

Health Characteristics of Infertile Women and their Socio-Demographic Correlates in Al-Anbar Province

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Abstract:

Background: Infertility is a global public health concern affecting approximately a tenth of couples worldwide. The incidence of infertility in a population has important demographic and social associations and implications. Many studies have focused on the medical aspects of infertility but have rarely examined the socio-demographic determinants and correlates.

Objectives: The aim of this study was to explore and analyze reproductive, demographic and social correlates of infertility among a sample of infertile women attending the infertility center in AlAnbar Province.

Patients and methods: A case control study conducted in the infertility center at Al-Ramadi Maternity and Children Teaching Hospital during the period of September 2013 to August 2014. The study consisted of 150 cases of primary and secondary infertile, and 301 healthy fertile women. A structured questionnaire, including various reproductive and socio-demographic variables, was developed and designed for the purpose of the study. Bivariate analyses included estimation of odds ratio (OR), and 95% confidence interval (CI) for odds ratio were performed.

Results: There were significant associations between female infertility and being from rural areas, low education, unemployment, age at marriage > 25 years, second marriage for a woman; and being a second or third wife. Infertile women were strongly significantly different from their fertile counterparts in having low income, bad quality of life, not satisfied with their daily activities, feeling of much life stress, having poor and irrational nutrition, bad relationship with their husbands; and not contented with sexual intimacy. Body mass index > 30 was found to increase the risk of infertility about 15 times, while smoking did not have a significant relation with infertility. All women with primary and secondary infertility felt that their condition affected their social life negatively.

Conclusion: Female infertility is associated with various demographic and social correlates leading to bad quality of life and much stress. Thus, couples' education and sympathetic marital counseling should be an essential component of any program of infertility management.

Key Words: Infertility, reproductive factors, socio-demographic correlates.

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Introduction:

Infertility is an important public health problem which concerns and affects more than 10% of couples worldwide.

It is estimated to affect as many as 186 million people worldwide ⁽¹⁾.

Infertility is defined as a failure to conceive over 12 months of un-protective intercourse ⁽²⁾.

Primary infertility is a term used to refer to couples that have never conceived a pregnancy, while secondary infertility refers to couples who have previously conceived successfully but who have difficulty achieving a subsequent conception ⁽³⁾. Infertility varies across regions of the world and is estimated to affect 8 to 12 per cent of couples worldwide with the highest incidence in some regions of Sub-Saharan Africa as infertility rate may reach 50%, while it is 20% in Eastern Mediterranean Region and 11% in the developed world ⁽⁴⁾.

Although it is a problem among both men and women, about one-third of infertility cases are caused exclusively by women's problems ⁽⁵⁾.

Female infertility may be caused by an underlying medical condition that may damage the fallopian tubes, interferes with ovulation, or causes hormonal complications ⁽⁶⁾.

The incidence of infertility in a population has important demographic and social associations and implications. Biological and social factors, including age of marriage, literacy, stress due to economic status, religious attitudes, urbanization, contraceptive usage and nuclear families, play a significant role in lowering fertility ⁽⁷⁾.

A study of the socio-demographic determinants of subfertility in Sri Lanka found that demographic factors such as the age of the woman, age at marriage have a significant influence on infertility. Use of long term drugs, body mass index, genetic factors and mental illnesses also affected fertility. Furthermore, socio economic factors such as education, occupation, daily working hours, and location of work place, income and expenditure status have shown up as significant determinants of infertility ⁽⁸⁾.

Among risk factors for female infertility are excessive weight gain with body mass index (BMI) greater than 27 kg/m² ⁽⁹⁾, several lifestyle factors including habits of diet, clothing, exercise, and use of alcohol, tobacco, and recreational drugs ⁽¹⁰⁾. The use of intrauterine device (IUD) has been held responsible for impairing fertility in some cases due to the risk of pelvic inflammatory disease (PID) and tubal infertility due to infections. Infertility was quiet widely conceived as a psychosomatic illness in cases where no organic cause could be identified ⁽¹¹⁾.

Infertility has social and psychological aspects, as well as being a medical problem. Couples commonly report encountering a number of stressors associated with their state of infertility to a level differ according to their society. Therefore consequences of infertility for couples in developing countries, where children are highly valued for economic and socio cultural as well as personal reasons can be far more severe than for couples in western countries ⁽¹²⁾. Stressors can include, but are not limited to, stress related to their sexual functioning, stress related to the endurance and quality of their relationship, and stress related to changes in their social and family networks ⁽¹³⁾.

