Investigating the Impact of Structural Social Determinants of Health on Women's Reproductive behavior: A Systematic Review

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Abstract

Introduction

Reproductive behavior significantly influences global population dynamics. Understanding the relationship between demographic changes and social determinants of health is essential, particularly for women of reproductive age.

This study investigates how structural social determinants affect reproductive behavior worldwide.

Methods: This review involved a comprehensive search of international databases, including Web of Science, Embase, Scopus, Google Scholar, Magiran, State Inpatient Database (SID), and PubMed. The search utilized a range of keywords related to "social determinants of health" and "reproductive behavior," derived from Medical Subject Headings (MeSH) and Embase Subject Headings (Emtree). The timeframe for included studies was from January 2014 to November 2024. Studies were selected based on predefined inclusion and exclusion criteria, focusing solely on observational research published in Persian or English. Two independent researchers conducted quality assessments using the Newcastle-Ottawa Scale and extracted key findings.

Results: Out of 15,867 reviewed articles, 83 met the criteria for inclusion. The analysis indicated a strong association between women's reproductive behavior and structural determinants of health. Notably, education level was the most frequently studied factor (42 studies), while income had the lowest representation (17 studies).

Discussion: This review shows that structural social determinants especially education, income, and cultural norms strongly influence women's reproductive behavior. Education had the most consistent impact, while income was underrepresented but still relevant. These findings stress the need for policies that address social inequalities to improve reproductive health outcomes.

Conclusion: The study underscores the importance of structural social determinants, such as education, income, occupation, and cultural factors, in shaping reproductive behavior.

Policymakers should consider these determinants in reproductive health planning to effectively implement population policies and programs**.**

Keywords: Social determinants of health, Structural social determinants of health, Reproductive behavior, Childbearing

Background

Reproductive behavior (RB) is considered as a key determinant of global population fluctuations. Today, half of the countries worldwide exhibit fertility rates below the replacement level, with projections indicating that the global population peaks at 9.7 billion by 2064, followed by a sustained decline. In this context, the total fertility rate (TFR) is projected to be below the replacement level of 2.1 children per woman in 77% of high-income countries and 93% of all of the countries by 2050 and 2100, respectively. Excluding the effects of migration, several countries are projected to experience a population decline of over 50% during 2017-2100 [1].

Low fertility levels may create an inverted population pyramid over time, characterized by a larger elderly and a lower working-age population, resulting in placing an increasing burden on healthcare systems, transforming labor and consumer markets, and altering patterns of resource utilization [2]. Therefore, fertility estimations and projections play a critical role in raising public awareness regarding policies related to health resources, workforce supply, education level, gender equality, and family support [3]. Researchers interested in this field seek to understand the factors influencing RB [4]. RB can be defined as a complex phenomenon encompassing biological influences and individual decisions influenced by socio-economic status and cultural beliefs. RB involves reproduction-related behaviors, number of children, birth spacing, contraceptive use, child sex preferences, unintended pregnancy, abortion, and fertility intentions [5].

The couples' health is among the factors influencing their RB. Given that social determinants of health play a crucial role in health outcomes, the impact of which on RB should be viewed as a vital context for decision-making and health policy development at macro and micro levels [6]. According to the World Health Organization (WHO), social determinants of health, as the non-medical factors affecting health outcomes, are regarded as the conditions in which individuals are born, grow, work, and live, along with broader factors influencing daily life conditions including social support, education level, employment and job security, working conditions, food security, housing, basic amenities, environment, non-discrimination, and access to cost-effective healthcare services. Based on the WHO model, social determinants of health are categorized into two main groups including structural and intermediary determinants. Structural determinants are recognized as the factors creating social class including gender, income, education level, occupation, and ethnicity [7].

The debate on the association between social determinants of health and fertility remains unresolved, despite significant advancements and evidence, emphasizing that human reproduction during the pre-transition era was influenced by biological and more complex decision-making processes involving individuals and families interacting with socio-economic frameworks [8].

RB is typically influenced by the interplay of several biological, socio-economic, and demographic factors [9]. Based on some studies, the most critical factors affecting women's fertility include racial, ethnic, and national discrimination (for immigrants and minorities), micro- and macro-economic factors (income, cost of living, and healthcare), socio-cultural determinants (education level, employment, and family norms), and socio-geographic variables (place of living and urban residence status) [6].

The effect of the structural determinants of health on women's childbearing across the globe cannot be accurately assessed since the majority of existing studies are considered as country-specific, evaluating the impact of one or more social determinants of health on fertility.

A significant research gap is found in identifying, categorizing, and examining the social factors affecting women's reproductive health. The gap is regarded as significant because reproductive health experts argued that variations in RB should be investigated due to geographical diversity in the prevalence and quality of reproductive health services, as well as the differences in religious, socio-economic, and cultural contexts [10]. Additionally, demographers studied the differences and determinants of RB [9]. The gap should be addressed due to its crucial role in understanding family issues of global concern such as unintended pregnancy, low fertility, and delayed childbearing, as well as enhancing public awareness concerning the development of health-oriented policies, design of better interventions, and more effective planning based on the results. Systematic reviews explicitly summarize reported results, as well as providing the best form of evidence for judgment. The present systematic review was conducted to analyze the impact of structural determinants of health on women's RB.

Methods

This systematic review was conducted from 2014 to November 2024 to determine the association between structural determinants of health and Reproductive behavior based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the following steps.

- ***Search Strategy***

Keywords and search strategies were developed through searches in Medical Subject Headings (MeSH) and Embase Subject Headings (Emtree), in consultation with the research team and experts, and by reviewing relevant articles. The search strategies employed in the PubMed database are presented in Table 1. This study utilized the Population, Exposure, Comparison, Outcome (PECO) framework for formulating the systematic review question, where "P" (population) represents married women of reproductive age, "E" (exposure) denotes structural determinants of health, "C" (Comparison) has no place in this study due to the observational nature of studies, and "O" (outcome) refers to Reproductive behavior. The search components in this study were two-fold, focusing on Problems and Exposure.

The articles utilized in this study were retrieved from searches of the Irandoc, State Inpatient Database (SID), Magiran, Iranmedex, Web of Science, Google Scholar, Embase, Scopus, and PubMed databases. In order to maximize search comprehensiveness, broad Persian keywords, including social determinants of health, structural determinants of health, Reproductive behavior, and ethnicity, along with their English equivalents based on MeSH terms for English articles, were employed. Keyword combinations were generated using Boolean operators (AND, OR, NOT) specific to each database. Additionally, the reference lists of the retrieved articles were reviewed to identify further relevant studies. No geographical restrictions were applied in this study.

Article Selection

"Reproductive behavior" was uniformly defined by both researchers as the number of children born (current fertility status), the ideal number of children, gender preferences, and birth spacing (future fertility status). Consequently, articles meeting the following criteria were entered into the initial review. The inclusion criteria for articles were as follows: All original research articles in Persian and English that contained the searched keywords in their title, abstract, and keywords;

articles with available full texts and an observational design (cross-sectional, case-control, cohort); and articles whose study population was limited to women of reproductive age. Review articles, letters to the editor, conference papers, non-English articles, and articles for which full texts were unavailable (despite email contact with the corresponding author) were excluded from the present study. The titles, abstracts, and full texts of articles were independently reviewed by two researchers. Subsequently, eligible articles were selected after full-text reviewing. It is worth noting that the studies were reviewed independently by the two researchers, and in cases of disagreement, a third reviewer with expertise in systematic reviews was consulted. Throughout the entire process of writing the article, research ethics, including honesty, avoidance of plagiarism, and adherence to intellectual property rights, were upheld.

- ***Data Extraction***

Data were extracted based on a checklist prepared by the researchers, which contained the first author's name, publication year, the country, design, number and characteristics of participants, and key findings of the article. Each article was independently reviewed by the first author using all items on the checklist, and only articles deemed to be of acceptable quality were included in the study.

