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Research Article

Factors Affecting Fertility among Saudi Women

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Abstract: The aim of this study is to assess fertility determinants among Saudi women. A **c**ross sectional descriptive study design was used. All data was collected through distribution via online questionnaire (twitter, facebook). Target populations were Saudi ever married females living in Riyadh city, KSA. Respondents were 305 ever married females responding to online communication. Self administered questionnaire was uploaded via Google drive. Fertility was positively correlated to: age of a women or her husband, duration of marriage and BMI. Fertility was negatively correlated to age at marriage, age at the first pregnancy and the space between children. All these were statistically significant. It is worth mentioned that son preference (proportion of male children) had no effect on fertility behavior. Utilizing regression analysis, factors entered the regression model of participants' fertility were: participant age, time space between children, age at first pregnancy , BMI, age at marriage , husband age and duration of marriage and all of them were good predictors of female fertility except BMI and age at marriage.
Keywords: Fertility determinants, Fertility in Saudi Arabia.

INTRODUCTION

Fertility is defined as "the actual production of a live offspring" [1]. Fertility in Saudi Arabia has been known to be high with noticeable high birth rates and low death rates. That is why it can be considered the country with the highest fertility among Arab region. However, fertility in the kingdom has registered a declining trend in the last few years [2]. Total fertility rate (TFR) is found to be 4.53 in a survey conducted in 1999, which is lower than the previous TFR in 1985 which was 7. We can see that they came from as high as 7 to about 4.5 within less than 15 years [3]. In order to know the reason behind this, we must identify the factors that affect or control fertility [4].

By clearly identifying the factors affecting fertility, it will be easier to raise the number of successful pregnancies and to control time and number of these pregnancies, thus avoiding unwanted pregnancies [4]. Identification of these factors might also help preventing secondary infertility.

The real reason behind the high birth rates in Saudi Arabia has not been clearly defined. Only few studies were conducted about fertility and were limited to Riyadh city with small sample sizes [2].

Infertility places a huge psychological burden on infertile couples, especially for women. Greater knowledge of the factors affecting fertility may help to decrease the incidence of infertility by allowing couples to avoid certain risk factors [5].

Developed countries have experienced both some population growth and unprecedented declines in fertility rates during the last half of the twentieth century. Couples now have fewer than two children on average in most European countries and they tend to postpone these births until a later age [6].

The World Health Organization (WHO) considers the prevalence of contraceptive use among a society as one of the determinants of women's health and empowerment in that society. Some societies, however, use contraceptives to regulate pregnancies and in birth spacing [7].

Aim of the study

To study the factors affecting fertility in Saudi females.

Specific objectives

- Assessment of effects of socioeconomic status e.g age, education and income, on fertility.

- Assessment of effect of woman's health status on fertility.
- Assessment of woman employment on fertility.

MATERIALS AND METHODS

Study design: Cross sectional descriptive.

Study settings: All data collected through distribution via online questionnaire (twitter, facebook).

Target population: Saudi ever married females living in Riyadh.

Subjects: 305 ever married females responding to online communication.

Procedure: Self administered questionnaire was uploaded via Google drive consisting of:

- 1-Demographic data (age, income, education level, marital status, occupational status)
- 2-Personal data:(Chronic diseases, menarche, menstrual day, age of menopause, age at marriage, number of pregnancies, number of giving birth, weight and height)

All data collected through distribution via online questionnaire (twitter, facebook). Data collected were coded; tabulated and analyzed using the statistical package of social science (SPSS) version 16.0. The applied tests were chi-square, t test and ANOVA and 0.05 levels were used as a cutoff point of significance. Multiple associations were evaluated in a multiple linear regression model. This procedure allowed the estimation of the strength of the association between each independent variable and the dependent variable taking into account the potential confounding effects of the other independent variables.

RESULTS

Table 1: Socio-demographic characteristics of the sample's women

	No.	%
Age:		
- 17-25 years old	64	21.1
- 26-35 years old	124	40.9
- 36-50 years old	100	33.0
- Above 50 years old	15	5.0
Educational level:		
- Intermediate and below	14	4.6
- High school	52	17.2
- Bachelor and above	236	78.1
Marital status:		
- Married	288	94.4
- Divorced	11	3.6
- Widowed	6	2.0
Occupational status:		
- Working	159	52.1
- Not working	146	47.9
Family Income:		
- Less than 3000	12	3.9
- 3000-7000	50	16.4
- 8000-13000	108	35.5
- More than 13000	134	44.1
Residence Location:		
- Middle	23	7.5
- North	118	38.7
- South	31	10.2
- East	84	27.5
- West	49	16.1
Residence Type:		
- Extended	103	33.9
- Nuclear	200	65.8
Participant's Smoking:		
- Yes	6	2.0
- No	298	98.0
Husband's Smoking:		
- Yes	101	33.3
- No	202	66.7

