Reproductive Behavior Changes in the Current Iraqi Community and its Influencing Factors

Omaima Abdulrazzaq Zubair*
*Department of Family and Community Medicine, College of Medicine, University of Mosul, Mosul, Iraq
Correspondence: oaz@uomosul.edu.iq

ABSTRACT

Background: Regional factors influence reproductive behavior worldwide, including political instability and social, economic, and cultural factors. Recently, Iraq has been subjected to a different mix of factors that affect its people's reproductive behavior.

Aim: To examine the reproductive behavior of the Iraqi community and the factors influencing it.

Methods: Data were collected through several methods, including a cross-sectional survey during the year 2023, a review of the birth registry database from the Nineveh Health Directorate, and the analysis of a statistical database available from the total fertility rate of Iraq 1925-2020.

Results: The findings indicate a significant shift in reproductive behavior among Iraqi people as there has been a decline in fertility rates in the last decade, followed by a slight increase in the previous 3 years. Political stability and the provision of health services significantly impact determining the number of children a family prefers. However, personal desire, war, displacement, increased living expenses, higher parental education, increased health awareness, and wife's employment could negatively influence family size (P < 0.001). Individuals aged 35–44 years who are employed, have a higher educational level, and live in urban areas typically have the lowest mean number of children, with a preference for having approximately 2–4 children per family.

Conclusion: Many modulating factors appeared to affect the reproductive behavior in the Iraqi community. Governmental planning and studies health departments should anticipate demographic shifts to mitigate potential adverse outcomes and capitalize on demographic opportunities.

Keywords: Fertility, reproductive, Healthcare access, Urbanization, Family planning.

تغيرات السلوك الانجابي في المجتمع العراقي الحالي والعوامل المؤثرة فيها

اميمه عبدالرزاق زبير*
*فرع طب الاسرة والمجتمع ، كلية الطب ، جامعة الموصل ، الموصل ، العراق

الخلاصة

الخلفية: يتأثر السلوك الإنجابي في جميع أنحاء العالم بعوامل إقليمية بما في ذلك عدم الاستقرار السياسي والعوامل الاجتماعية والاقتصادية والثقافية. في الآونة الأخيرة، تعرض العراق لمزيج مختلف من العوامل التي تؤثر على السلوك الإنجابي لشعبه.

الهدف: هدفت الدراسة إلى دراسة السلوك الإنجابي للمجتمع العراقي والعوامل المؤثرة عليه.

الطرق: تم جمع البيانات من خلال عدة طرق، بما في ذلك المسح المقطعي خلال عام ٢٠٢٣، ومراجعة قاعدة بيانات سجل المواليد من مديرية صحة نينوى، وتحليل قاعدة بيانات إحصائية متاحة من معدل الخصوبة الإجمالي للعراق ١٩٢٥-٢٠٢٠.

النتائج: تشير النتائج إلى تحول كبير في السلوك الإنجابي بين الشعب العراقي حيث كان هناك انخفاض في معدلات الخصوبة في العقد الماضي، تلاه زيادة طفيفة في السنوات الثلاث الماضية. كان للاستقرار السياسي وتوفير الخدمات الصحية تأثير كبير على تحديد عدد الأطفال الذين تفضل الأسرة إنجابهم. ومع ذلك، فإن الرغبة الشخصية، والحرب، والنزوح، وزيادة نفقات المعيشة، والتعليم العالي للوالدين، وزيادة الوعي الصحي، وعمل الزوجة كانت العوامل التي يمكن أن تؤثر سلبًا على حجم الأسرة (P > ٠.٠٠١). الأفراد الذين تتراوح أعمارهم بين ٣٥ و ٤٤ عامًا، والذين يعملون، ولديهم مستوى تعليمي أعلى، ويعيشون في المناطق الحضرية لديهم عادةً أقل متوسط عدد للأطفال، مع تفضيل وجود ما يقرب من ٢-٤ أطفال لكل أسرة.