Infertile women often experience marked isolation from the fertile world, in part due to perceived or real social unacceptability. Across many cultures, individuals perceive their childlessness as a sign of diminished status, defectiveness, and reduced competence ⁽¹⁴⁾.

The main objective of this study is to describe and analyze reproductive, demographic and social correlates of infertility among a sample of infertile women attending the infertility center in Al-Anbar Maternity and Children Hospital compared with another sample of fertile women from the same hospital (controls).

Patients and Methods:

This is a case control study conducted in the infertility center at Al-Ramadi Maternity and Children Teaching Hospital during the period of September 2013 to August 2014. The inclusion criteria for infertile patients were: 1) Women from 16 to 35 years of age, and 2) with a confirmed diagnosis of primary and secondary infertility. All cases were diagnosed by a gynecologist involved in infertility management in the hospital. All new cases of infertility visiting the center at that time were involved in the study (convenient sample). The exclusion criteria include women with known infertile husbands depending on abnormal clinical exams (done by the urologist) and abnormal results of 2 seminal fluid analysis according to WHO criteria of fertile men.

The group of healthy women (controls) was randomly selected, matched by age, from those who gave birth in the same hospital.

The total sample size was 451 women; 150 cases and 301 controls. A structured questionnaire was developed and designed for the purpose of the study by the investigators. The respondents were interviewed face to face after taking verbal consent.

The information covered by the questionnaire included age, residence, education and occupation, age at menarche, age at marriage, order of marriage, kinship with husband; self-estimation of family income, life quality, nutrition quality, daily routine, life stress; and relationships with husband and family, as well as attitudes to sexual intimacy. Information regarding regularity of menses, previous use of contraception and any family history of infertility were also recorded. Body weight and height were measured to calculate the body mass index (BMI).

It is necessary to determine the definition of some variables such as quality of life, daily routine, life stress, and intimacy. Quality of life is a broad term used to evaluate the general well-being of individuals over a wide range of contexts, including healthcare. In this study, "quality of life" was defined as women's perceptions about widely-valued aspects of life, such as social well-being and happiness. Satisfaction with daily routine included women's contentment with the sequence and volume of daily social activities (work, household duties, relaxing, etc.). "Life stress" was defined as a condition that resulted when person-environment transactions lead the person to perceive a difficulty to cope with the demands of a life. Intimacy in this study was used as a substitute for a woman's sexual life. In our culture, it is embarrassing for a woman to answer a direct question about her sexual life. To avoid such an awkward situation, the term intimacy was used.

Statistical analysis: Data was analyzed by using SPSS (version 21). Bivariate analyses included Odds ratio calculation, 95% confidence interval for Odds ratio and P values were calculated. The statistical significance of associations was assessed by Chi-square (χ^2) test. P values less than 0.05 were considered significant.

Results:

Results of this study show that cases included 150 females with infertility (55.3% primary and 44.7% secondary infertility) with a mean age of 26.7 ± 5.4 years; and controls included 301 fertile females with a mean age of 26.1 ± 5.8 years.

Table(1) showed the distribution of cases with infertility and controls by selected reproductive and demographic characteristics. The Table shows a significant association between female infertility and being from rural areas, low

education, unemployment, second marriage for a woman; and being a second or third wife. No significant association was found between infertility and age at menarche more than 13 years. While age of women at marriage over 25 years was

associated with 2.3 times risk of infertility (OR=2.3, 95% CI=1.21-4.34).

Regarding kinship of women with husbands, results show no significant association between infertility and consanguineous marriage.

Table1: Selected reproductive and demographic characteristics of the study sample associated with infertility

Variable	Cases (infertile women) No %		Controls (fertile women) No %		OR	95% CI for OR P value	
Residence:							
Urban	84	56.0	222	73.8	Ref	(1.46- 3.33)	
Rural	66	44.0	79	26.2	2.2	<0.001*	
Educational level:							
High education	24	16.0	81	26.9	Ref	(1- 3.44)	0.05
Medium education	34	22.7	62	20.6	1.9	(1.2-3.3)	
Low education	92	61.3	158	52.5	2.0		
Occupation:							
Employed	20	13.3	64	21.3	Ref		
Unemployed	130	86.7	237	78.7	1.8	(1.02- 3.03)	0.04*
Age at menarche:							
<13 years	68	45.3	152	50.5	Ref		
13+ years	82	54.7	149	49.5	1.2	(0.8- 1.8)	0.3
Age at marriage:							
<18	46	30.7	98	32.6	Ref		
18-24	76	50.7	177	58.8	0.9	(0.6-1.4)	0.69
25+	28	18.7	26	8.6	2.3	(1.2-4.3)	0.01*
Kinship with husband:							
Negative	87	58.0	188	62.5	Ref		
Positive(consanguineous)	63	42.0	113	37.5	1.2	(0.81-1.8)	0.36
Order of marriage for women:							
First marriage	136	90.7	295	98.0	Ref		
Second marriage	14	9.3	6	2.0	5.1	(1.9-13.4)	0.001*
Order of marriage for men:							
First marriage	106	70.7	268	89.0	Ref		
>=Second marriage	44	29.3	33	11.0	3.4	(2.0-5.5)	<0.001*