- ***Quality Assessment***

The initial literature search, screening, and quality assessment of articles were conducted independently by two authors to minimize bias. The Newcastle-Ottawa Scale (NOS) was employed to assess the quality of the articles. This scale is a tool specifically designed to evaluate the methodological quality of non-randomized studies (the NOS cohort version and its modified version for cross-sectional studies), such as observational research. The scale evaluates articles based on the selection process (in four domains, including sample representativeness, sample size,

non-response, and measurement instruments), comparability (one domain, including assessment of confounders and other influencing factors), and results (in two aspects, including outcome assessment and statistical tests) [11]. (According to the NOS for cohort studies, the minimum score (stars) is zero, and the maximum is 9. Studies scoring 6 or higher are considered to be of good quality, while those scoring below 6 are considered to be of poor quality. Based on the modified NOS for cross-sectional studies, the minimum score is zero (representing the weakest study) and the maximum is 10 (representing the strongest study). Moreover, studies scoring below 4 are considered to be of low quality [12, 13].

- ***Article Screening***

The extracted articles were imported into EndNote software. An initial assessment reviewed 15,867 articles, of which 8,667 were excluded due to duplication. Subsequently, the titles and abstracts of the remaining 3,596 articles were screened, culminating in the exclusion of 3,096 irrelevant articles. The full texts of the remaining 480 articles were reviewed, and ultimately, 83 high-quality articles were selected for final analysis and inclusion in the study. It is worth noting that some articles examined multiple determinants simultaneously. The article selection process is illustrated in Figure 1.

Results

The initial systematic literature search retrieved 15,867 articles. After removing duplicates and reviewing the titles and abstracts, the full texts of 480 studies were assessed following excluding those irrelevant to the objective based on the inclusion/exclusion criteria, resulting in including 83 studies in the final analysis. The selected studies comprised 75 cross-sectional and eight cohort ones, encompassing a total sample size of approximately 622,791 female subjects. Table 2

indicates the characteristics of the reviewed studies, while Table 3 shows the results regarding the association between social factors affecting health and RB.

In the next step, the association between structural determinants of health and women's RB was evaluated across four categories of education level, income, occupation, and ethnicity/culture/religion, considering three distinct dimensions of RB including the number of children born (current fertility status), ideal number of children and gender preferences, as well as the birth spacing (future fertility status). Some studies examined multiple determinants concurrently by focusing on the association between women's RB and education level (N=42), occupation (N=38), ethnicity/culture/religion (N=19), and income (N=17) (Table 2). The results revealed that the frequency of reported factors was associated to education level, occupation, ethnicity/culture/religion, and income, respectively. Fig. 2 shows the association between social factors affecting health and RB.

Education level

Studies on women's higher education levels yielded divergent results, which can be categorized into two distinct groups. Investigating 42 studies represented that women's higher education level was associated with fewer children born, greater contraceptive use, delayed childbearing, lower fertility rates, smaller ideal family sizes (often preferring only one child), and longer birth intervals extending from marriage to first birth [14-56]. However, four studies indicated a correlation between women's higher education levels and an increase in the ideal and total number of children [23, 57-60]. Additionally, five studies reported an association between women's lower education levels and higher number of children [60-64]. However, four studies represented no significant association between women's education levels and their RB [36, 65-67].

Occupation

Addressing 14 studies revealed that women's employment correlates with constrained RBs including reduced likelihood of childbearing (through cessation and postponement), smaller ideal family sizes (often preferring only one child), and extended birth spacing (longer time to first birth and between pregnancies) [8, 17, 30, 31, 38, 47, 68-75]. However, six studies identified positive effects of employment on RB, especially larger ideal family sizes [48, 57, 65, 76-78]. In addition, five studies found no association between employment status and RB [35, 66, 67, 79, 80]. However, one study reported a positive association between employment and fertility in Eastern Europe and a negative correlation between employment and childbearing in Western Europe [81]. Further, six studies analyzed RB among unemployed women and housekeepers, among which five ones indicated that the women had a higher number of children, shorter birth spacing, and more positive attitudes toward childbearing [29, 45, 62, 82, 83]. However, one of the above-mentioned studies reported that the overall female unemployment rate negatively influenced childbearing decisions, while first-child intensions remained unaffected [84].

Ethnicity/culture/religion

Ethnicity/culture/religion is among the social determinants of health influencing RB. Assessing 19 studies represented a positive association between ethnicity/culture/religion and RB, suggesting that ethnicity affects women's birth spacing and number of children. Furthermore, nine studies reported variations in the number of children across different ethnicities and cultures [5, 25, 35, 41, 67, 85-88].

The results in three studies reported that a male-child preference can influence childbearing continuation or cessation [21, 37, 68]. Additionally, seven studies indicated that religion significantly influenced ideal family size, with Sunni women exhibiting a tendency toward childbearing compared to their Shia counterparts [22, 67, 89-93].

Income

Totally, 17 studies examined the role of income on women's RB. Investigating five studies found that higher income was associated with fewer children and increased birth spacing [28, 37, 41, 43, 44]. However, five studies reported the opposite results, proposing that higher income impacted RB positively [8, 48, 49, 54, 77]. Further, one study showed that insufficient income reduced the tendency toward childbearing [30]. Finally, six studies found no association between income and RB [35, 45, 66, 74, 80, 89].

Discussion

This review aimed to assess the pooled effect of structural determinants of health (occupation, income, education, and ethnicity/culture/religion) on women's reproductive behavior (number of children born, ideal number of children, and birth spacing). The results revealed that structural determinants of health affected women's reproductive behavior, among which the highest and lowest frequencies were associated with their education and income, respectively.

- ***Education Level***

Education is among the key factors influencing reproductive behavior. Based on the results of some studies, higher education levels are associated with restricted reproductive behavior, which is in line with the results reported by others in developed countries, claiming a correlation between increased female education levels and descending fertility trends, as well as broader changes in family structures [94-96]. Other studies in Europe indicated a negative association between reproductive behavior and women's education level due to higher opportunity costs associated with childbearing and parenting responsibilities [97, 98], which is consistent with the results presented by others, representing that more educated women exhibit lower fertility rates [33, 99-102]. Actually, more educated women prefer quality over quantity of children, value free time more, and no longer regard children as the sole focus of their lives [103]. Accordingly, higher education levels entail longer periods of education, leading to delayed marriage and childbearing, shortened reproductive lifespan, increased access to contraceptives, and a significant reduction in the total fertility rate (TFR) among educated women [104-106]. Additionally, a negative association was found between women's education levels and fertility rates in countries with

traditional family models and a high degree of gender-based role differentiation [107]. Across East Asian societies, marriage is fraught with various traditional expectations of women including childbirth, child rearing, and housework. Thus, the benefits of marriage are fewer and its costs are higher for more educated women under these circumstances [108]. Education may alter childbearing decisions because more and longer education can empower women, leading to later marriage and childbearing, as well as smaller families. Further, women's education may help improve their bargaining power with their husbands, resulting in obtaining their consent to use contraceptive methods [32].

The literature provides extensive evidence representing that more educated women prefer lower fertility rates. However, several studies revealed a correlation between women's higher education levels and a higher number of children with shorter birth intervals. In fact, women's income increases by achieving higher education levels, resulting in increasing their power to make informed decisions about childbearing while considering their family's well-being [109]. However, this dynamic alters when child-rearing responsibilities are not exclusively borne by women and accessible childcare services are available [110]. In other words, more educated women benefit from more instrumental authority and make more individual decisions in the family. Furthermore, women showing greater autonomy exhibit higher fertility rate compared to those with limited decision-making.

Based on some reports, lower education levels are associated with a higher number of children and shorter birth spacing. In addition, some argue that limited education can restrict women's access to family planning information and services, resulting in complicating their ability to make informed decisions regarding reproductive health such as birth spacing or fertility limitation, while simultaneously elevating the risk of unintended pregnancies [111]. The differences in results could be due to methodological differences among different populations in different regions and periods .Mechanisms for the association between women's education and fertility operates through multiple pathways .Therefore, family policies can operate effectively when they implement programs which integrate the role of motherhood with the continuation of women's education after marriage, leading to their empowerment. Officials can help working mothers by providing cheap childcare services such as establishing kindergartens at schools or workplaces, which help women combine maternal and social roles [112] .