الاستنتاج: يبدو أن العديد من العوامل المؤثرة تؤثر على السلوك الانجابي للمجتمع العراقي. يجب على أقسام التخطيط والدراسات الصحية الحكومية توقع التحولات الديموغرافية للتخفيف من النتائج السلبية المحتملة والاستفادة من الفرص الديموغرافية.

الكلمات المفتاحية: الخصوبة، الإنجاب، الوصول إلى الرعاية الصحية، التحضر، تنظيم الأسرة.

INTRODUCTION

Smart and effective public policies are established based on accurate population data classification. [1] Demographic population growth is a critical issue that affects various aspects of life in any society, including economic, social, and environmental aspects. [2] Fertility, measured by birth statistics, affects these determinants of the population, and the statistical concept of fertility should be distinguished from biological factors or the physiological ability to reproduce, which is more complex to assess. [3] A community's culture, economics, and needs shape its reproductive behavior. [4]

Factors such as war, displacement, and globalization influence and alter reproductive patterns. [5] Over the past few decades, the fertility rate among Iraqi women has significantly changed. The grandmothers of women in their 40s today typically had approximately 7–12 children during their reproductive years. However, the average number of births per woman decreased from 7.4 in the 1970s, which rendered Iraq one of the countries with the highest fertility rates worldwide at that time, to 3.446 in 2023. [6]

Over the past few decades, Iraq's fertility rate has experienced significant fluctuations, driven by the dramatic events in the region. The fertility rate began to decrease in the 1980s. It has continued to decline until the present, contributing to shifts in Iraq's growth rate in the opposite direction.

This decrease in fertility, coupled with an increase in the growth rate (from 1.6 in 2021 to 7.0 % in 2022), has led to a period of advantageous demographic changes. A larger working-age population relative to the dependent population (children and older adults) can boost economic productivity and growth, creating potential development opportunities. [7]

However, realizing these potential benefits requires effective governance, investments in education and healthcare, and the creation of adequate and appropriate employment opportunities to drive economic growth and boost gross domestic product (GDP). Without these measures, failure is inevitable. [8]

This study aimed to assess the changes in the reproductive behavior of Iraqi individuals and their impact on the current Iraqi society.

METHODS

Institutional approval was obtained from the Department of Family and Community Medicine, College of Medicine, University of Mosul, and the Directorate of Health and its administrative offices with the approval of the Ethics Committee of the Preparation, Training, and Research Unit. The Medical Research Ethics Committee reviewed and approved the study (ref. no.: UOM/COM/MREC/22-23 (36) dated 21 May 2023).

The results of the study were collected from four sources of data. The first source was the Statistical Division of the Nineveh Health Directorate, which provided the delivery records, including the total number of deliveries in the governorate, encompassing both rural and urban areas in 2010, 2014, and 2018–2023. The second data source was the Ministry of Health's published "Basic Iraq Data" statistics, extracted from the Ministry's annual reports, which reflect the country's situation. The third source was the publicly available online total fertility rate of Iraq 1925-2020 and Iraq: Age structure in 2023. [9,10] The fourth source involved a cross-sectional survey through direct interviews with 250 participants who met the inclusion criteria. Adult Iraqi people aged 21 and older who lived in the area of sample collection were interviewed after obtaining their approval to participate in the study. A brief explanation of the nature and purpose of the study has been given to them. Non-Iraqi people who lived in Iraq were not included in the study. Any Iraqi person younger than 21 was excluded from the study as their opinion may not yet be fully formed, they have less experience, and there might be some unrealistic answers. This measure was done to minimize the bias that could affect the validity of the results. The interviews were conducted using a well-prepared structured questionnaire to gather data on factors related to reproductive behavior and beliefs. A multistage sampling technique was used to select the study participants from the Nineveh governorate through its distributed health facilities, as shown in Figure 1. A convenient sample was selected by dividing the governorate into left and right banks of the Tigris River. Primary healthcare centers representing the high and low socioeconomic classes in Mosul city, "the biggest district of the governorate," were chosen from each bank, along with one maternity hospital on each