*significant

Social correlates of infertility based on subjective self-rating as perceived by the respondents (Table 2) reveals that insufficient family income was significantly associated with infertility.

Other significant associates of infertility were bad quality of life (OR=11.8, 95% CI = 5.08–27.38, $P < 0.001$), poor and irrational nutrition (OR=4.7, 95% CI=2.63- 8.27); being not satisfied with daily activities (OR=6.5, 95% CI = 3.96–10.77); having life stress (OR=12.9, 95% CI = 8.0-20.7), bad

relationship with husbands (OR=3.8, 95% CI=2.08-7.1), and not contented with their sexual intimacy (OR= 2.7, 95% CI = 1.7-4.2).

Other factors that could attribute to infertility were demonstrated in Table 3.

More than half of infertile women were found to have irregular menses (57.3%) compared to only 4.3% of fertile group (OR= 29.7, 95% CI= 15.5-56.4) with strong statistical association ($p < 0.001$).

Table 2: Subjective self-rating of selected social factors affecting infertility (as perceived by respondents)

Variable	Cases (infertile women) No %		Controls (fertile women) No %		OR	95%CI for OR P value	
Family income:							
Excellent	7	4.7	56	18.6	Ref		
Good	71	47.3	163	54.2	3.5	(1.5-8.0)	0.003*
Less than needed/barely sufficient	72	48.0	82	27.2	7.0	(3.0-16.4)	<0.001*
Quality of life:							
Excellent	7	4.7	79	26.2	Ref		
Good	73	48.7	155	51.5	5.3	(2.3-12.1)	<0.001*
Not bad	70	46.7	67	22.3	11.8	(5.1-27.3)	<0.001*
Satisfaction with daily activities:							
Well contented	39	26.0	191	63.5	Ref		
Moderately contented	43	28.7	59	19.6	3.6	(2.1-6.0)	<0.001*
Not contented	68	45.3	51	16.9	6.5	(3.9-10.7)	<0.001*
Self-assessment of life stress:							
Never	36	24.0	241	80.3	Ref		
Positive for stress	114	76.0	59	19.7	12.9	(8.0-20.7)	<0.001*
Quality of nutrition:							
Good & rational	40	26.7	140	46.5	Ref		
Moderate	66	44.0	128	42.5	1.8	(1.1-2.8)	0.012*
Poor & irrational	44	29.3	33	11.0	4.7	(2.6-8.2)	<0.001*
Quality of relationship with husband:							
Excellent	20	13.3	102	33.9	Ref		
Good	84	56.0	138	45.8	3.1	(1.8-5.3)	<0.001*
Bad/equivocal	46	30.7	61	20.3	3.8	(2.1-7.1)	<0.001*
Importance of sexual intimacy:							
Not important	10	6.7	61	20.3	Ref		
Important	75	50.0	156	51.8	2.9	(1.4-6.0)	0.004*
Very important	65	43.3	84	27.9	4.7	(2.2-9.9)	<0.001*
Feeling content with your sexual intimacy:							
Yes	93	62.0	246	81.7	Ref		
No	57	38.0	55	18.3	2.7	(1.7-4.2)	<0.001*

*significant

Table 3: Distribution of infertile and fertile women according to other factors affecting infertility

Variable	Cases (infertile women) No %		Controls (fertile women) No %		OR	95%CI for OR P value
Regularity of menses:						
Regular	64	42.7	287		Ref	
Irregular	86	57.3	95.7 13 4.3		29.7	(15.6-56.4) <0.001*
Ever using contraception:						
Yes	27		184	61.1	Ref	
No	18.0 123 82.0		117 38.9		7.2	(4.4-11.5) <0.001*
Family history of infertility:						
Negative	82	54.7	205	68.1	Ref	
Positive	68	45.3	96 31.9		1.8	(1.2-2.6) 0.005*
History of chronic diseases:						
Negative	131	87.3	259	86.0	Ref	
Positive	19	12.7	42	14.0	0.9	(0.5-1.6) 0.71
History of gynecological or pelvic surgery:						
No	93	62.0	205	68.1	Ref	
Yes	57	38.0	96	31.9	1.3	(0.8-1.9) 0.2
Smoking habit:						
Non smoker	142	94.7	289	96.0	Ref	
Smoker	8	5.3	12	4.0	1.4	(0.5-3.4) 0.51
Body mass index:						
Acceptable (<25)	16	10.7	134	44.7	Ref	
Overweight (25-29.9)	60	40.0	123	41.0	4.1	(2.2-7.4) <0.001*
Obese (30+)	74	49.3	43	14.3	14.4	(7.6-27.3) <0.001*