Occupation

Since the mid-20th century, the dramatic increase in female workforce participation has led to a rise in women's experiences regarding work-family conflict [113, 114]. Some studies indicated a negative impact of women's employment on reproductive behavior. The substantial shift in female employment is among the critical indicators of modernization, which has enabled women to obtain economic independence, resulting in altering their status and traditional roles compared to the past, enhancing their declined reproductive behavior due to entering the workforce and engaging in economic activities. Other studies represented that possessing a permanent occupation and a stable income are recognized as the key prerequisites for everybody prior to childbearing decisions since job insecurity and financial uncertainty often lead individuals to delayed childbearing [115-118]. Additionally, women's participation in the workforce and intense competition in the labor market contribute to restricted reproductive behavior [119].

Some studies reported a positive effect of women's employment on reproductive behavior, which is congruent with the results reported by Ahmadjahd et al., emphasizing that employed women show positive fertility intentions and behaviors compared to housekeepers [120]. Others asserted that intended family size is inversely associated with individual inactivity (unemployment) [121]. Matysiak and Vignoli (2008) found that employment is generally associated with a higher probability of fatherhood among men, while the association between workforce participation and childbearing among women is considered as heterogeneous. Overall, evidence confirms that the association between female employment and their fertility should be evaluated while regarding the specific characteristics of each individual country, and its impact depends on socio-economic conditions and development [122].

Further analysis reveals that the results regarding unemployed women and reproductive behavior are recognized as inconsistent. Unemployment, as a key characteristic of an uncertain future and economic crisis, indirectly leads to delayed marriage and childbearing. Over the past few decades, mothers' participation in the labor market has increased although women contribute to childbearing significantly more than men. This double shift can place considerable strain on employed mothers due to the incompatibility between their roles in the labor market and family [120, 123]. In other words, the compatibility of family and work is considered as a key determinant of reproductive

behavior. A large number of women simultaneously have a job and several children where the two can easily be combined, leading to high fertility and participation in the labor force. Fewer women work and fewer babies are born when career and family objectives conflict. Thus, population policies can implement programs which help mothers combine their work with an extended family such as the availability of public childcare and other family-supportive policies. Greater involvement of fathers in childcare provision, social norms in favor of working mothers, and flexible labor markets help women combine maternal and social roles [124]. Policymakers must adopt policies to benefit from the positive economic effects of women's employment, as well as to maintain the quality and manner of their presence as the main guardians of childbearing and raising children in the family include paid maternity and paternity leave, prohibiting gender discrimination in hiring and in terminating employment based on pregnancy, and establishing a right of return to workplace following maternity leave Gender-sensitive tax reforms, wage management systems institution [125].

- ***Ethnicity/culture/religion***

Various ethnic and religious groups show differences in reproductive behaviors [126]. Based on this review, reproductive behaviors vary significantly among different ethnic groups. Other studies recognized ethnicity as a factor influencing childbearing, birth spacing, and male-child preference. In other words, reproductive behaviors, intentions, and ideals vary based on ethnic groups.

Based on the results, ethnicity influences ideal family size [26, 27, 29, 51, 63, 83]. Minority groups select childbearing as a means of escaping minority status to varying degrees. According to the ethnic-cultural approach, each ethnicity experiences different reproductive behaviors based on its specific cultural values. Large families may be highly valued and methods of birth control can be prohibited in the cultures of certain ethnic groups. Further, male-child preference may exist or reproductive behavior can be fatalistic in such context [87, 127], which is congruent with the results of this study, leading to differences in the reproductive behaviors of ethnicities and religions.

A male-child preference can influence childbearing continuation or cessation [2, 16, 36, 45]. Lucas and Mire declared that some societies emphasize giving birth to male children due to explicit economic, social, and religious reasons. Deep gender inequalities prevalent in developing countries lead men and women to favor male over female children in their cost-benefit calculations

regarding family planning [128]. However, others maintain that giving birth to female children is more valued, resulting in reducing a male-child preference. Further, increased wealth alleviates concerns regarding security in old age, leading to a decrease in sex preference and fertility [129].
Religion acts as a secondary factor in explaining childbearing patterns [88]. The present study emphasizes that religion significantly impacts ideal family size, with Sunni women exhibiting a greater tendency toward having children (or additional children) compared to their Shia counterparts. Other studies demonstrated higher fertility rates among Sunni women compared to Shia ones in Iran [68, 92], which is in line with the results of this study. The rationale behind the association between religion and reproductive behaviors is explained by the specific theology hypothesis asserting that the religious groups with doctrines regarding reproductive behavior such as prohibitions on abortion and non-use of contraceptives experience different fertility outcomes compared to other groups [130]. In another study, fertility rates in predominantly Sunni cities were reported to be higher than those in predominantly Shia ones. However, this difference was regarded as ignorable, with an effect size of 0.12. Individual variables such as education level, employment status, and place of residence significantly affect fertility [131]. Religion and religious belief can influence reproductive behavior at the individual and country levels. For example, Vatican and Muslim leaders opposed aspects of family planning, especially abortion and women's autonomy, at the 1994 United Nations Population Conference in Cairo. Furthermore, increases in faith have been associated with population growth in some parts of the world. Religious beliefs influence reproductive behavior, especially when people believe that fertility is divinely determined, observing children as God’s gift [91].

- ***Income***

Women with higher income may gain more control over family planning and can make independent childbearing decisions. Income constraints appear to be a primary determinant restricting fertility [132]. A decline in high income may diminish women's bargaining power within the household, leading to less motivation for higher-income women to pursue childbearing [133]. This review focused on the results of other studies indicating a positive impact of higher income on reproductive behavior. Income status is recognized as one of the most crucial determinants affecting fertility [120, 134-136]. Financial status is considered as a major determinant in satisfying human needs, and the economic cost of raising children is regarded as a significant barrier to achieving intended fertility outcomes [137]. The association between women’s economic

empowerment and childbearing is greatly influenced by the work-family balance. In societies with well-established work-family reconciliation systems such as Northern Europe and France, income and job security are guaranteed when women give birth, and a positive correlation is observed between women's income and childbearing. However, women's income and childbearing are negatively correlated in societies with relatively traditional gender roles such as Southern Europe and Germany, where reconciling women's employment with household responsibilities creates different challenges [138].

Increased income mitigates the psychological stress stemming from childbearing by enhancing parents' confidence in meeting their children's educational, developmental, and caregiving needs, while fulfilling their occupational responsibilities, resulting in influencing reproductive decisions. In other words, higher income and improved financial status raises the tendency to expand the family [139]. However, some studies reported a negative impact of higher income on reproductive behavior. Higher income may negatively influence the likelihood of giving birth to a first child since women tend to prioritize career advancement. Conversely, financial security associated with higher income appears to encourage the decision to have second or third children, potentially supporting larger family sizes [140]. Families with fewer children did not exhibit a tendency to postpone or avoid childbearing due to financial concerns. Therefore, economic constraints cannot be recognized as an absolute and predictive determinant of reproductive behavior.

The discrepancy can be attributed to cross-national differences in legal frameworks such as disparities in family policies, gendered division of childcare duties, social norms, and labor market institutions which play a crucial role in understanding the realities of reproductive behavior as influenced by women's income. Finally, policies encouraging higher birth rates can help families make informed reproductive choices by improving their financial and living conditions [141].

Conclusions

Based on the findings of this research, structural social determinants of health are associated with women's fertility behavior. Hence, implementing any practical intervention in the field of fertility should be founded on the economic, social, cultural, and demographic realities of societies. This evidence underscores the necessity of taking into account the roles of all influencing factors in any planning related to fertility behavior and of developing and implementing strategic programs tailored to the specific features of each society in order to effectively manage fertility behaviors.

Given the diverse fertility behaviors across different regions, cultures, and ethnicities, reproductive health programs should be accomplished alongside population growth policies. The findings of this study can serve as an appropriate guide for health policymakers to address barriers to childbearing and promote population growth.

Strengths and limitations

The present study addressed the association between structural determinants of health and women's RB across the globe, yielding more comprehensive results compared to other ones conducted within a single or limited number of countries. However, several limitations were observed here, which warrant consideration. For example, RBs were studied using various criteria and instruments. Thus, some of the studies were excluded due to the pre-defined criteria for RBs established at the beginning. Utilizing aggregate data deterred drawing individual-level inferences about the association between factors influencing RB. Additionally, analyzing RB focused solely on women, resulting in ignoring the social determinants of health associated with men. Future studies should focus on male populations or couples since men and women make joint decisions regarding childbearing, as well as the number of their intended children. The results of this study may not be easily generalized due to their focus on subpopulations affected by specific policy alterations in specific countries over specific periods. For a complete picture, more evidence is needed on the effects of social determinants of health on RB at different levels and institutional settings across countries.

