

Gap between Preferred and Observed  
Fertility Behaviors among Mothers in  
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## Abstract

**Introduction:** Fertility gap is the difference between preferred and observed rates. Preferred fertility rates have a predictive value in forecasting the future course of fertility in any community.

**Aim:** The present study aimed at detecting gap, if any, between preferred and observed maternal fertility behaviors in Mosul at the north of Iraq and defining the underlying reasons behind their preference.

**Subjects and methods:** Across-sectional design was adopted; during which 1302 mothers at child-bearing age who had at least two living children. They were interviewed during their attendance to 20 primary health care centers distributed throughout Mosul in the North of Iraq. Data collection instrument was a validated questionnaire form prepared for such purposes.

**Result:** No gap was detected between mean preferred age at marriage and mean observed age (18.5 years) rather than 0.5 year; with a significant positive correlation between them ( $r = 0.2$ ,  $p = 0.000$ ). High parity was reported among 27.8% that was not correlated with maternal preference. Prevalence of short birth interval was 77.6%. Furthermore, 11.6 month-gap was showed between observed and preferred birth interval with a positive significant correlation, too ( $r = 0.3$ ,  $p = 0.000$ ).

Social aspect had the vital role in encouraging preference of teenage marriage (94.0%) and short birth interval (67.8%). Economic reason was the first reason among 43.1% of mothers who preferred high parity.

**Conclusions:** A real gap was detected between preferred and observed indicators of fertility behaviors. Social reasons were the main cause behind this behavior followed by economic reasons. Health education about comprehensive family life is necessary for constructing health fertility behaviors, which are consistent with religious and social contexts.

## Introduction

People's fertility behaviors adequately reflect their preferences that they would like to practice [1]. However, some people might want to have more children than they actually do but they are unable to realize their wish for various reasons.

Fertility gap is the difference between preferred and observed fertility. It reflects the existence of unrealized fertility and at the same time indicates the existence of a window of opportunities for policy action [2].

The basic determinants of fertility are the underlying socioeconomic conditions. They indirectly act through their influence on the immediate determinants which, in turn, are seen as direct determinants of fertility. These determinants include: Age at starting reproduction, number of children and duration of postpartum unproductiveness i.e. birth spacing. Thus, fertility gap points to a cultural lag, since the preferred fertility is a measure of social norms that needs long time to be changed in comparison to time needed for the modification of real fertility behaviors. Consequently, fertility behaviors are the product of interaction of a complex set of factors, which include: biological, cultural, demographical, familial and social [3]. They are determined by concepts and beliefs that are inherited in a culture from which it is almost impossible for the individual to disengage him completely [4].

In developing countries where fertility regulation is not widespread, researches in fertility preference have received considerable attention in recent years because of its relationship with the complex family building processes [5]. Parental attitudes and aspirations in fertility decision-making seem to be related to the future course of fertility in a society. So, exploration of the desired or preferred family size will possibly substitute eventual fertility or completed family size. If a respondent's stated fertility preferences are related in some way to her eventual fertility, then information on fertility preference should have a predictive value in forecasting the future course of fertility, and under voluntary control, the desired number of children will be an increasingly important determinant of fertility [6].

The present study aimed at detecting gap, if any, between preferred and observed fertility behaviors among of married women in childbearing age in Mosul at the North of Iraq and defining the underlying reasons behind their preference.

### Subjects and Methods

The present study adopted a cross-sectional design based on health institutions after obtaining administrative and ethical agreements from Nineveh Health Directorate in Mosul at the North of Iraq. The required sample size was estimated following the Daniel’s [7] equation with 95% confidence interval and 0.03 widths

$$(d) : n = \left[ \left( Z_{(1-\alpha)}^2 p \frac{q}{d^2} \right) \times 2 \right] + 5\%$$

P is the proportion of the population possessing the characteristics of interest i.e. women in child bearing age which was replaced by 14% according to the report of the Public Health Department in Nineveh Health Office in 2012.