side. Additionally, other districts were selected from each side of the river to represent the governorate's diverse ethnic groups. For example, Sinjar was chosen for the Yazidi community, Hamdania for Christians, and other areas for additional ethnic groups (flowchart 1). Informed consent was obtained from each participant after briefly explaining the research objectives. Confidentiality was maintained throughout the study.
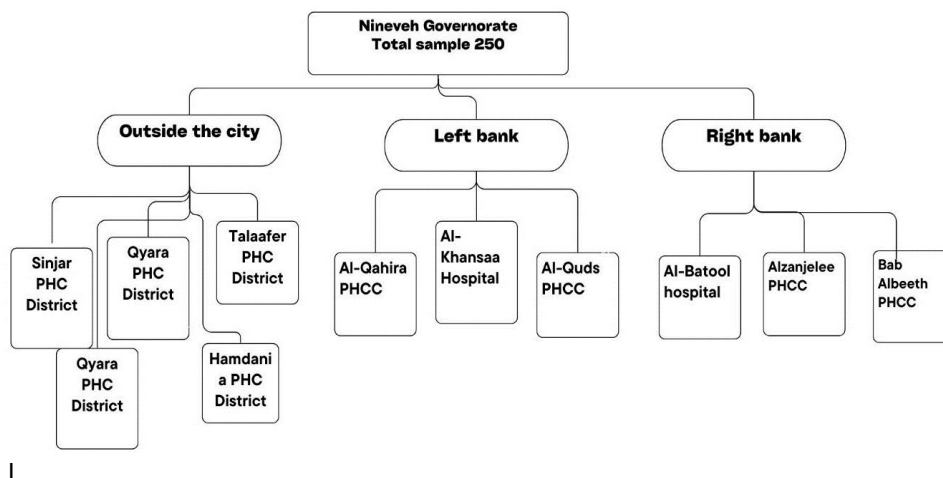
Flowchart (1) represents the selected sample areas included in this study

The study employed a mixed-methods approach. Qualitative data were gathered through focus groups to determine the factors that affect reproductive behavior and develop a questionnaire. These questions were converted into close-ended questions to collect (10)quantitative data from participants.

The validity and reliability of the answers were assessed, yielding a validity of 70% and a reliability of 87%. The questions were categorized into the following sections: sociodemographic characteristics, factors affecting reproductive decisions, and living conditions. Data were encoded, entered into Excel, and then transferred to SPSS for analysis. Each analysis was conducted independently to identify the differences and similarities in responses. Chi-square and goodness-of-fit tests were used to determine participant answer variations, with the mean number of children per group calculated along with the standard deviation (SD).

Definitions of Terms

Total fertility rate refers to the average number of children a woman of childbearing age (typically defined as 15–44 years) can expect to have throughout her reproductive years. [11-13]

Birth rate refers to the actual number of live births in a given population. [14]

Growth rate refers to the rate at which a country's economy expands or contracts over time. It is typically measured as the percentage change in the country's GDP from one year to the next. [15]

RESULTS

The statistical data from the Ministry of Health's annual report indicated a significant decrease in the fertility index rate in various Iraqi governorates in the previous years (figure 1). [9]
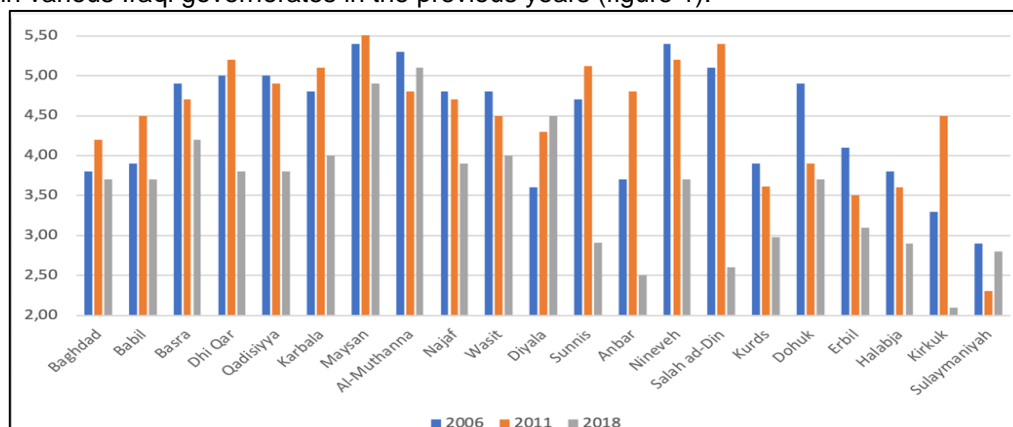