List of abbreviations

State Inpatient Database (SID)

Medical Subject Headings (MeSH)

Embase Subject Headings (Emtree)

Total Fertility Rate (TFR)

Reproductive behavior (RB)

AUTHORS CONTRIBUTION

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIAL

All data generated or analyzed during this study are included in this published article.

STANDARDS OF REPORTING

PRISMA guidelines were followed.

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CONFLICT OF INTEREST

The author(s) declare no conflict of interest, financial or otherwise.

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SUPPLEMENTARY MATERIAL

PRISMA checklist is available as supplementary material on the publisher’s website along with the published article.

Ethics approval and consent to participate

This study was extracted from a thesis approved under the ethics code IR.SBMU.PHARMACY.REC.1401.107. there is no human participation involved in this systematic review.

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Table 1:Article selection process in Pumped database

No.	Keywords	Number of articles

#1	"Social Determinants of Health"[mh] OR "Demography"[mh] OR "Population Characteristics"[mh] OR "Social Class"[mh] OR "Sociological Factors"[mh] OR" Socioeconomic Factors"[mh] OR "Economic Factors"[mh] OR "Economic status"[mh] OR "Racial Groups"[mh] OR "Race Factors"[mh] OR "Ethnicity"[mh] OR "Cultural Characteristics"[mh] OR "Educational Status"[mh] OR "Literacy"[mh] OR "Occupations"[mh] OR "Employment"[mh] OR "Job Security"[mh] OR "Unemployment"[mh] OR "Income"[mh] OR Social Determinants of Health[tiab] OR Demography[tiab] OR Population Characteristics[tiab] OR Social Class[tiab] OR Sociological Factors[tiab] OR Socioeconomic Factors[tiab] OR Economic Factors[tiab] OR Economic status[tiab] OR Racial Groups[tiab] OR Race Factors[tiab] OR Ethnicity[tiab] OR Cultural Characteristics[tiab] OR Educational Status[tiab] OR Literacy[tiab] OR Occupations[tiab] OR Employment[tiab] OR Job Security[tiab] OR Unemployment[tiab] OR Income[tiab] OR [tiab] OR [tiab] OR Social Determinants of Health [tiab] OR Demography[tiab] OR Population Characteristics[tiab] OR Social Class[tiab] OR Sociological Factors[tiab] OR Socioeconomic Factors[tiab] OR Economic Factors[tiab] OR Economic status[tiab] OR Racial Groups[tiab] OR Race Factors[tiab] OR Ethnicity[tiab] OR Cultural Characteristics[tiab] OR Educational Status[tiab] OR Literacy[tiab] OR Occupations[tiab] OR Employment[tiab] OR Job Security[tiab] OR Unemployment[tiab] OR Income[tiab] OR Health Social Determinant[tiab] OR Health Social Determinants[tiab] OR Structural Determinants Of Health[tiab] OR Health Structural Determinant[tiab] OR Health Structural Determinants[tiab] OR Social Determinant[tiab] OR Health Determinant[tiab] OR Demographics[tiab] OR Demographic[tiab] OR Demographic Factors[tiab] OR Demographic Factor[tiab] OR Population Characteristic[tiab] OR Population Statistics[tiab] OR Social Classes[tiab] OR Socioeconomic Status[tiab] OR Socioeconomic Level[tiab] OR Socioeconomic Levels[tiab] OR Sociological Factor[tiab] OR Socioeconomic Factor[tiab] OR Socioeconomic Characteristics[tiab] OR Socioeconomic Characteristic[tiab] OR Standard of Living[tiab] OR Living Standard[tiab] OR Living Standards[tiab] OR High Income Population[tiab] OR High-Income Populations[tiab] OR Economic Factor[tiab] OR Economic status[tiab] OR Racial Group[tiab] OR Race[tiab] OR Races[tiab] OR Race Factor[tiab] OR Racial Factors[tiab] OR Racial Factor[tiab] OR Ethnic Groups[tiab] OR Ethnic Group[tiab] OR Nationality[tiab] OR Nationalities[tiab] OR Cultural Characteristic[tiab] OR Education[tiab] OR Education Level[tiab] OR Education Levels[tiab] OR Level of Education[tiab] OR Illiteracy[tiab] OR Occupation[tiab] OR Vocations[tiab] OR Vocation[tiab] OR Employment Termination[tiab] OR Underemployment[tiab] OR Employment Status[tiab] OR Occupational Status[tiab] OR Labor Force[tiab] OR Labor Forces[tiab] OR Employment Security[tiab] OR Job Stability[tiab] OR Job Stabilities[tiab] OR Employment Stability[tiab] OR Employment Stabilities[tiab] OR Job Retention[tiab] OR Unemployment[tiab] OR Incomes[tiab] OR Savings[tiab]	**2,507,250 results**
#2	"Reproductive Behavior"[mh] OR "Contraception Behavior"[mh] OR Reproductive Behavior[tiab] OR Contraception Behavior[tiab] OR Childbearing[tiab] OR women childbearing[tiab] OR fertility childbearing[tiab] OR Childbearing[tiab] OR reproductive decision making[tiab] OR Voluntary Childlessness[tiab] OR Delayed Childbearing[tiab]	**34,376 results**
#1 AND #2	("Social Determinants of Health"[mh] OR "Demography"[mh] OR "Population Characteristics"[mh] OR "Social Class"[mh] OR "Sociological Factors"[mh] OR" Socioeconomic Factors"[mh] OR "Economic Factors"[mh] OR "Economic status"[mh] OR "Racial Groups"[mh] OR "Race Factors"[mh] OR "Ethnicity"[mh] OR "Cultural Characteristics"[mh] OR "Educational Status"[mh] OR "Literacy"[mh] OR "Occupations"[mh] OR "Employment"[mh] OR "Job Security"[mh] OR "Unemployment"[mh] OR "Income"[mh] OR Social Determinants of Health[tiab] OR Demography[tiab] OR Population Characteristics[tiab] OR Social Class[tiab] OR Sociological Factors[tiab] OR Socioeconomic Factors[tiab] OR Economic Factors[tiab] OR Economic status[tiab] OR Racial Groups[tiab] OR Race Factors[tiab] OR Ethnicity[tiab] OR Cultural Characteristics[tiab] OR Educational Status[tiab] OR Literacy[tiab] OR Occupations[tiab] OR Employment[tiab] OR Job Security[tiab] OR Unemployment[tiab] OR Income[tiab] OR [tiab] OR [tiab] OR Social Determinants of Health [tiab] OR Demography[tiab] OR Population Characteristics[tiab] OR Social Class[tiab] OR Sociological Factors[tiab] OR Socioeconomic Factors[tiab] OR Economic Factors[tiab] OR Economic status[tiab] OR Racial Groups[tiab] OR Race Factors[tiab] OR Ethnicity[tiab] OR Cultural Characteristics[tiab] OR Educational Status[tiab] OR Literacy[tiab] OR Occupations[tiab] OR Employment[tiab] OR Job Security[tiab] OR Unemployment[tiab] OR Income[tiab] OR Health Social Determinant[tiab] OR Health Social Determinants[tiab] OR Structural Determinants Of Health[tiab] OR Health Structural Determinant[tiab] OR Health Structural Determinants[tiab] OR Social Determinant[tiab] OR Health Determinant[tiab] OR Demographics[tiab] OR Demographic[tiab] OR Demographic Factors[tiab] OR Demographic Factor[tiab] OR Population Characteristic[tiab] OR Population Statistics[tiab] OR Social Classes[tiab] OR Socioeconomic Status[tiab] OR Socioeconomic Level[tiab] OR Socioeconomic Levels[tiab] OR Sociological Factor[tiab] OR Socioeconomic Factor[tiab] OR	**15,564 results**

