society, generally, the infertility is a failed condition to conceive by twelve or more than twelve months of natural fertilization attempts [2]. In 2012 it was reported by Pakpour et al. [3] that infertility is suffered by about 20%

of couples. Approximately 6-26% of those women have belonged to developed countries. According to the World Fertility Survey, the south Asian nations have a much lower infertility rate of 4-6%. Additionally, about 10-15% of all married couples are reported with infertility all over the world [1].

The exposure to certain lifestyles and behaviors may have a positive or negative influence over reproductive health [4], among women either underweight or overweight is the foremost root of infertility. On another hand, obesity has been reported to be a significant factor for the increased rate of miscarriages which may further lead infertility [5]. The key reasons for the occurrence of women's infertility could be exposure to certain endocrine altering chemicals, increased stress and lifestyle factors [6]. According to WHO estimation, this pathology affects

nearly 50-80 million women across the globe and the incidence variables may reach up to 50% of all women [2].

Numerous studies have shown the impact of various lifestyle factors on reproductive health [6]. Unfortunately, this type of work has no significant attention in Pakistan, especially in Sindh Province. However, the Hyderabad is the second largest city of Sindh, Pakistan after Karachi (Mini Pakistan), with various nationalities, hence the proposed study was aimed to explore the various epidemiological factors of female infertility at Hyderabad Sindh, Pakistan.

2. Methods

This case-control study was conducted in Hyderabad, Sindh, Pakistan from February 2015 to September 2016. Ethical approval was obtained from the Institutional Ethical Committee at the Institute of Biochemistry, University of Sindh, Jamshoro, Sindh, Pakistan.

2.1. Study Participants

The hiring of study subjects was done at the Australian Concept and Fertility Center Hyderabad. A total of 60 confirmed infertile female subjects; along with 47 subjects (age, sex, and locality matched) with a negative history of infertility having 3 or more than 3 children during the study period; were selected for comparison.

A verbal informed consent was obtained from all study subjects and they were interviewed about their demographic characters like profession, age, type of drinking water, and personal history of complications of menstrual cycles, family history of infertility, use of contraceptives as well as antidepressants, history of miscarriages, use of medications to regulate menstrual cycle/ prevent menstrual cramps, consumption of tea and cold/fizzy drinks. Weight and height were measured to calculate body mass index. The subjects with the undefined cause of infertility were included in the study and all those were excluded who were found with hypertension, diabetes, asthma, cancer, or any serious mental problem.

2.2. Statistical Analysis

Mean and standard deviation, as well as percentage, were calculated for infertile and fertile females in respect of their BMI and demographic characteristics respectively. The SPSS software (version 23.0) was used for statistical analysis, whereas, odd ratios of risk factors for the development of infertility were evaluated by using a chi-squared test with 95% confidential interval. The student's t-test was applied over the mean values of BMI between two groups to find out the level of significance and results were considered as significant if $p < 0.05$.

3. Results

The mean age range of infertile females was 30.17-36.70 years, and for fertile females, it was 31.60-37.75 years. The majority of infertile and fertile females belonged to the age group of 36-45 years. Furthermore, infertile women as compared to the fertile women were housewives followed by Government employees, students and consume surface water for drinking purposes (table 1).

Table 1. Demographic characteristics of infertile and fertile women.

Description	Infertile Females N=60 (%)	Fertile Females N=47 (%)
Mean Age Range (years)	30.17-36.70	31.60-37.75
Age Groups		
25-35 years	28.33	31.91
36-45 years	71.66	68.08
Profession		
Housewives	81.66	68.08
Government employee	13.33	31.91
Student	5	0
Drinking-Water		
Surface Water	80	65.95
Underground Water	20	34.04

In the present study, most of the infertile females were seen obese following the overweight. Statistically, obesity was found significantly positively associated with infertility, whereas the fertile females were seen to have normal BMI followed by underweight as depicted in the figure 1.

Different risk factors were calculated for female infertility from which menstruations with cramps, passing of clots during menstruations, positive family history of infertility and use of medications for menstruation showed a significantly positive association with female infertility, whereas, a significant negative association was found with irregular menstrual periods. The personal history of miscarriages and the use of medications to relieve menstrual cramps showed a non-significant positive association with female infertility. The use of contraceptives, antidepressants, taking no tea/ taking >3 cups of tea/day and consumption of cold/fizzy drinks 2-3 times/day or once in a week either occasionally witnessed the non-significant negative association to female infertility (table 2).

Table 2. Association of different factors with female infertility.