Figure 1. Fertility index (average number of children per woman, 2006, 2011, and 2018)

This decrease in fertility has run over several decades since 1925 (figure 2), as reported by the Total fertility rate of Iraq from 1925 to 2020.
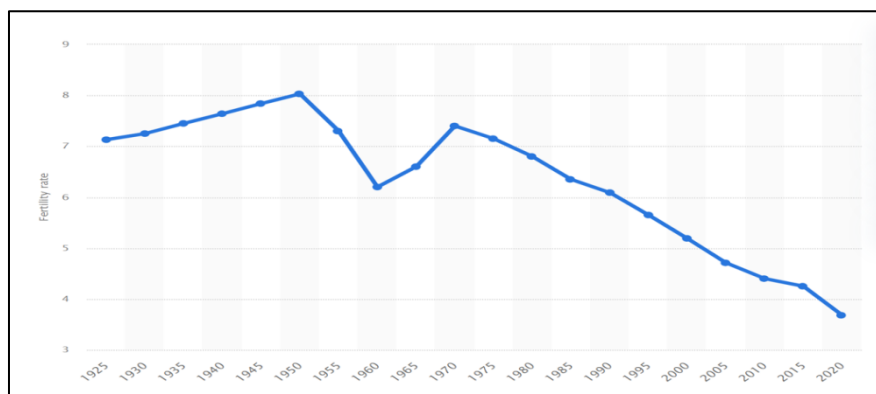

Figure 2. Total fertility rate in Iraq from 1925 to 2020 [10]

The results obtained from the registration records at the Statistical Division of the Nineveh Health Directorate for different years revealed that the total number of deliveries in the governorate was higher in 2010 (127,537 babies/year) compared with the previous year (91,159). However, a slight gradual increase was observed from 2020 to 2024, as shown in Figure 3.
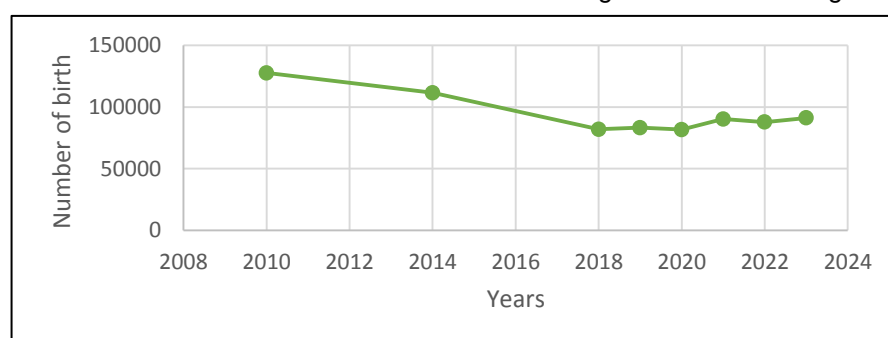