	Socioeconomic Characteristics[tiab] OR Socioeconomic Characteristic[tiab] OR Standard of Living[tiab] OR Living Standard[tiab] OR Living Standards[tiab] OR High Income Population[tiab] OR High-Income Populations[tiab] OR Economic Factor[tiab] OR Economic status[tiab] OR Racial Group[tiab] OR Race[tiab] OR Races[tiab] OR Race Factor[tiab] OR Racial Factors[tiab] OR Racial Factor[tiab] OR Ethnic Groups[tiab] OR Ethnic Group[tiab] OR Nationality[tiab] OR Nationalities[tiab] OR Cultural Characteristic[tiab] OR Education[tiab] OR Education Level[tiab] OR Education Levels[tiab] OR Level of Education[tiab] OR Illiteracy[tiab] OR Occupation[tiab] OR Vocations[tiab] OR Vocation[tiab] OR Employment Termination[tiab] OR Underemployment[tiab] OR Employment Status[tiab] OR Occupational Status[tiab] OR Labor Force[tiab] OR Labor Forces[tiab] OR Employment Security[tiab] OR Job Stability[tiab] OR Job Stabilities[tiab] OR Employment Stability[tiab] OR Employment Stabilities[tiab] OR Job Retention[tiab] OR Unemployment[tiab] OR Incomes[tiab] OR Savings[tiab]) AND ("Reproductive Behavior"[mh] OR "Contraception Behavior"[mh] OR Reproductive Behavior[tiab] OR Contraception Behavior[tiab] OR Childbearing[tiab] OR women childbearing[tiab] OR fertility childbearing[tiab] OR Childbearing[tiab] OR reproductive decision making[tiab] OR Voluntary Childlessness[tiab] OR Delayed Childbearing[tiab])	
#1 AND #2	Date: (2014-2024)	**5,577 results**

Table 2. Characteristics of reviewed articles on the association between structural determinants of health and women's Reproductive behavior

Row number	Author, Year	Article Location	Article Type	Methodology	Structural Social Determinants of Health	Main Finding	Quality Score
1	**Adebowale.etal(2014)(60)**	Nigeria	Cohort	The 2008 NDHS[4] dataset; Research sample: 19,622 married women aged 15-49	Education level	Women with lower education levels tend to have shorter birth spacing and a higher number of pregnancies.	8
2	**Hosseini(2014)(68)**	Hamedan/Iran	Cross-sectional	Structured questionnaire; Study sample: 273 married women of reproductive age	Occupation, culture	Employed women are more likely to cease childbearing ($p = 0.001$). Women with a weaker preference for male-children are more likely to cease childbearing ($p < 0.05$).	7
3	**Shayan(2014)(64)**	Shiraz/Iran	Cross-sectional	Researcher-made demographic and reproductive history questionnaire	Education level	Women with elementary school and high school education levels have shorter birth spacing to their first child birth compared to illiterate women ($p < 0.05$).	6
4	**Ahmadi(2014)(89)**	Ahvaz/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 384 employed women over 19 years old	Income, culture	There is no statistically significant relationship between family income and fertility intention ($p > 0.05$). Religious orientations significantly influence the	9

[4]. Nigeria Demographic and Health Survey

						inclination toward fertility and childbearing ($p = 0.001$).	
5	**Breschi.etal(2014)(8)**	Italy	Cohort	Church records, tax records, and other documents; Study sample: 4225 women	Occupation, income	Reproductive behavior is significantly influenced by socioeconomic status (occupation, income).	9
6	**Buyinza. (2014)(14)**	Uganda	Cross-sectional	The 2006 UDHS[5] dataset Study sample: Women aged 15-49 of reproductive age	Education level	Higher education levels are associated with lower fertility rates and have a positive correlation with contraceptives.	7
7	**Currie.etal(2014)(142)**	USA	Cohort	US vital birth statistics data from 1975 to 2010 and the information about unemployment rates from the US Department of Labor; Study sample: 110.9 million birth records of women aged 15-43	Occupation	For every 1% increase in the national unemployment rate, there is an approximate decrease of 0.5 pregnancies per 1000 women.	9
8	**Hwang.etal (2014)(15)**	China	Cross-sectional	Cross-national panel data from 156 countries	Education level	Women's higher education levels lead to an increase in their mean age at first birth and a decrease in the total fertility rate.	8

[5]. Uganda Demographic and Health Survey

9	**Davia.etal (2015)(16)**	Spain	Retrospective cohort	Data from the Fertility Sociology Research Center (2006); Study sample: 2975 women	Education level	Education influences the women's timing and nature of decisions regarding their first childbirth, with higher education often culminating in a delay in family formation.	8
10	**Ranjbar.etal (2015)(17)**	Iran	Cross-sectional	Researcher-made questionnaire Study sample: 17178 married women aged 20-40	Education level, occupation	With increasing education levels, the mean time between marriage and first pregnancy increased from 64.13 to 95.24 months. Women's employment postpones the timing of first childbirth.	9
11	**Reshadat(2015)(18)**	Iran	Cross-sectional	Data from the Statistical Center of Iran; Study sample: Married women aged 15-49	Education level	Lower fertility is associated with higher education levels, and increased literacy is correlated with decreased fertility ($p < 0.05$).	7
12	**Zheng.etal(2016)(19)**	China	Cross-sectional	Questionnaire; Study sample: 17093 Chinese women with one child	Education level	Women with higher education levels have lower fertility intentions.	8
13	**Hajizadeh.etal(2016)(65)**	Iran	Cross-sectional	Reproductive behavior Questionnaire; Study sample: 267 women employed in the Department of	Education level, occupation	Women's employment had a positive influence on childbearing. There was no statistically significant difference between women's	8

				Education, healthcare centers, and hospitals, and 273 housewives		education levels and their number of children.	
14	**Attari.etal(2016)(20)**	Pakistan	Cross-sectional	Data on total fertility and employment rates from the 2012 MICS[6]	Occupation, education level	Female literacy rates are negatively and significantly correlated with fertility. Conversely, employment rates are positively associated with fertility.	6
15	**Asadi(2016)(79)**	Asadabad/Iran	Cross-sectional	Researcher-made Perceived Need for Childbearing Questionnaire; Study sample: 310 employed and unemployed married women aged 18-45	Occupation	Fertility intentions were similar between employed women and housewives (unemployed), and employment had no negative impact on childbearing ($p > 0.05$).	9
16	**Motlagh(2016)(21)**	Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 2114 women of reproductive age	Education level, ethnicity	Increased educational levels were associated with decreased fertility, and there was a significant relationship between child gender preferences and ethnicity ($p < 0.05$).	9
17	**Seymour(2016)(61)**	USA	Prospective cohort	Data from the 1979 National Longitudinal Survey of Youth;	Education level	Basic literacy is significantly associated with overall childbearing, with lower literacy levels being	8

[6]. Multiple Indicator Cluster Survey

				Study sample: 4025 women of reproductive age		correlated with higher overall fertility.	
18	**Shreffler.etal(2017)(143)**	USA	Cross-sectional	Telephone survey; Study sample: 1800 employed women aged 25-45	Occupation	Women with more professional occupations are more likely to postpone childbearing.	8
19	**Bagheri(2017)(57)**	Semnan/Iran	Cross-sectional	Structured questionnaire	Education level, occupation	The ideal number of children was 1.142 times higher among women with university education levels compared to those with elementary school and high school education levels. The ideal number of children was 21.1 higher among employed women compared to unemployed women ($p < 0.05$).	9
20	**Sabermahani(2017)(22)**	Iran	Cross-sectional	A combination of cross-sectional and time-series data from statistical yearbooks of the Statistical Center of Iran and the National Organization for Civil Registration	Education level, occupation, ethnicity	Women's higher education levels are associated with a decrease in the number of children ($p < 0.001$). Unemployment significantly postpones fertility ($p < 0.05$). Sunni women exhibited a more positive attitude toward fertility ($p < 0.05$).	6