Table 2: Factors that affect fertility of the participants

Variables	Parity (mean ± SD)
Age of female	
- 17-25y.o	.63 ± .74
- 26-35y.o	2.14 ± 1.28
- 36-50y.o	4.70 ± 1.78
- 50 and above	5.33 ± 1.79
ANOVA	.000 **
BMI	
- Under weight	1.16 ± 1.94
- Normal	2.02 ± 1.84
- Over weight	2.95 ± 2.09
- Obese	4.10 ± 2.34
ANOVA	.000**
Occupational Status	
- Working	2.94 ± 2.12
- Not working	2.84 ± 2.33
ANOVA	.692
Income	
- Less than 3000	2.17 ± 2.68
- 3000-7000	1.90 ± 2.07
- 8000-12000	2.41 ± 1.92
- 13000 or more	3.70 ± 2.21
ANOVA	.000**
Husband's age	
- 20-35y.o	1.13 ± 1.17
- 36-50y.o	3.62± 1.69
- 51-65y.o	5.02 ± 1.98
- 66 and above	5.80 ± 1.78
ANOVA	.000***
Husband's job requirements	
- Night shifts	2.18 ± 2.04
- Traveling	2.80 ± 1.90
- Irregular work hours	2.72 ± 2.33
- Fixed work schedule	2.88 ± 2.21
- Others	4.38 ± 1.60
ANOVA	.108
Chronic Disease	
- Yes	4.32 ± 2.14
- No	2.60 ± 2.12
ANOVA	.000**
Husband's smoking	
- Yes	2.08 ± 1.74
- No	3.27 ± 2.29
ANOVA	.000**
Participant's Smoking	
- Yes	1 ±1.26
- No	2.91 ± 2.19
ANOVA	.035*
Cola consumption	
- Daily	2.78 ± 2.37
- Weekly	2.45 ± 2
- Monthly	3.27 ± 2.19
ANOVA	.033 *

Table (1) demonstrates socio-demographic characteristics of study participants, most of them aged 26-35 (40.7%) and the lowest percentage is those in age group above 50 years old (4.9%). As regard the levels of education it was found that the majority of participants had bachelor degree or higher (77.4%) and only (4.6%) had Intermediate school education or less. The majority of the sample were married (94.4%),

(3.6%) divorced and (2%) widowed. More than half were working (52.1%) and only (47.9%) were not working. Regarding economical state, only 3.9% of participants had income less than 3000 riyals/month, while 43.9% had income higher than 13000 riyals/month. As for residence location, (38.7%) of the participants are living in North of Riyadh City, and only (7.5%) are in Middle of Riyadh. Two-thirds of the sample is living in nuclear family (65.6%) and the other third are within extended families (33.8%). The majority of the females from sample do not smoke (298). On the other hand, their husbands' smoking behavior, (66.2%) do not smoke and (33.1%) of them do.

Table 2 describes the factors which affect fertility. One of the most significant factors was age of both woman and her husband; they were highly significant with parity (.000). BMI, also, was highly significant as obese women had significant more number of offspring than those with average BMI. It was found that working status of women did not have an impact on fertility. Women that had family income more than 13000 SR/month had a significant higher number of offspring that those with lower income. Regarding special requirements of husband job such as night shifts, traveling, irregular work hours or fixed work schedule, it was found that they had no significant effect on women's fertility. It was also found that having chronic disease, smoking of either a woman or her husband and frequent cola consumption had negative effect on fertility.

Table 3 demonstrates that fertility was positively correlated to: age of a women or her husband, duration of marriage and BMI. Fertility was negatively correlated to age at marriage, age at the first pregnancy and the space between children. All these were statistically significant. It is worth mentioned that son preference (proportion of male children) had no effect on fertility behavior.