Figure 3. Total number of births in the Nineveh Governorate per year

The analysis of the baseline data from Iraq revealed that the age group (15-64) is the predominant age group rather than 0-14 or 65 years and more, as appeared in (figure 4).
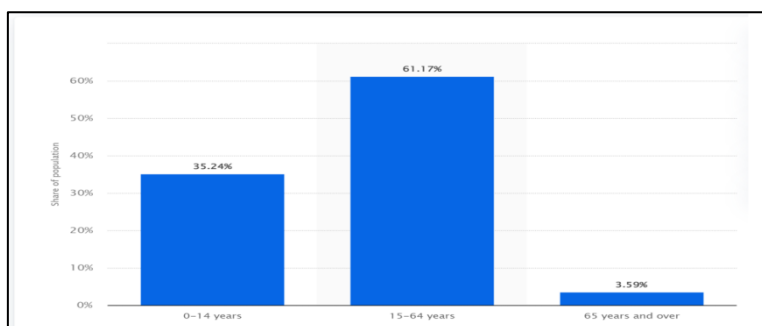
Figure 4. Age structure in Iraq

The statistics from the Statistical Unit of the Nineveh Directorate show a higher utilization of private sector services in the Nineveh Governorate in recent years compared with the previous years (figure 5).

Figure 5. Number of deliveries in private hospitals per year

Table 1. Data collected through a cross-sectional survey by the site visit

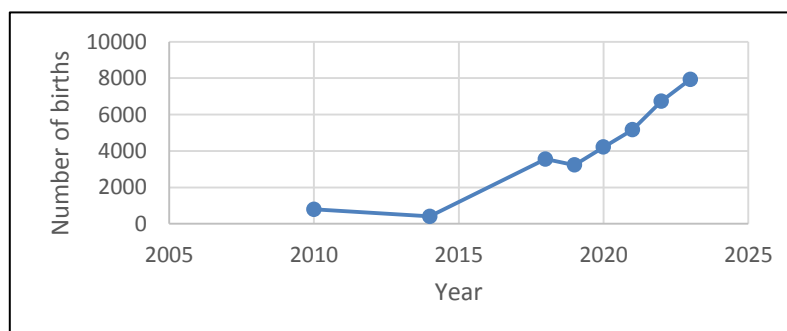| Sites	Number of participants	%
Al Quds Primary Health Care Center	25	10
Al-Qahira primary healthcare	23	9.2
Al-Zanjelee primary healthcare	21	8.4
Bab Albeeth	23	9.2
Al-Batool hospital	25	10
Al-Khansaa Hospital	23	9.2
Talaafer primary health care district	23	9.2
Qyara primary health care district	21	8.4
Sinjar Primary Health Care District	21	8.4
Al-Hamdania Primary Health Care District	22	8.8
Makhmoor Primary Health Care District	23	9.2
Total	250	100

Table 1 shows the distribution of study participants according to collection sites, as it appeared to be as much as possible evenly distributed through all areas to ensure a representative sample.

Table 2 represents the distribution of study participants according to their sociodemographic characteristics. There is uniformity of representation of the target population as about half of the participants were from rural areas and the other half from urban regions. The prevalent age among participants was 25-35 years. Islamic religion with Arab nationality was predominant among the participants, representing 71.6% and 76.8 %, respectively. About 65% of the participants had secondary and higher education. The nuclear family was present in 70 % of the participants. The desired number of children 2-4 was chosen among 38% of the participants, while 5-7 children presented in 37%. The desired number of children among the participants was 2- 4, as presented in 68%.

Table 2. Sociodemographic and personal characteristics of the study population

Characteristics	Number	(%)
Age		
<25	43	17.2
25–35	89	35.6
35–<45	71	28.4
≥45	47	18.8
Sex		
Male	111	44.4
Female	139	55.6
Residence		
Urban	146	58.4
Rural	104	41.6
Religion		
Islam	179	71.6
Christianity	39	15.6
Yazidism	32	12.8
Sabians	0	0
Ethnicity		
Arab	192	76.8
Kurd	34	13.6
Turkman	22	8.8
Shabak	2	0.8
Education level		
No formal education	10	4
Primary	70	28
Secondary	76	30.4
University and higher	94	37.6
Living arrangements		
Nuclear family living	177	70.8
Extended family	73	29.2
Occupation		
Employed	123	49.2
Self-employed	72	28.8
Unemployed	55	22
Family member number		
The number of children participants have		
0	2	0.8
1	31	12.4
2–4	95	38
5–7	94	37.6
≥7	28	11.2
The expected desired number of children is 2–4.		
Yes	171	68.4
No	79	31.6