21	**Sheikh.etal (2017)(23)**	Pakistan	Cross-sectional	The 2012-2013 PDHS[7] dataset; Study sample: 13558 married women aged 15-49	Education level	Women's education in Pakistan positively influences fertility preferences, leading to a decline in the overall fertility rate.	6
22	**Khraif.etal (2017)(24)**	Saudi Arabia	Cross-sectional	Researcher-made questionnaire; Study sample: 343 women employed at King Saud University	Education level	Enhancing education levels significantly reduce fertility.	7
23	**Naz(2017)(93)**	Tehran/Iran	Cross-sectional	The Reproductive behavior Questionnaire and the Religious Attitude Questionnaire; Study sample: 200 employed women	Culture	There is a statistically significant association between Reproductive behavior and religious orientation ($p < 0.05$).	8
24	**Bagheri(2018)(62)**	Tehran/Iran	Cross-sectional	The 2011 census raw data file; Study sample: 3342 married women	Education level, occupation	Women with lower education levels and unemployed women gave birth to a higher mean number of children ($p = 0.001$).	9
25	**Khadivzadeh(2018)(90)**	Mashhad/Iran	Cross-sectional	The demographic questionnaire, the Reproductive behavior Questionnaire, and	Culture	Higher levels of religious belief are associated with a greater desire for fertility.	8

[7]. Pakistan Demographic and Health Survey

				the Religious Attitude Questionnaire; Study sample: 844 women aged 15-49			
26	**Abassi(2018)(85)**	North Khorasan/Iran	Cross-sectional	Researcher-made Reproductive behavior Questionnaire; Study sample: 1000 women from 5 ethnicities (Fars, Turkish, Kurdish, Turkmen, and Tatar)	Ethnicity	The number of children varies significantly among different ethnic groups.	9
27	**Erfani(2018)(25)**	Hamedan/Iran	Cross-sectional	Data from the Hamadan Fertility Survey; Study sample: 3000 married women aged 15-49	Education level, ethnicity	Higher education is associated with increased birth spacing, particularly influencing the timing of second and third births ($p < 0.05$). Ethnicity had a significant effect only on birth spacing.	9
28	**Razeghi Nasrabad.etal(2018)(26)**	Iran	Cross-sectional	Structured questionnaire; Study sample: 1149 married women aged 33-44	Education level	There is a significant difference between women's postponement of childbearing and the age at first birth and their education level.	8
29	**Sadeghi.etal(2018)(86)**	Maku/Iran	Survey	Researcher-made questionnaire;	Ethnicity	The ethnocentrism level exhibits a positive and statistically significant	7

				Study sample: 384 Kurdish and Turkish married women aged 15-49		correlation with fertility; as ethnocentrism increases, so too does women's fertility.	
30	**Ali.etal(2018)(27)**	Egypt	Cross-sectional	The National Household Representative Questionnaire and Interview; Study sample: 97314 women aged 22-49	Education level	Each year of women's education is associated with a decrease of 0.079 in the number of children born per woman.	9
31	**Holowko.etal(2018)(55)**	Australia	Cohort	Researcher-made questionnaire; Study sample: 899.6 women aged 37-42	Education level	Women with low and moderate education levels are more likely to have their first child before the age of 24 compared to those with higher education levels.	9
32	**Afarini(2018)(28)**	Tehran/Iran	Cross-sectional	The Validated Social Support Questionnaire; Study sample: 822 married women of reproductive age (15-49 years old)	Education level, income	Each additional year of female education was associated with an 8% decrease in fertility intentions. Individuals with low socioeconomic status exhibited 47% lower fertility intentions.	9
33	**Soltanian(2019)(29)**	Hamedan/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 500 married women aged 15-49	Education level, occupation	Parents with university education have their first child later in life ($p < 0.05$). Housewives have their first	8

						child earlier compared to employed women ($p < 0.05$).	
34	**Torabi(2019)(30)**	Tehran/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 460 married women of reproductive age (15-49 years old)	Education level, income, occupation	High employment and education levels, coupled with insufficient income, reduce the tendency toward childbearing.	8
35	**Bagheri(2019)(70)**	Tehran/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 610 married women aged 15-49	Occupation	Employment status had a significant impact on the second birth spacing, with employment leading to an increase in birth spacing ($p < 0.05$).	9
36	**Sadeghi(2019)(87)**	Maku	Cross-sectional	Researcher-made questionnaire; Study sample: 384 Kurdish and Turkish married women aged 15-49	Ethnicity	The value placed on having a large number of children (3 or more) and the preference for male children are more pronounced among Kurdish women compared to Turkish women. Ethnicity has a significant effect on gender preference and the perceived value of children.	9
37	**Bandehelahi(2019)(31)**	Hamedan/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 610 married women aged 15-49	Education level, occupation	Increased education levels lead to a longer first birth spacing ($p < 0.05$). The mean first birth spacing was greater among employed women compared	9

						to unemployed women ($p < 0.05$).	
38	**Samari.etal (2019)(32)**	Egypt	Cross-sectional	Longitudinal data from the 2006 and 2012 Egypt Panel Survey; Study sample: 4336 married women of reproductive age (15-49 years old)	Education level	For each increase in education level, there were 0.056 fewer births.	9
39	**WUSU.etal(2019)(33)**	Nigeria	Cross-sectional	The NDHS; Study sample: 51879 women of reproductive age (15-49 years old)	Education level	Female education is inversely related to fertility in both northern and southern Nigeria.	9
40	**Obiyan.etal (2019)(34)**	Africa	Cross-sectional	The GMICS[8] dataset; Study sample: 8053 educated women of reproductive age	Education level	Education is negatively correlated with fertility; each additional year of education is associated with a decrease of 0.25 in the expected number of children.	9
41	**Aradmehr(2019)(35)**	Torbat-e-Heydariyeh/Iran	Cross-sectional	The demographic questionnaire, the Fertility Information Questionnaire, and the Religiosity Questionnaire;	Education level, income, occupation, religion	A statistically significant inverse relationship was reported between education level and fertility ($p < 0.001$). Fertility rates exhibited no significant association with	9

[8]. Ghana Multiple Indicator Cluster Survey

				Study sample: 241 married women aged 15-49		employment and income level ($p > 0.05$). Religious beliefs had a positive and significant relationship with childbearing and the number of children ($P=0.009$).	
42	**Alishah(2019)(75)**	Sari/Iran	Cross-sectional	The Demographic-Fertility Checklist, Fertility Questionnaire, and Women's Empowerment Questionnaire; Study sample: 810 women living in urban and rural regions aged 18-39	Occupation	Women's employment status is a significant factor influencing their reproductive capacity (number of children and birth spacing) ($\beta = 0.11$, $P = 0.003$). The mean capacity score of employed women is 11% higher than that of unemployed women.	8
43	**Zare(2019)(54)**	Sabzevar/Iran	Cross-sectional	Data including Miller's Demographic and Childbearing Questionnaire; Study sample: 450 women aged 18-35	Education level, income	There was a statistically significant negative correlation between positive fertility motivation and education level ($P = 0.01$), and between negative fertility motivation and income level ($P = 0.001$).	8
44	**Impicciatore.etal(2020)(36)**	Six European countries	Cross-sectional	Data from the second wave of the GGS[9] dataset;	Education level	For the first child, education has a significant negative	9

[9]. Gender and Generation Survey

		(Bulgaria, Czech Republic, France, Germany, Poland, and Italy)		Study sample: 90924 women of reproductive age		effect on the timing of childbearing decisions.	
45	**Dehesh(2020)(37)**	Kerman/Iran	Cross-sectional	Checklist; Study sample: 1350 women aged 15-49	Education level, income, culture	Educated couples are 1.5 times more likely to have longer pregnancy spacing. Favorable family income leads to longer pregnancy spacing ($p < 0.05$). Maternal preference for male children leads to shorter pregnancy spacing ($p < 0.05$).	9
46	**Mahmoudiani(2020)(67)**	Fars/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 882 rural married women of reproductive age (15-49)	Religion, ethnicity, occupation, education level	Ethnicity ($P = 0.023$) and religion ($P = 0.002$) have a significant effect on the spacing between the first and second child. No significant relationship was found between women's employment status and birth spacing. Employed women tend to have a longer birth spacing between their first and second children; however, the birth spacing between	7

						second and third children is the opposite. Women's education does not influence birth spacing.	
47	**Araban(2020)(38)**	483 married women aged 15-49	Cross-sectional	Researcher-made questionnaire and the Attitude Toward Childbearing Questionnaire	Education level, occupation	Higher education is associated with a decreased pregnancy intention ($p<0.05$). Occupational status is a significant predictor of fertility intentions, with employment being associated with lower fertility ($p<0.05$).	9
48	**Ahinkorah(2020)(39)**	32 countries in sub-Saharan Africa	Cross-sectional	Data from demographic and health survey of 32 countries in sub-Saharan Africa; Study sample: 232784 married women of reproductive age	Education level	Women with higher education levels exhibited a lower tendency toward childbearing.	9
49	**Halimatusa'diyah(2021)(91)**	Iran	Cross-sectional	Researcher-made questionnaire	Religion	All religious tendencies demonstrated a similar probability of higher fertility.	8
50	**Rohmah(2021)(40)**	34 provinces in Indonesia	Cross-sectional	The IDHS[10] dataset;	Education level	Women with high school education levels were 2.227	8