*significant

With regards to family history of infertility, cases with positive family history were found to have about twice risk of infertility compared to controls ($p=0.005$). Results also found no statistical association between infertility and previous use of contraception, history of chronic disease, history of any gynecological or pelvic surgery, and with history of smoking.

However, obesity (BMI 30 and above) was found to be highly significantly associated with female infertility. Obese women were 14 times more liable for infertility than those who have normal weight (OR=14.4, 95% CI=7.6-27.3).

It was noticed that there were no significant differences between primary and secondary infertile women regarding the above studied reproductive, demographic and social factors except that

women with primary infertility were having significantly higher age at menarche (13 years and more) than those with secondary infertility. On the other hand, a higher proportion of patients with secondary infertility had ever used contraception compared to those of primary infertility ($P < 0.001$). Added to that, more than half of them were having positive history of gynecological or pelvic surgery ($P = 0.004$). Irregularity of menses was noticed significantly higher among primary infertility cases.

This study also revealed that infertility is stigmatizing for most infertile

women as 128 of them considered infertility as a social stigma out of 150 (83%). At the same time 140 out of 150 (93.3%) of all infertile women declared that their social life is negatively affected by infertility.

Binary Logistic Regression Analysis of factors that predict infertility showed that the following factors were significant predictors of infertility: BMI, life stress, sexual intimacy importance, and regularity of menses ($p = 0.0001$). Other factors that show prediction of infertility include education, order of marriage and content with sexual intimacy (Table 4).

Table 4: Binary Logistic Regression Analysis to predict infertility

Variables in the Equation	B	S.E.	Wald	df	P value	OR	95% C.I. for OR	
							Lower	Upper
BMI (Kg/m ²)	1.452	0.303	23.002	1	0.0001*	4.271	2.360	7.731
Self-assessment of life stress	3.248	0.554	34.355	1	0.0001*	25.745	8.689	76.281
Sexual intimacy important	-1.554	0.330	22.125	1	0.0001*	0.211	0.111	0.404
Regularity of menses	-3.515	0.549	40.997	1	0.0001*	0.030	0.010	0.087
Education	0.494	0.195	6.430	1	0.011*	1.638	1.119	2.400
Order of marriage	2.868	1.181	5.900	1	0.015*	17.609	1.740	178.214
Content with sexual intimacy	-1.111	0.493	5.067	1	0.024*	0.329	0.125	0.866
Constant	-1.026	2.196	0.218	1	0.640	0.358		

Discussion:

In this study, the reproductive and socio-demographic characteristics of infertile women were highlighted in comparison with a control group who were fertile, matched by age.

The present study showed that the majority of cases with infertility were from rural areas, which is similar to William,

et al study⁽¹⁵⁾ but in contrast to Mokhtar S et al study⁽⁴⁾ and Saoji study⁽¹⁶⁾ which

revealed that majority of infertile female were from urban area.

The results also suggest that low educational levels were associated with infertility. Mukhtar S et al detected from their study that low level of education was significantly associated with secondary

infertility⁽⁴⁾. This result contradicts Dutta et al study which stated that women with infertility reported higher levels of education⁽¹⁷⁾.

However, age at marriage > 25 years proved to be a significant risk factor for female infertility which is comparable with the finding of many studies^(4,16,18). The age associated decline in female fecundity is largely attributable to abnormalities in the oocyte.

Cross cousin marriages are among socio-cultural factors that have been identified as potential determinants of infertility⁽¹⁹⁾. In the present study, although 42.0% of infertile females had consanguineous marriage compared with 37.5% of fertile females, the difference was not significant. Consanguineous marriage is common in our province among all groups.

Female second marriage was found as a significant correlate of infertility, it could be explained as a consequence of infertility after a divorce. Same result of significant association was noticed for second or third marriage of men. This result agrees with Joyce O et al study which stated that women in the infertility group were more likely to be in polygamous marriage settings compared with fertile group⁽²⁰⁾. Aghanwa et al identified polygamy as a differentiating factor among fertile and infertile groups in their study⁽²¹⁾. Spouses of women who are deemed infertile are often encouraged by relatives to marry other women to have children in order to sustain a family lineage.