(Table 3) depicts that the mean number of children per participant was lowest (3.83± 1.5 SD) among those aged 35–<45 years. It was also lowest among participants with higher education levels and were employed. Urban participants had a lower mean number of children compared with rural participants (3.7 ±1.4 SD versus 4.5± 1.7SD). The predominant desired number of children was 2–4, except for rural residents, who predominantly desired five or more children (63.5%).

Table 3. Mean number of children and personal characteristics of the study sample

Variable	Number N=250	(%)	The mean number of children ±SD	Number of children desired (% within the age)		
				0–1 child	2–4 Children	≥5 children
Age						
<25	43	17.2	4.09 1.48	1 (2.3%)	33 (76.7%)	9 (20.9%)
25–<35	89	35.6	3.97 1.50	0 (0.0%)	59 (66.3%)	30 (33.7%)
35–<45	71	28.4	3.83 1.58	2 (2.8%)	46 (64.8%)	23 (32.4%)
≥45	47	18.8	4.47 1.86	0 (0.0%)	30 (63.8%)	17 (36.2%)
Education						
No formal education	10	4.0	4.90 1.97	0 (0.0%)	6 (60.0%)	4 (40.0%)
Primary	70	28.0	3.99 1.67	1 (1.4%)	44 (62.9%)	25 (35.7%)
Secondary	76	30.4	4.28 1.75	0 (0.0%)	51 (67.1%)	25 (32.9%)
University and higher	94	37.6	3.81 1.31	2 (2.1%)	67 (71.3%)	25 (26.6%)
Job						
Unemployed	55	22.0	4.42 1.83	1 (1.8%)	38 (69.1%)	16 (29.1%)
Employed	123	49.2	3.82 1.54	2 (1.6%)	84 (68.3%)	37 (30.1%)
Self-employed	72	28.8	4.14 1.46	0 (0.0%)	46 (63.9%)	26 (36.1%)
Residence						
Urban	146	58.4	3.71 1.41	2 (1.4%)	131 (89.7%)	13 (8.9%)
Rural	104	41.6	4.52 1.72	1 (1.0%)	37 (35.6%)	66 (63.5%)

(Table 4) illustrate that most participants agreed that increased political stability and the provision of health services in the region were the primary contributors to the decision to increase the number of children in the family. By contrast, personal desire, war, displacement, increasing living expenses, higher levels of education among parents, increased health awareness, and the wife's employment status were perceived as having a negative effect on the family size. The participants somewhat agreed that the desires of the partner's family, the community's pressure, jealousy, social media influence, the partner's desire, religious beliefs, or the husband's employment status have minor or no role in family planning. The effect of contraception was viewed as having both negative and negligible effects on the decision to have children.

Table 4. Factors affecting the decision of conception among the study population [N=250]

Factors	Agree with increase		Agree with decrease		No effect		P-value*
	No.	%	No.	%	No.	%	
Intention to determine the number of children							
Personal desire	87	34.8	129	51.6	34	13.6	<0.001
Partner's desire	56	22.4	51	20.4	143	57.2	<0.001
The desire of the partner's family	54	21.6	64	25.6	132	52.8	<0.001
Pressure on the community	71	28.4	57	22.8	122	48.8	<0.001
Jealousy	72	28.8	32	12.8	146	58.8	<0.001
Influence of social media	45	18	16	6.4	189	75.6	<0.001
Religious beliefs	37	14.8	0	0	213	85.2	<0.001
Increasing living expenses	46	18.4	138	55.2	66	26.4	<0.001
Higher education costs	37	14.8	130	52	83	33.2	<0.001
Increased health awareness	45	18	121	48.4	84	33.6	<0.001
Wife's employment status	88	35.2	150	60	12	2.8	<0.001
Husband's employment status	74	29.6	55	22	121	48.4	<0.001
Effects of war	6	2.4	217	86.8	27	10.8	<0.001
Displacement	33	13.2	195	78	22	8.8	<0.001
Increased political stability	183	73.2	36	14.4	31	12.4	<0.001
Provision of contraceptive pills	3	1.2	132	52.8	115	46	<0.001
Provision of health services	191	76.4	23	9.2	36	14.4	<0.001

* Chi-square or goodness-of-fit test was applied (d.f. = 2).