Description	Infertile Females N=60 (%)	Fertile Females N=47 (%)	OR (95% CI)	p-value ≤0.05
Menstruation cycle				
Irregular	51.66	19.19	0.22 (0.083-0.581)	0.001
Regular	48.33	80.85	1.000 (Reference)	-
Cramps during menstruation				
Yes	70	34.04	4.52 (1.852-11.190)	0.000
No	30	65.95	1.000 (Reference)	-
Clots during menstruation				
Yes	58.33	31.91	2.98 (1.24-7.21)	0.007
No	41.66	68.08	1.000 (Reference)	-
Family history of infertility				
Positive	65	17.02	9.054 (3.297-25.676)	0.000
Negative	35	82.97	1.000 (Reference)	-
Personal history of miscarriages				
Yes	33.33	25.25	1.542 (0.613-3.910)	0.399
No	66.66	78.7	1.000 (Reference)	-
Use of contraceptives				
Yes	36.66	38.29	0.933 (0.394-2.212)	1.05
No	63.33	61.7	1.000 (Reference)	-
Use of Antidepressant				
Yes	31.66	46.8	0.527 (0.221-1.249)	0.16
No	68.38	53.19	1.000 (Reference)	-
Medication to relieve cramps				
Yes	33.33	27.65	1.137 (0.460-2.824)	0.835
No	76.66	72.34	1.000 (Reference)	-
Medications for menstruation				
Yes	70	15.9	12.33 (4.242-37.35)	0.001
No	30	84.09	1.000 (Reference)	-
Consumption of tea				
0 cups	18.33	17.02	0.720 (0.191-2.703)	0.72
More than 3 cups/day	46.66	53.19	0.587 (0.214-1.593)	
2-3 cups/day	35	23.4	1.000 (Reference)	-
Cold Drinks/Fizzy Drinks				
Occasionally	13.33	21.27	0.578 (0.151-2.172)	0.357
2-3 times in day	33.33	40.42	0.760 (0.263-2.186)	0.634
Once in a week	23.33	10.63	0.022 (0.500-8.492)	0.264
No Drinks	30	27.65	1.000 (Reference)	-

4. Discussion

Infertility has been considered a common problem as it affects almost 1 in 6 couples and it is defined as the inability to conceive after a certain period of time following the sexual intercourse for 6 months/1 year without any contraceptive measures. Infertility cannot be linked to a specific gender as both male and female factors account for 40% while 20% of cases are either due to shared or unexplained causes. In Pakistan, the overall prevalence of infertility is about 22%, out of which 5% of cases are considered as primary infertility, whereas 18% as secondary infertility [7]. Infertility majorly affects the women's quality of life and is linked to the loss of feelings control, diminish self-confidence, long-lasting sorrow, depression and anxiety [3]. The incidence of female infertility has been significantly increased due to the changing lifestyles and exposure to environmental stress. Female infertility, following the cardio and cancer diseases, is the third serious health issue, specially belongs only to the reproductive health that is totally dissimilar from other diseases. Though it is not life-ending, however, its detrimental influence on patients and their families besides the whole society can not be underestimated [8]. In 2010, a systematic study was performed in more than 190 countries to estimate the incidence of infertility, which demonstrated that women aged between 20-40 years suffered primary infertility making an incidence rate of 1.9%, whereas secondary infertility incidence rate was 10.5% [9]. Ashraf et al. reported that the female infertility rate has been raised to 10-20% and it has become almost round about 15% of all women in the world [10].

Moreover, various epidemiological studies regarding risk factors of female infertility are not well predictable [11]. But the factors like age, menstruation, body mass index, lifestyle, obstetrical history, drinking, smoking patterns, and environmental factors are thought to be the key factors of infertility [12]. Likewise, the age of women has an important and powerful influence to conceive a physiological pregnancy, undeniably, in approximate cases, the age might be considered a lifestyle choice. However, this is not the matter in most cases, as some women who have significant professional and societal pressure may postpone motherhood into the 30s, while the previous generation's age to start a family was 20s normally [6]. The present study has also demonstrated the >30 years mean age range among infertile females, furthermore, 71.66% was seen with the age of 36-45 years (table 1). Baird et al.