[10]. Indonesia Demographic and Health Survey

				Study sample: 44853 Indonesian rural women aged 15-49		times more likely to use contraceptives compared to illiterate women.	
51	**Biney(2021)(41)**	South Africa	Cross-sectional	The 2016 SADHS[11] dataset; Study sample: 6124 women of reproductive age	Education level, race, ethnicity, income	Race and ethnicity were determinants associated with increased childbearing, whereas higher education levels and income were associated with decreased childbearing.	9
52	**Bagheri(2021)(82)**	Tehran/Iran	Cross-sectional	Structured questionnaire; Study sample: 610 married women aged 15-49	Occupation	Unemployed women gave birth to their second child earlier than employed women ($p < 0.05$).	9
53	**Dorahaki(2021)(58)**	Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 304 married women aged 15-49	Education level	Woman's education levels have a significant positive correlation with their total number of children.	8
54	**Kohan(2022)(80)**	Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 500 married women having at least one child	Education level, income, occupation	There is no significant correlation between attitudes toward fertility control and the demographic variables of female occupation, education levels, and financial status.	8
55	**Akram.atal (2022)(56)**	Pakistan	Cross-sectional	The 2012-2023 PDHS dataset;	Occupation, education level	Employed women with high school or higher education	7

[11]. South Africa Demographic and Health Survey

				Study sample: 13558 women aged 15-49		levels tend to marry at older ages and are more likely to have fewer children.	
56	**Kristensen.etal (2022)(84)**	Norway	Cohort	Recorded data of Norwegian population between 1994 and 2014; Study sample: Women aged 20-45	Occupation	The overall unemployment rate in a society has a greater negative impact on decisions regarding subsequent childbearing, but does not significantly influence the decision to have a first child.	9
57	**Soharwardi.etal(2022)(42)**	Pakistan	Cross-sectional	The PDHS; Study sample: Married women aged 15-49	Education level	Education influences fertility preferences in Pakistan. Female education has a negative impact on Reproductive behavior.	8
58	**Gatta.etal (2022)(76)**	Italy	Cross-sectional	Researcher-made questionnaire; Study sample: 442 married employed women of reproductive age (18-45)	Occupation	Occupation is a strong predictor of increased positive fertility intentions, raising the likelihood of a firm intention to have (another) child by 1.0%.	9
59	**Xue.etal (2022)(71)**	China	Cross-sectional	National data from the Chinese Social Survey; Study sample: 96810 women	Occupation	The number of children born to employed women was significantly lower than that of unemployed women.	9
60	**Kuloğlu.etal (2022)(77)**	49 countries	Cross-sectional	Data from the World Development Indicators database	Occupation, income	The economic index variable (employment status, income) has a	9

				between 1990 and 2018; Study sample: -----		positive and significant effect on fertility. A one-unit increase in the index variable has a 60% effect on fertility.	
61	**Chen.etal(2022)(59)**	China	Cross-sectional	Data from the CGSS[12] database (2010-2012); Study sample: Women born between 1971 and 1989 aged at least 23	Education level	Each additional year of female education increases the number of children ever born by 10%, decreases the likelihood of childlessness by 3%, and increases the probability of having two or more children by 4%.	9
62	**Dehesh(2022)(43)**	Kerman/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 1350 women aged 15-49	Education level, income	University-educated women are 1.47 times more likely to have a longer spacing between marriage and first birth. Adequate family income increased the first birth spacing by 2.26 times.	9
63	**Abasi(2022)(88)**	Khorasan/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 406 Fars and Turkmen women of reproductive age	Education level, occupation, ethnicity	Women's education level (P = 0.001) and occupation (P = 0.001) are significant factors influencing the number of children. The effect of ethnicity on the number of children is secondary.	9
64	**Giammarco(2022)(78)**	Italy	Cross-sectional	The data from the Italian FSS[13] Survey;	Occupation	Women's employment is positively associated with	9

[12]. China General Social Survey
[13]. Family and Social Subjects

				Study sample: 9327 women		fertility at the individual level in both northern and southern Italy.	
65	**Ekholuenetale(2022)(44)**	37 countries in sub-Saharan African	Cross-sectional	Cross-sectional demographic and health data; Study sample: 496082 women of reproductive age	Education level, income	Increased education levels and household wealth may increase the use of contraceptives.	9
66	**Naderipour(2023)(45)**	Zanjan/Iran	Cross-sectional	The Demographic the Attitude Toward Childbearing Questionnaire; Study sample: 220 married women of reproductive age (15-49) without child	Education level, income, occupation	Income level was not significantly associated with the mean score of attitude toward childbearing ($p = 0.210$). There is a significant association between women's education level ($p < 0.001$) and employment status ($p < 0.001$).	8
67	**Shasha(2023)(46)**	31 countries in sub-Saharan African	Cross-sectional	Demographic and health survey in 31 countries in sub-Saharan Africa between 2010 and 2021; Study sample: 54671 young women aged 20-24	Education level	Completing high school education or attaining higher education levels was associated with a reduced likelihood of childbearing among young women.	9
68	**Pieroni(2023)(72)**	Italy	Cross-sectional	Longitudinal data from the administrative	Occupation	Temporary employment contracts constrain Reproductive behavior by	8

				records of the Italian National Social Security Institute; Study sample: 4966 employed women of reproductive age		1.5%, with this effect increasing to 4% among childless women.	
69	**Tomatis.etal(2023)(81)**	7 European countries	Cross-sectional	Survey data and the application of statistical models; Study sample: 25031 women	Occupation	In Eastern Europe, there is greater compatibility between employment and fertility, whereas Western European countries exhibit a divergence between employment and childbearing.	8
70	**Golub.etal (2023)(73)**	Bosnia and Herzegovina	Survey	Researcher-made questionnaire; Study sample: 1000 women aged 15-49	Occupation	Employment significantly influences Reproductive behavior and family size, as employed women have an average of 2.1 children, unemployed women 1.9 children, and temporarily employed women 1.73 children.	7
71	**Alimoradiyan(2023)(63)**	Khorramabad/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 478 married women aged 15-49	Education level	Women's education levels affect the birth spacing of the first and second children.	7
72	**Heydari(2023)(47)**	Tehran/Iran	Cross-sectional	Researcher-made questionnaire;	Education level, occupation	The tendency toward having only one child has a statistically significant	8

				Study sample: 420 married women		positive correlation with both education level and employment status.	
73	**Malmir(2023)(92)**	Iran	Cross-sectional	The 2018 Iran National Family Survey data; Study sample: 1020 married women aged 18-44	Religion	Religion alone significantly influences ideal family size; Sunni women expressed a greater desire to have a child (or another child) compared to Shia women.	9
74	**Yarger.etal(2024)(83)**	China	Cohort	25-year data from the 1979 National Longitudinal Survey of Youth; Study sample: 4415 women aged 18-45	Occupation	Unemployed women were 5% more likely to have more children than full-time or part-time employed women.	8
75	**Dorahaki(2024)(66)**	Kashan/Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 385 women aged 18-44	Education level, occupation, income	The variables of education level, employment, and family income exhibited no statistically significant relationship with the number of children women intended to have.	8
76	**Khosravi.atal (2024)(48)**	Iran	Cross-sectional	Researcher-made questionnaire; Study sample: 116 married employed women	Occupation education level, income	A correlation exists between education levels and all indicators of Reproductive behavior. Income level and employment status were also determinants affecting Reproductive behavior.	8