The study followed a multi-stage stratified sampling method; Mosul City was divided by Tigris River vertically and by Nineveh Street (it is the main street in the city) and its extension horizontally into four geographical areas: North East, North West, South East and South West. Subsequently each area was stratified into three social strata (urban, suburban and rural) according to their closeness to the city center. Twenty Primary Health Care Centers (PHCCs) were non-randomly selected depending on population size and proportion of women in childbearing age in each catchment area. The included PHCCs were representing 70% of all centers in Mosul City. Inclusion criteria were explicitly defined that was “currently married women in childbearing age (15-49 years), having at least two living children which attended one of the included PHCCs”. Eligible mothers were selected on a consecutive base after obtaining a verbal consent from them. Distribution of the estimated sample was weighted according to population size and proportion of married women in childbearing age in each catchment area.

A special questionnaire form comprising closed and open ended questions was structured. It inquiries about the socio-demographic characteristics of the studied mothers. The actual fertility behaviors were looked for by asking the mothers to cite their age at which they

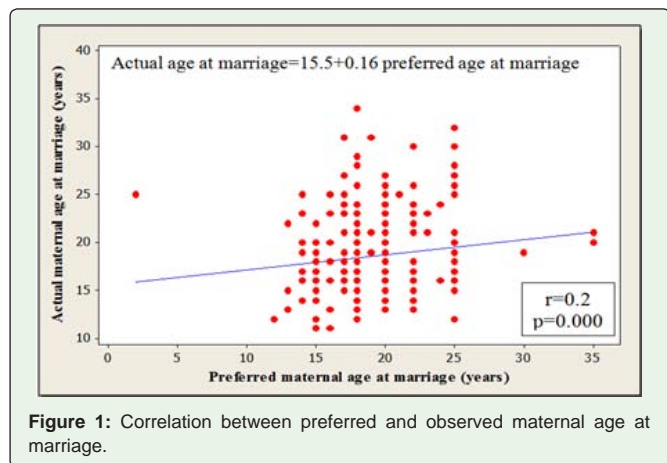


Figure 1: Correlation between preferred and observed maternal age at marriage.

had got married, number of living children and interval between their births. In addition, they had to determine their desired age at marriage, parity and birth interval; as well as they had to state reason(s) that motivated them to decide their preference. The first reason mentioned by mothers was considered in the analysis. The difference between preferred and observed fertility behaviors was considered to find out the gap. The adopted questionnaire was validated by Angoff approach [8] which is the most widely used method. A group of eleven experts judged the validity’s aspects, i.e. coverage, clarity and reality, as 85.0%, 85.5% and 80.9% respectively. As a final point, the questionnaire got 83.8% as an average.

A pilot study was carried out before practicing the questionnaire form in order to construct an appropriate and informative edition of the adopted form; to assess reliability and finally to estimate time needed for completing data collection. It was conducted in one of the selected PHCC. Twenty mothers who met the inclusion criteria were selected consecutively. Both intra and inter-observers variations were estimated as 86.8% and 82.9% respectively that made questionnaire’s reliability 87.2%.

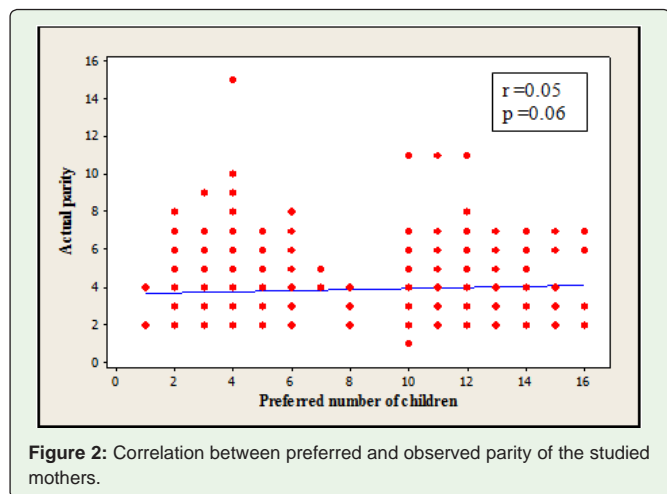
Almost ten months duration (from 1<sup>st</sup> April, 2011 till the end of Jan, 2012) was needed to collect the required data. Work schedule was organized to visit each geographical area once every fourth week. The first area was selected randomly and the remaining was arranged systematically in a clock-wise direction.