DISCUSSION

Nineveh is the second largest governorate in Iraq, following Baghdad, the capital. It is located in the north of Iraq along the Tigris River. The population is distributed across both sides of the river, within Mosul city "being the biggest Nineveh's district" and many other villages scattered throughout the surrounding rural areas. The governorate is home to a diverse population with various ethnic and religious backgrounds, such as Arabs, Kurds, Turkmen, and Shabak, with various religions such as Islam, Christianity, Yezidism, and possibly Sabaeans, living together peacefully in a cohesive community. This makes Nineveh the small representative community of the Iraqi population.

The Iraqi community is part of the Middle Eastern community as family customs and habits were traditionally rooted, specifically remain predominant in rural areas. However, these practices have gradually evolved in urban regions due to the dramatic circumstances affecting the country. These challenging environments have impacted the economy and altered people's moral values, leading to shifts in their desires and intentions, especially during periods of economic constraint. However, the average number of births per woman decreased from 7.4 in the 1970s, which rendered Iraq one of the countries with the highest fertility rates worldwide at that time, to 3.446 in 2023. [6]

The national data reveals decreased fertility rates across Iraq over the past several decades. [10] This trend aligns with the total fertility rate of Iraq from 1925 to 2020, indicating a decline in the total fertility rates in each governorate in previous years. [9] Upon reviewing the age distribution in Iraq's population, demographics analysis revealed shifts in the composition of different age groups over time. In the past, the 0-14-year-old cohort held a position at the bottom of the population pyramid, resulting in a broad bell-shaped structure with a wider base, unlike in recent times. [16-18] However, recent data indicates a decline in this age group, resulting in a shrinking base for the pyramid. [19]This transformation denotes a reduction in the populace, hinting at demographic adjustments that may influence forthcoming population growth and age demographics.

This trend has been reinforced by statistics gathered from the present study by the Nineveh Governorate. Similarly, a study conducted in Basra demonstrated a decline in fertility among women in the last two decades. [20]

This transformation denotes a reduction in the populace, hinting at demographic adjustments that may influence forthcoming population growth and age demographics. Urdal H. and Che C. P. [21] suggested that conflict-related factors, such as reduced access to healthcare, increased maternal mortality, and lower levels of education, contributed to the decline in reproductive health during the periods of war.

The decline in Nineveh's fertility rate over the last decade was followed by a modest increase, especially in the second decade of the millennium. However, the fertility rates have yet to return to the 20th century's levels. The social shifts during and after the catastrophic events in the region, besides the COVID-19 pandemic of 2019, led to significant changes in customs for both men and women. These changes contributed to an increase in the number of divorced women, with divorce rates rising from 3 per hour in 2004 to 10 per hour in early 2024. [22] This rise in the number of broken families has contributed to a decline in reproduction. Additionally, the war has biologically impacted both male and female reproductive health. [23]

These changes have influenced the age structure of the community. In 2010, the 0–4-year age group represented a large proportion of the population. Over the last 10 years, this cohort has grown, expanding the 15–64-year age group. By contrast, the declining birth rate has reduced the size of the 0–4-year age group at the pyramid's base. Despite the increasing life expectancy of those aged 65 years and older, a decrease in birth rates led to a decrease in the dependency ratio. It altered the shape of the population pyramid. If this trend continues, it may result in further contraction at the pyramid's base. This era gave rise to the demographic gift, a term describing the benefits arising from the coincidental decline in birth rates and rise in life expectancy—a legacy of the "demographic transition." [24]

This demographic dividend presents an opportunity for the government to implement effective strategies for national development. Additionally, the age structure model can be used to predict the composition of the population in a country in the coming years. [25]

The mean number of children reported by the participants varied based on different group characteristics; however, it generally ranged from 3.7 to 4.5. The lowest mean was observed among those aged 35–45 years, with higher education levels, employed, and living in urban areas. Most participants desired 2–4 children per family, except those living in rural areas, who preferred a more significant number of children per family.