Table 3: Correlation between fertility and other variables

	Parity
Participant's age	
- Pearson correlation	.764**
- Sig. (2-tailed)	.000
Husband's age	
- Pearson correlation	.699**
- Sig. (2-tailed)	.000
Duration of Marriage	
- Pearson correlation	.825**
- Sig. (2-tailed)	.000
Age at marriage	
- Pearson correlation	-.288**
- Sig. (2-tailed)	.000
Age at 1st pregnancy	
- Pearson correlation	-.346**
- Sig. (2-tailed)	.000
Space between children	
- Pearson correlation	-.231*
- Sig. (2-tailed)	.043
BMI	
- Pearson correlation	.365**
- Sig. (2-tailed)	.000
Son preference	
- Pearson correlation	-0.107
- Sig. (2-tailed)	0.08

The multiple linear regression in Table 4 shows that factors entered the regression model of participants' fertility were: participant age, time space between children, age at first pregnancy , BMI, age at marriage , husband age and duration of marriage and all of them were good predictors of female fertility except BMI and age at marriage.

Table 4: Model summary of multiple linear regression

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**ANOVA sig.**
1	0.889[a]	0.791	0.765	1.05511	0.000[a]

Predictors: (Constant), participant age, time space between children, age at first pregnancy , BMI, age at marriage , husband age, duration of marriage

DISCUSSION

One of the most significant factors was age of the woman; it was correlated significantly with fertility period (.001), age of menopause (.000), parity (.000) and gravidity (.000). Abdul Salam, A named these factors along with "type of family" as "significant determinants of fertility". In the same study, he stated that "age at marriage determines the age at conception, which reflects the years of active reproductive life". This might be one of the factors that highly affect fertility in Saudi Arabia, because teenage marriages were common in the country [2]. Soto, E et al have found that increased maternal age above 35-39 years and the age of the male partner above 35 years were associated with decreased levels of fertility [4]. In conclusion, women's fertility begins to decline in the late 20s with substantial decreases by the late 30s. Fertility for men is less affected by age, but shows significant decline by the late 30s [8]. Other factors that also affected fertility behavior were age at marriage and women education [3].

Dunson D *et al*. reported a study in 2002, about the change with age in the level and duration of fertility in the menstrual cycle. Most analysis of age-related changes in fertility cannot separate effects due to reduced frequency of sexual intercourse from effects directly related to aging. Information on intercourse collected daily through each menstrual cycle provides the data estimating day-specific probabilities of pregnancy for specific day relative to ovulation, and these estimates allow confounded analysis of aging effects [8].

In the present study, BMI, also, was highly correlated to age of menarche (.037), parity (.000) and gravidity (.000). Although women who are overweight, obese or very obese have been having difficulties in conceiving spontaneously in many other studies.

In a recent cohort study be Wise *et al*., it had been found that a woman's body max index (BMI) higher than 35 kg/m^2 or lower than 20 kg/m^2 has been associated with low fertility rates [9]. Another meta-analysis by Maheshwair *et al*. [10], showed that women with BMI higher than 25 kg/m^2 had a lower chance of pregnancy following in vitro fertilization (IVF), required intensive treatment and had an increased miscarriage rate compared with normal weight women. Studies have proved that overweight and obese women needed longer time to pregnancy (TTP) than normal weight women.

Birth rate and pregnancy show a progressive decrease with each unit of Body Mass Index (BMI) below normal. Effective treatment of overweight and obesity shows improvements in reproductive outcome [4]. Body weight and its constituent components of fat mass and lean tissue, play an important role in modulating reproductive development and function [11]. In addition, in women presenting with ovulatory infertility, weight reduction may restore ovulation and conception.

Furthermore, Hollmann *et al*. [12] found an improvement in menstrual function and ovulatory pattern in 80% in pregnancy rate of 29%.

Husband's education had no significant effect on fertility behavior in current study. Studies about the effect of husband's education on fertility conducted in Riyadh showed some contradictions. For example, one study by Al-Obaidi in 1995 [13] showed a positive relationship between fertility and husband's education; which means that the increase in husband's education leads to an increase in fertility. These results are not consistent with findings of another study that was conducted in the same city by Al-Otaibi in 1994 [14].

This study also found that smoking of the female or her husband was associated with decreased fecundability and delay in conception. There were no studies to prove the causality of male smoking and infertility; however, smokers have 23% decrease in sperm concentration and 13% decrease in sperm motility compared with nonsmokers [4]. Husband's smoking highly affects gravidity (.000) and parity (.000) in the present study. This might be either due to the effect of second hand smoke on women, or because male smoking affects both motility and the number of sperms. Female cola consumption affects parity (.033). In a study conducted by Soto E *et al*. regarding factors affecting fertility; there were some factors that showed association with reduced fertility, such as: age, weight and smoking. Heavy caffeine consumption has been linked with sub-fertility in some studies [4]. In a study about the effect of consuming soft drinks (Cola in particular) by Mahboub, S in 2013 showed that women who consume cola had shorter Fertility period than non consumers, consumers also had lower number of children compared to those who do not consume and there was also an association between the frequency of cola consumption and late menarche [15].