The present study estimated the prevalence of both preferred and observed fertility behaviors and the correlation in-between was assessed by using Pearson’s correlation (r). P-value was considered as significant when it was equal or less than 0.05 throughout the analysis.

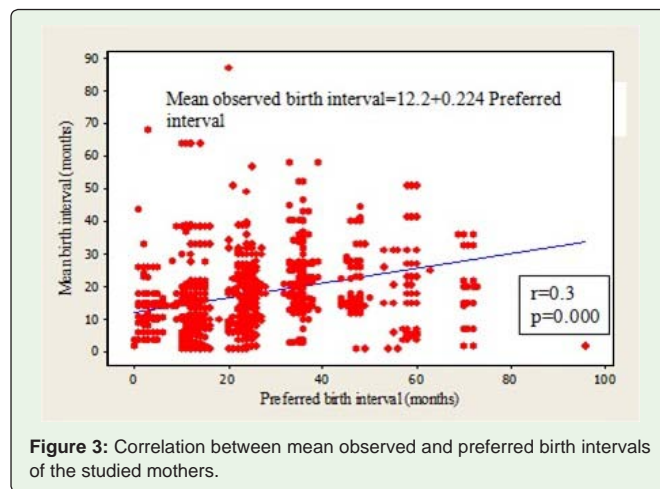
Table 1: Prevalence of desired and observed fertility behaviors among study sample.

Fertility behaviors	Desired		Observed		Correlation (r)	p-value
	No.	(%)	No.	(%)		
<b>Maternal age at marriage (years)</b>						
< 15	92	-7.1	204	-15.7	0.2*	<0.001
15-19	520	-39.9	612	-47		
≥ 20	669	-51.4	483	-37.3		
Mean ± SD	19.0 ± 3.3		18.5 ± 4.2			
Fertility gap	0.5 year					
<b>Parity (children per mother)</b>						
4-Feb	836	-64.2	940	-72.2	0.05	0.06
≥ 5	466	-35.8	362	-27.8		
Mean ± SD	4.8 ± 2.0		3.8 ± 1.6			
Fertility gap	1.0 child					
<b>Mean birth interval (months)</b>						
< 24	338	-26	1011	-77.6	0.3**	<0.001
≥ 24	964	-74	291	-22.4		
Mean ± SD	30 ± 18.2		18.4 ± 11.3			
Fertility gap	11.6Months					

\*Pearson’s correlation was use



**Figure 2:** Correlation between preferred and observed parity of the studied mothers.



**Figure 3:** Correlation between mean observed and preferred birth intervals of the studied mothers.

**Results**

The current study interviewed 1302 women who possess the inclusion criteria. More than half of the interviewed mothers (52.4%) were urban residents and 47.6% were either from suburban or rural regions. Most of studied families (93.9%) were Muslims. Arabs constituted 83.7%. While Kurds, Turkmen and Shabaks formed 7.3%, 4.8% and 4.1% respectively.

The mean current age was  $30.0 \pm 7.7$  years. Almost three quarters of mothers (70.3%) were 20-39 years old, 7.4% were teenagers and 12.3% were at the end of their fertility span (40-49 years old). Illiterates formed just less than one half (48.8%) of mothers. The fraction of working mothers was 7.1%.

Table 1 demonstrates the prevalence of preferred and observed fertility behaviors. Two thirds of studied mothers (62.7%) had got married during their teenage; 15.7% were just children at the time of their marriage i.e. before the age of fifteen, and 47.0% were at the age group 15-19 years. At the same time, 47.2% of the interviewed mothers preferred teenage marriage. The mean desired age at marriage was  $19.0 \pm 3.3$  years, despite the fact that the observed mean maternal age at marriage was  $18.5 \pm 4.2$  years. Therefore, the gap detected between the mean of preferred age at marriage and mean of actual age at marriage was 0.5 year with a positive significant correlation between these variables ( $r = 0.2, p < 0.001$ ) (Figure 1). The same table shows that three quarters (72.2%) of mothers had parity between 2-4