stated that when a woman reaches the age of 35 years, her fertility potential declines, even at an earlier age, both quality and quantity of oocytes decreases but it is clinically evident at about 35 years of age [13]. In this study we found that 81.66% of women were housewives (table 1), the possible reason behind this may be obesity, and being overweight as shown in the figure 1. On the other hand, 80% infertile females reported the consumption of surface water as compared to the underground water (table 1). The main source of water supply to Hyderabad city is the Phulleli canal and Kotri Barrage from the river Indus. Henceforth further studies are required to establish the link between infertility and surface water contamination. Although, the link between reproductive functions and obesity is well studied for many years and still is being studied. Because early adulthood obesity brings significant changes in the reproductive system. As it was reported by Dag et al. that obese women have a three-fold high risk of infertility as compared to the non-obese women, and their fertility ratio is reduced for both natural as well as assisted conception cycle [14]. These findings were consistent with our study because the majority of women seeking treatment against infertility were obese followed by overweight (figure 1). Further, these findings were also similar to the study of Wise et al. [15]. The lifestyle changes and overall economical improvements have caused the greater number of overweight individuals leading to obesity, which is proved to be a leading factor of infertility. Whereas, Esmaeilzadeh et al. [16] explored that 4.8-fold infertile women are at the risk of obesity and 3.8-fold have a risk of being overweight as compared to normal fertile women. Moreover, obesity also gives rise to numerous problems such as demographics, social, psychological as well as health and it plays a key significant role, particularly in women's reproductive disorders. It also has been associated with menstrual problems, anovulation, miscarriages, reproductive difficulties and adverse results of pregnancies [14]. The negative impact of obesity on fertility may be mediated by ovulatory dysfunction or by other mechanisms. However, large-scale studies suggest that the primary impact of female obesity may be at the level of the oocyte or embryo [17].
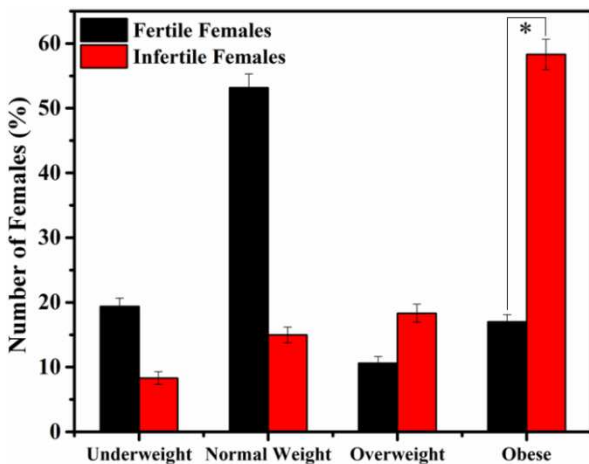

Figure 1. *Comparison of body mass index (BMI) between infertile and fertile females.*

In this study, an association of various menstrual disorders with female infertility was found (table 2), which may be developed due to the metabolic diseases. It is well known that the role of the thyroid gland is directly affected by the relationship of the hypothalamic-pituitary gland with ovarian hormones. If the thyroid gland's function is increased then it will cause menstrual disorders, while, the depressed function of gland increases the flow in menstrual cycles, uterus bleeding and may cause secondary amenorrhea [18]. Furthermore, Roupa et al. stated that neoplasms may also cause thyroid dysfunctioning and the disorders of the pituitary gland again may bring a decrease in the functioning of the thyroid gland, finally menstrual cycle changes could occur under a stressed condition. Consequently, women have a high risk of menstrual problems besides infertility disorder [18]. The women, who are overweight and obese may have increased rate of menstrual dysfunction and anovulation, in addition, these disturbances are seen more common among obese women [14]. Similar to the present study (table 2), the Shamila and Sasikala have also reported the menstrual irregularities, that were positively associated with female infertility [19]. Furthermore, we found a significant association of positive family history with infertility problems, so it may be the genetic and chromosomal factor which is needed to be studied in a detailed study.

A significant positive association of medication to regularize menstruation cycle was observed (table 2), whereas, use of contraceptives and antidepressants showed a non-significant positive association with female infertility. It is suggested by some studies that most of the prescribed and non-prescribed medicines may affect the menstrual cycles and ovulation. However, the use of steroids drugs and antidepressant drugs may lead to bringing obesity [20], in turn, it may become a significant cause of infertility. However, the daily stress besides new high demanding ways of life has also been found with a negative impact on fertility rate [21]. On the other hand, the professional women; specifically those having high career goals due to tough competition and struggle to achieve financial security besides comfortable life; mostly try to delay the pregnancy by taking contraceptives for a long time, unfortunately, it has shown a negative effect on fertility in many couples.

5. Conclusion

The mean age range of infertile females was 30.17-36.70 years, mostly they were housewives and consumes surface water. A high ratio of infertile females was found obese following overweight. Menstrual cycles with cramps, passing of clots in menstrual cycles, positive family history of infertility and use of medicines for menstruation were found significantly positively associated with female infertility, whereas irregular menstrual cycles showed a significant negative association. Personal history of miscarriages and the use of medications to relieve the pain of menstrual cramps revealed a non-significant positive association with female

infertility. Taking tea or consumption of cold/fizzy drinks showed a negative association with female infertility. Moreover, in present study the number of study participants was not enough. Henceforth, it is highly recommended that similar studies shoud be performed with a large scale population across the country.

Acknowledgements

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