Among the studied social correlates of infertility which were based on subjective self rating of the respondents was income. Insufficient family income was found to be significantly associated with infertility. This is in accordance with Jumayev I et al study, and Al-Neami M study in Mosul^(5, 22). This can be explained by the fact that evaluating and treating infertility, for some cases, is a costly

process, couples with high income can attend private clinics and can afford buying costly medication, while those with low income are the usual attendees of infertility clinics of a public hospital in which management is free or low cost. However, this result contradicts Wilcox et al and Valsangkar S et al studies which reported that significant association was obtained between high income and infertility^(23, 24).

In our country, because of cultural, religious and social importance of having children, the presence of infertility is expected to adversely affect the quality of life in affected women. The results of this study indicate that infertility has a significant impact on the quality of life of women and on their satisfaction with their daily social activities. This is in line with Theofilou P who reported that infertility is consistently associated with decreased scores in quality of life domains, the most affected are mental health, vitality, emotional behavior, psychological, environmental, physical functioning and social functioning⁽²⁵⁾. Same results were obtained by Chachamovich JR et al and Monga M et al studies^(26, 27).

This study also found that infertile women were having life stress 13 times higher than fertile group, and that social stigmatization habitually reinforced low self-esteem that prevail among childless women and make 76% of them feel stressed. This result is similar to Karachi study which also found that majority of infertile women (72%) felt severely pressurized and stressed due to infertility⁽²⁸⁾. Furthermore, studies conducted in Thailand have shown parallel results where psychological trauma resulting from infertility ended up in low self-esteem, security and self-confidence in such women⁽²⁹⁾.

The quality of relationship with husbands and other family members was also affected by infertility. In this study, infertile women reported poor marital

relationship compared with controls. Although uncommon, opinions contrary to our findings do exist as mentioned in the works of Schmidt L who found that some infertile couples experience marital benefits⁽³⁰⁾.

To determine whether sexual satisfaction was associated with infertility, attention was focused on women's perception of the importance of sexual intimacy. Infertile women in this study thought of sexual intimacy as very important issue compared to controls, but 38.0% of them compared to 18.3% of controls, felt less or poorly contented with their sexual intimacy.

While intimacy and marital satisfaction are directly related to each other, it has been indicated that infertility can result in higher levels of marital dissatisfaction.

This study also highlighted the effect of other factors associated with infertility. Menstrual irregularity among infertile females was found to be positively correlated with female infertility. This result agrees with many other studies^(4,16,31).

Family history of infertility was also a positive correlate of infertility in this study which is in accordance with Mukhtar S et al and Melissa, et al studies^(4,32).

With regards to life style factors, obesity proved to be significantly associated with infertility in the present study which is congruent with many studies^(16,33,34). The strongest obesity-related effect on fertility is anovulation. Polycystic ovarian syndrome (PCOS), the most noted cause of anovulation, is furthermore exacerbated by increased insulin resistance and hyperinsulinaemia associated with overweight and obesity⁽³⁵⁾.

Regarding nutrition, a significant association was obtained between poor and irrational nutrition and infertility in the cases which is inconsistent with Jumayev I et al study which could not find an

association of female infertility with self-rated nutrition quality⁽⁵⁾.

Epidemiological studies indicate that cigarette smoking, excessive caffeine and alcohol consumption reduce fertility in the female partner⁽³³⁾, however, in the present study; no significant association of smoking was noticed with infertility.

Although the study has identified several correlates of female infertility, there have been several limitations. First, due to security reasons, the study was conducted in only one hospital (one infertility center) which would not represent the whole population in Al Anbar, and a population based study was difficult to be conducted in such circumstances. Second, the study elicited the respondents' subjective feelings about different socioeconomic factors, which can vary depending on the personality and other factors of the respondents. Third, some respondents may have developed a bias toward answering sensitive questions about their sexual intimacy and relationships with their husbands and other family members.

In conclusion, female infertility is strongly associated with various correlates such as higher age at marriage >25 years, low education, insufficient family income, obesity, poor quality of life, stress, and a lack of contentment about sexual intimacy, leading to a higher remarriage rate and further complicating the problem of infertility.

Thus, further studies and researches are recommended, a population-based study might better represent the actual status of the infertile women. Effective counseling, reassurance and measures to reduce the impact of infertility on marital and sexual life are needed to impart a holistic treatment of infertility.

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