**Table 2:** Concepts behind preferring high fertility behaviors as stated by studied mothers.

Concepts	Desired Fertility Behaviors					
	Teenage marriage		High parity		Short birth interval	
	No.	(%)	No.	(%)	No.	(%)
	<b>614</b>	<b>-47.20%</b>	<b>466</b>	<b>-35.80%</b>	<b>338</b>	<b>-26.00%</b>
<b>Religious</b>	19	-3.1	85	-18.2		--
<b>Health</b>	13	-2.1	37	-7.9	82	-24.3
<b>Economic</b>	18	-2.9	135	-29	27	-7.9
<b>Social</b>	564	-91.9	209	-44.9	229	-67.8
<b>Total</b>	614	-100	466	-100	338	-100

living children per mother while higher parity was reported among 27.8%. The mean of observed parity (3.8 children per mother) showed no significant correlation with maternal preference (4.8 children per mother). Accordingly, mothers preferred to have one child more than actually they did (Figure 2).

The mean birth interval stated by mothers was 18.4 months. Prevalence of short birth interval was 77.6%; while, the mean of desired birth interval was 30 months. Consequently, there was an 11.6 months gap between observed and desired spacing with a positive significant correlation in between ( $r = 0.3, p < 0.001$ ) (Figure 3).

**Table 3:** Details of social concepts that incite preferring high fertility behaviors.

Social Concepts	No.	(%)
<b>Preference of teenage marriage</b>		
Mature enough to carry on family responsibilities	307	-54.4
Lessen difficulties of establishing new family	87	-15.4
Securing future	81	-14.2
To catch her chance of marriage	47	-8.3
Young wife can cope with her husband's style	29	-5.1
Enjoy her life	14	-2.6
Total	564	-100
<b>Preference of high parity</b>		
Good socialization	55	-26.3
Social welfare	54	-25.8
Social support	42	-20.1
Replacement of child's death	31	-14.8
Satisfy husbands' needs	27	-13
Total	209	-100
<b>Preference of short birth interval</b>		
Attain better brotherhood	76	-33.2
Invest time to have more children	69	-30.1
To lessen difficulties raised from child rearing	61	-26.7
Son preference	17	-7.4
Disposal from dilemma raised from delayed pregnancy	6	-2.6
Total	229	-100

Maternal concepts that motivated preference of high fertility behaviors are revealed in Table 2. Social reasons played the utmost role in encouraging preference of teenage marriage (91.9%), having high parity (44.9%) and short birth interval (67.8%). It is worth noting that just less than one third of the studied mothers (29.0%) preferred having high parity as a hope for financial gain.

Details of social concepts that incite mothers to prefer high fertility behaviors which include teenage marriage, having five or more living children and birth interval shorter than 24 months are displayed in Table 3. More than half of study subjects (54.4%) stated that teenage girls become mature enough at such age to fulfill responsibilities of marriage, childbearing and rearing. More than one quarter (26.3%) mentioned good socialization for high parity preference and 33.2% declared better brotherhood between children as a cause of short birth interval favorite. Only 7% stated son preference as a cause of having short spacing.

## Discussion

The present study used a cross-section design that has a long tradition in sociology and forms the general methodology of sociological and anthropological researches [9]. It has the advantage of being fairly quick and easy to perform [10]. However, the most important dilemma that may come up with this design is selection bias [11]. Subjects in health-institutions are more accessible for interview as well as more cooperative with investigators than persons in the community particularly in discussing such deeply settled issue [11]. However, in the present study, efforts were devoted to ensure representativeness by adopting multi-stage stratified sampling technique to include all social strata distributed in urban, peri-urban and rural settings.

In addition, attempts were saved to determine precise ethical and safety standards related to the investigation of such issue [11,12]. Furthermore, health-institutions attendants are more accessible and cooperative than people in the community particularly in discussing such deeply settled issue. Other concerns in such in-depth medico-sociological study stems from the controversy about meaningfulness or validity of such attitudinal data related to fertility preferences [10]. The present study hired an Angoff approach to assess the validity of the adopted questionnaire.