This trend may be related to the low education levels among rural residents compared with urban residents. [26] The nature of rural life, which often involves agricultural work, creates a demand for more offspring to assist in the fields.

Additionally, prevailing customs in rural areas, such as marrying multiple times, contribute to larger family sizes. This behavior has been reported in other studies. [27] However, rural families with higher education and formal employment tend to have fewer children. This observation is reinforced by feedback from participants living in rural areas.

On the contrary, the urban community, characterized by higher levels of education and more modern lifestyles, has different priorities regarding family size. Factors such as limited resources, increased living expenses, the effects of war, rising housing costs, the availability of contraceptive methods, and the increased awareness among women about their health and family planning have all influenced these priorities. Additionally, most urban women are currently employed. These factors, combined with the circumstances mentioned above, have shaped the outcomes of deliveries in the community.

In the current study, personal desire combined with a higher level of education plays a significant role in decreasing childbearing behavior. Most urban and educated individuals are less inclined to expand their families owing to the burdens of life, the need to secure a livelihood, and concerns about their children's future. These parents, who have experienced numerous hardships, tend to have their attitudes shaped by these experiences. Additionally, global awareness has influenced individuals' perspectives on family size. Research across countries that experienced civil conflict over the past 40 years demonstrated that fertility rates typically decline by up to one-third during instability and rebound quickly once the conflict ends. Fertility declines during conflicts are often most pronounced among women with higher education levels and greater wealth. [28]

Partner's desires, social media influence, community pressure, and jealousy were typically observed to have a limited impact on reproductive decisions. However, an ecological analysis suggests an association between access to social media and the fertility levels of a country, although this is not supported by concrete evidence. [29,30]

Other studies reported that social media may modulate the use of contraception by transferring knowledge into behavior, especially in terms of using contraception, which can lead to decreased fertility. [31,32]

The present results show that the wife's employment has a negative impact on childbearing behavior, while the husband's employment has a limited effect. Similarly, a previous study that examined the effect of women's employment on fertility in Poland and Italy reported comparable findings. [33]

The participants' opinion significantly indicates that religion does not affect reproductive decisions. Similarly, Amini L. et al. [34] reported no effect of religion on childbearing decisions among women attending comprehensive health centers in their study. The participants were divided into two groups based on the role of contraception provision in reproductive decisions. Approximately 52% of the participants believed that contraception plays a role in decreasing reproduction, while 46% felt it has no impact on reproductive behavior. This contradictory opinion may be due to either ignorance of the use and importance of contraception, its unavailability, or the low levels of education. All of these factors may contribute to the unrealized need for contraception. [35-37]

This study is the first to analyze the fertility rates and their effect on age structure and demographic characteristics in Iraq and examine the factors that may shape its population pyramid.

The limitations of the current study were the unfamiliarity of the rural community with the research benefit, so some participants often felt shy or uncomfortable while the researcher explained the questions, which could affect their response besides the inevitable recall bias.

CONCLUSION

Reproductive levels in the community are influenced by various factors, including regional instability, such as war or displacement, cultural norms, educational levels, and health awareness. It is crucial to consider these factors for a country aiming to manage population growth effectively. Careful planning is essential for determining the future direction of a country's population growth. This involves deciding whether to leverage the demographic dividend or focus on expanding community programs with appropriate services. Changes in reproductive desires can significantly impact a country's demographic outcomes. Therefore, studying these factors provides valuable insights for stakeholders, helping to guide policies that shape population growth and prevent long-term negative effects.

Acknowledgment

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript

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