Surprisingly, income was a factor that highly affects fertility. Women that had family income more than 13000 SR/month had a significant higher number of offspring that those with lower income. In a study in 1992 conducted by Al-Isawi [16] in Dammam city, the author concluded that better economic conditions are associated with high fertility. While Abu-Subha [17] in 1989 stated that there is no association between fertility and economic conditions in Jordan. Similarly, another study by Abdul Salam A in 2013 suggests that economic condition has no affect on fertility in Saudi Arabia [2].

During the last half of the twentieth century developed countries have experienced both some population growth and unprecedented declines in fertility rates In European countries couples now have

fewer than two children on average in most. The couples tend to postpone these births until a later age. A decline in male fertility has been suggested by some studies of semen quality, but there is contrasting evidence of shorter times to pregnancy for couples trying to conceive. Economic factor is also considerable. The income of young men relative to their parents' incomes determines how they rate the ability of their own earnings to support a family. Lower relative income in the 1970s was associated with a lower fertility rate. The decline in fertility in the USA may have been attenuated by the sharp rise in female income during the late 1960s and early 1970s. The level of demand for children does not appear to be set by known psychological factors, although explanations for the desire to reproduce have been sought in biological, psychoanalytical and socio-cultural research. Recent studies indicate that adults with secure attachment relationships are more interested in being parents [6].

Women's participation in labor force was not significant fertility determinants in Saudi Arabian context, probably due to benefits given to workingwomen, especially extended motherhood leave [3]. However, some studies thought that it might be one of the factors that lead to decreased fertility in the country [2]. High levels of stress also showed evidence with disturbing menstrual function and reduced fertility in a study by Bunting, L [11]. Similarly, Axmon, A *et al*. concluded the same result. Other work related factors such as prolonged working hours , "physically demanding work" , jobs requiring long standing and night shifts seem to interfere with" both the female reproductive system and the growth of the fetus" [19].

Son preference had no significant effect on fertility. According to Khraif R in 2001, other factors that also affected fertility behavior were age at marriage and women education, "child death", "son preference", women's desire to have large family [3].

Al-Riyami A *et al*. conducted a study in 2003 about the determinants of women's fertility in Oman. The aim of that community based survey was to study the association of women education, and empowerment with some of the fertility determinants. Face to face interviews with 2037 women, who were or had been married including demographic data, fertility patterns, family planning, 2 women empowerment indices (decision making and freedom of movement), and other modules reproductive health. Results suggested that about 31% of the sample was considered highly empowered in decision-making and the mean number of decisions taken in the household was 4.46 for the overall sample. For freedom of movement, 29% of the sample was highly empowered with a mean number of 3.88 for the overall sample. The mean values of both indices varied significantly according to age, residence, level of education and work status. Women of higher freedoms of movement score were more likely to have less number of children in the first 20 years of marriage. Women of higher score of decision-making index were more likely to have longer closed birth interval. Women of low score in the decision-making index were more likely to get a child at an earlier age [12].

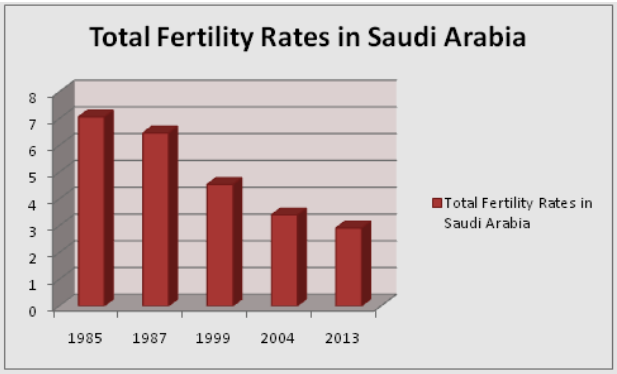

Fig. 1: Total fertility rates in Saudi Arabia

CONCLUSION

It was found that GFR (General Fertility Rate) in Saudi female decreased to be 2.91 compared to 4.53 in 1999, and it was found that fertility was positively correlated to age of a women or her husband, duration of marriage and BMI and negatively correlated to age at marriage, age at the first pregnancy and the space between children.

RECOMMENDATION

It could be helpful to conduct health education programs regarding reproductive health of females starting from adolescence till end of reproductive age (menopause) in all primary health care clinics and girl's schools in Saudi Arabia to raise the awareness for reproductive health among this target group.

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