The present study was carried out in Mosul, the second biggest and most populated city in Iraq. It is indicative of the mingling ethnic and religious cultures of Iraq. The majority of its people are Arab and Muslims followed by Christians. Others were hidden due to internal migration of some ethnic and religious groups as a result of the unstable security circumstances the area witnesses since 2003. However, Mosul still maintained its multicultural and multi-religious mosaic which had a great role in drawing its cultural beliefs and norms that affect all aspects of human behaviors including fertility.

In the present study the minimum age of marriage among studied mothers was eleven. Teenage marriage was recorded among 6 out of 10 mothers (62.7%); and almost two of such mothers got married when they were still children (15.7%). It is worthy to notice that Iraq had legislated eighteen years as the minimum age for females' marriage [13]. Popularity of teenage marriage that defies all legislations is a product of various socio-cultural factors. Religious beliefs encouraged few of mothers (3.1%) to prefer teenage marriage.

More than 90% of mothers prefer early marriage as a hope to get an enhanced social life. More than half of mothers (54.4%) believed that girls at teenage are physically and emotionally mature enough to take on the whole family's responsibilities. They convened that marriage at teenage will lessen difficulties of establishing a new family as they used to say that "Young wives are more flexible that can cope with their husbands thinking style". They described the condition as "If the tea cools, it is unlikely to be drunk". Such concepts deepened the popular notion which regards having children is the goal of marriage and/ or will further the link between the parents.

Sallam et al. [14] in Egypt reported that all women cited 20 years as the mean ideal age at marriage because, as they stated, "At such age female is sensible and mature enough to withstand the burden of pregnancy". However, they encouraged marriage before the age of 20 to cousins especially of first degree. While, Nigerian women believed that, as stated by Charles et al. [15] in 2000, the ideal age of females' marriage is the time when girls are mature enough for childbearing which may be at 14-17 years; and some of them said "Since nowadays girls become mature at an earlier time, they get married at 13 years old". In many traditional Sub-Saharan African communities, where child marriage is commonly practiced, marriage is regarded as a business deal and often represents a significant economic activity for a family. A daughter may be the only goods a family has left to be traded and sometimes girls can be used as currency or to settle debts [15].

Casterline [16] proved that wherever poverty is acute, a young girl may be regarded as an economic burden and her marriage will benefit both for the girl and her family as well. The present study found that 14.2% of participant mothers believed that early marriage will protect their daughters and save their future financially and socially. Such mothers explained their concept as that: "If the parents let their daughters grow up, their well-formed personality enable them to make independent decision regarding their marriage". So, it is preferred to engage daughters in marriage at an earlier time in order to overcome such problem. Moreover, likelihood of suitable marriage, as studied mother supposed, may become less significant as girls got older than twenty years. This concept is part of common concepts deeply rooted in developing countries specially in the Arab societies where early marriage is considered a means of securing young girls' future and protecting them [17,18]. It has been found that protecting young girls against dishonor is a frequently cited reason for early marriages in New Delhi in India, and parents also want to ensure their daughters' safety [19].

In the present work theme a parity found was four children per mother. However, higher parity was found among three out of ten mothers (27.8%) and one in every four mothers (26.4%) had five to nine children. The present study found that the preference of high parity stems from religious beliefs and particularly of Islam, which favor high parity but not to the extent of harming maternal health. Most of Muslim mothers repeated the Praiseworthy Speech of the Prophet Mohammed (Prayers and Peace be upon Him) which encourages marrying a warmhearted and fecund woman.

The same finding was stated by Al-Qudsi [20] in 2008 when he found that the single most remarkable demographic aspect of the Arab region is the high fertility level and son preference plus religious beliefs, which had a positive influence on the number of births. In



addition, Khawaja et al. [21] in 2009 found that the total fertility rate in Beirut is about two children higher among Muslim women. Then, Al Sheeha [22] in 2010 stated that 70.0% of Saudi women preferred to have 5 to 10 children and nearly one fourth (23.3%) preferred to have more than 10 children. They were considering the value of children as being a blessing from God. Only 4.8 % of Al-Sheeha subject desired to have less than 5 children. Kaufmann [23] in 2009 stated that the Muslim community in India has higher fertility than other major communities. They observed that both actual and desired family size was quite high attaining 3.3 and 6.1 respectively.

The present study recorded that 26.3% of mothers preferred high parity as a plan for good socialization, they frequently repeated the old proverb "Reduce and pamper" or they wished to achieve social welfare and support which as stated by 25.8% and 20.1% of mothers respectively. These mothers frequently cited the Precious Verse: In the name of God the Most Gracious the Most Merciful "Wealth and children are adornment of the worldly life" (Al-Kahf, from verse 46).

Obviously, mothers continue procreation, as 14.8% of mothers stated, in order to replace child's deaths, if occurred, and thus ensure the desired family size at the end of the reproductive period. However, holding such concepts was detected by 25.8% of mothers. Posterity as a life-support was reported by 20.1% as an intention for preferring high parity. Alike findings were recorded by Adhikari [24] in 2010 in traditional Nepalese society that has favored high fertility and children are considered a symbol of both social and economic well-being. It is viewed as a disgrace for a couple, particularly for the wife, not to have a lot of children. They believed in the Nepalese popular saying "May your progeny fill the hills and mountains". High fertility is desired because, as Nepalese population thought, by producing children, preferably sons, a woman raises her status in the family in addition to economic gains and old age security. As well, Eyayou et al. [25] in 2004 stated that couples with many children are esteemed in Ethiopia. So, children, irrespective of their gender, are highly valued and desired as both genders fill a very crucial gap in the social and cultural and economic life of Ethiopian people. Boys are shepherds, providers of security and extra hand in mining gold and cattle raiding. A girl fetches financial gain through dowry. Moreover, having many children is considered as insurance against high child mortality that is highly prevalent in Ethiopia.

Economic motivations was the second more frequent concept that incited studied mothers to prefer high parity as was found in the present study. Financial deficit motivated 29.0% of mothers to prefer having high parity as a hope for monetary gain. They trust the public notion of "Having children especially sons, will decant into your own dish". Beside, another frequent public statement says that "Daughters are indoor workers and sons are outdoor workers". It is worth to mention that in one of the peri-urban area, during data collection of the present study, one of the interviewed mothers who was married to a disabled unemployed husband and came to the PHCC just to ask for financial aid stated her concept as that "I want to have so many living children in order to get the largest amount of ration card's elements offered by the Government".

The present study found that the mean birth interval among almost eight out of ten mothers (77.6%) was shorter than 24 months. The observed birth interval was significantly a year shorter than preferred interval. Mothers of both religions (Muslims and

Christians) preferred 30 months as a mean interval and Muslim mothers frequently alluded to the Glorious Quraanic verse, saying: In the name of God the Most Gracious the Most Merciful "Mothers may breastfeed their children two complete years for whoever wishes to complete the nursing period" (Al-Baqarah, from verse 233). However, it should be notice that Islamic teaching encouraged a birth to pregnancy interval of 22-24 months in order to provide an opportunity for lactation.

The present study elucidated that almost two thirds of mothers who preferred short birth interval (67.8% of mothers) explained social reasons. They either planned to attain better brotherhood (33.2% of mothers) or to invest time and have more children (30.1% of mothers). One of the popular notions that recorded in the present study stated that, "Short birth interval allows the mother to have her desired number of children within the same duration of time and such practice will lessen difficulties that associated with repeating the child care".

A similar findings were reported among Egyptian mothers in 2004 who all stated that 2-3 years is the optimal spacing, since it allows time for mothers to recover from pregnancy, labor and lactation; reload her nutritional stores and provide time for the last born to secure his/her rights to comprehensive care and lactation [26]. However, despite the high awareness level of mothers their conviction level was low. They believed that couples who are financially comfortable can have many children deprived of resting period. In addition, giving birth to a girl will quicken occurrence of the next pregnancy to increase chances of having a boy especially if the mothers were healthy and well-nourished [27].

Finally, it can be concluded that a real gap was detected between observed and desired fertility indicators amongst Iraqi mothers in childbearing age. The picture might have been changed among older mothers who had completed their family size. Social concepts were the main pivot stated behind preferring high fertility behaviors.

The present study recommended that an effective employment of civil society organizations and religious leaders in the process of health education about comprehensive family life is necessary for constructing healthy fertility behaviors, which are consistent with religious and social contexts.

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