						Higher education was found to be associated with a longer spacing between marriage and first childbirth.	
77	**Zhou.etal (2024)(49)**	China	Cross-sectional	The 2021 CGSS database; Study sample: 864 women aged 20-49	Income, education level	Higher education levels were negatively associated with the intention to have a third child, whereas higher income had a positive effect on this intention.	9
78	**Baizan.etal(2024)(50)**	China	Cross-sectional	Data from the GFPS[14] between 2010 and 2018; Study sample: 12838 women	Education level	Increased education levels are correlated with declined fertility rates, particularly for second and third births.	9
79	**Afreen.etal (2024)(51)**	Pakistan	Cross-sectional	The PDHS dataset between 2017 and 2018; Study sample: 36412 women aged 15-49	Education level	Women's education levels have a significant and inverse effect on fertility rates in Pakistan.	8
80	**Juárez.etal(2024)(52)**	Italy and Mexico	Cross-sectional	The 2009 National Multipurpose Survey on Family and Social Aspects and the 2014 National Demographic Dynamics Survey; Study sample: 43850 women	Education level	There is a persistent negative relationship between fertility preferences and education levels in Mexico.	9

[14]. China Family Panel Studies

81	**Alizadeh Aghdam(2024)(74)**	Iran	Cross-sectional	Questionnaire; Study sample: 498 married women of reproductive age from Tabriz	Occupation, income	There is a statistically significant negative correlation between women's employment variables. No significant correlation was observed between income level and women's Reproductive behavior.	9
82	**Wang(2024)(53)**	Africa	Cross-sectional	National Survey of Women's Lives During Reproductive Age; Study sample: Women aged 20-34	Education level	One additional year of female education reduces the number of children ever born to women and the number of living children by 0.39 and 0.34, respectively.	8
83	**Sadeghi(2024)(5)**	Iran	Cross-sectional	The 2018 National Family Survey data; Study sample: 1302 married women aged 15-49	Ethnicity	Reproductive behaviors and ideals vary among women of different ethnic groups.	9

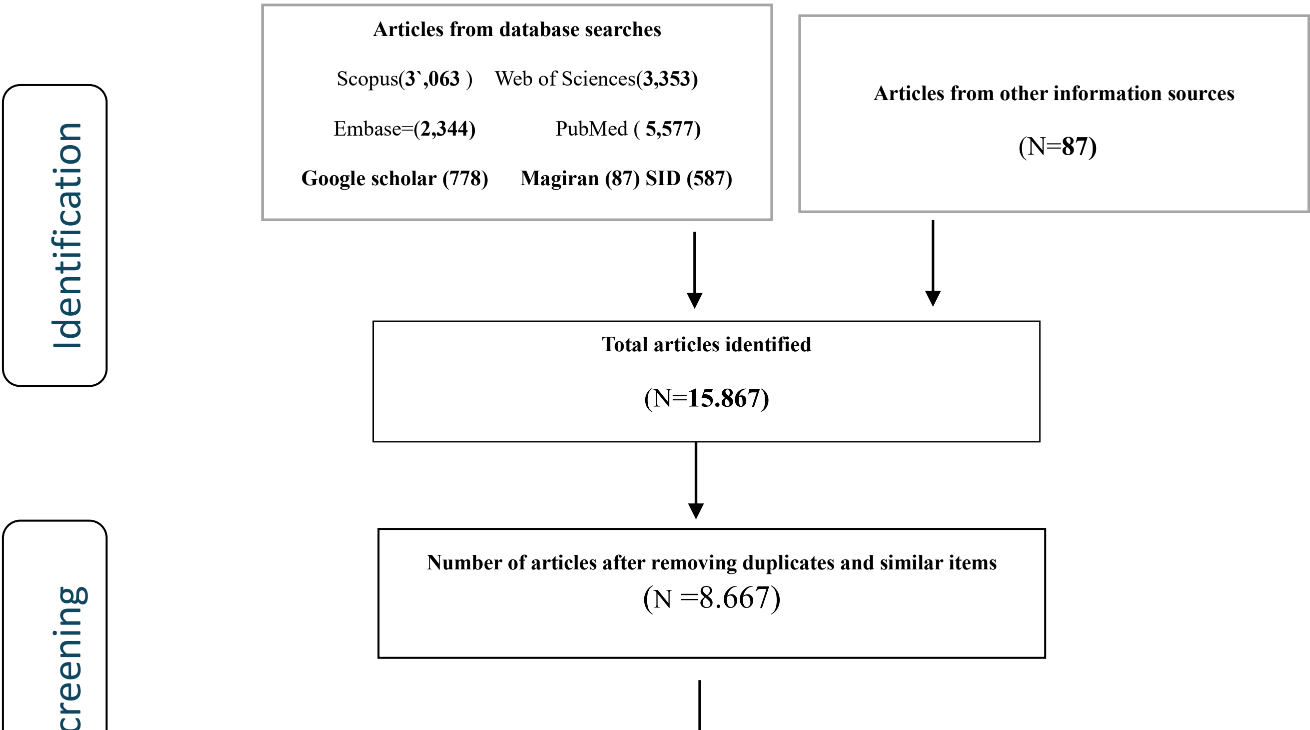

Figure-1. The process of searching and screening articles included in the systematic review

Table 3. Summary of comparison of characteristics of reviewed articles on the relationship between structural determinants of health and women's reproductive behavior

		between structural determinants of health				*reproductive behavior*			***Author, Year***	***Row number***
religion	*culture*	*ethnicity*	*income*	*occupation*	*education*	*Birth intervals (future fertility status)*	*Ideal number of children*	*Number of children born (current fertility status)*		
									Adebowale.etal(2014)	*1*
									Hosseini(2014)	***2***
									Shayan(2014)	***3***
									Ahmadi(2014)	***4***
									Breschi.etal(2014)	***5***
									Buyinza. (2014)	***6***
									Currie.etal(2014)	*7*
									Hwang.etal (2014)	***8***
									Davia.etal (2015)	***9***
									Ranjbar.etal (2015)	***10***
									Reshadat(2015)	***11***
									Zheng.etal(2016)	***12***
									Hajizadeh.etal(2016)	***13***
									Attari. Tal(2016)	***14***
									Asadi(2016)	***15***
									Motlagh(2016)	***16***
									Seymour(2016)	***17***
									Shreffler.etal(2017)	***18***
									Bagheri(2017)	***19***
									Sabermahani(2017)	***20***
									Sheikh.etal (2017)	***21***
									Khraif.etal (2017)	***22***
									Naz(2017)	***23***
									Bagheri(2018)	***24***
									Khadivzadeh(2018)	***25***

									Abassi(2018)	*26*
									Erfani(2018)	*27*
									Razeghi Nasrabad.etal(2018)	*28*
									Sadeghi.etal(2018)	*29*
									Ali.etal(2018)	*30*
									Holowko.etal(2018)	*31*
									Afarini(2018)	*32*
									Soltanian(2019)	*33*
									Torabi(2019)	*34*
									Bagheri(2019)	*35*
									Sadeghi(2019)	*36*
									Bandehelahi(2019)	*37*
									Samari.etal (2019)	*38*
									WUSU.etal(2019)	*39*
									Obiyan.etal (2019)	*40*
									Aradmehr(2019)	*41*
									Alishah(2019)	*42*
									Zare(2019)	*43*
									Impicciatore.etal(2020)	*44*
									Dehesh(2020)	*45*
									Mahmoudiani(2020)	*46*
									Araban(2020)	*47*
									Ahinkorah(2020)	*48*
									Halimatusa'diyah(2021)	*49*
									Rohmah(2021)	*50*
									Biney(2021)	*51*
									Bagheri(2021)	*52*
									Dorahaki(2021)	*53*
									Kohan(2022)	*54*
									Akram.atal (2022)	*55*
									Kristensen.etal (2022)	*56*
									Soharwardi.etal(2022)	*57*
									Gatta.etal (2022)	*58*
									Xue.etal (2022)	*59*
									Kuloğlu.etal (2022)	*60*
									Chen.etal(2022)	*61*
									Dehesh(2022)	*62*
									Abasi(2022)	*63*

									Giammarco(2022)	*64*
									Ekholuenetale(2022)	*65*
									Naderipour(2023)	*66*
									Shasha(2023)	*67*
									Pieroni(2023)	*68*
									Tomatis.etal(2023)	*69*
									Golub.etal (2023)	*70*
									Alimoradiyan(2023)	*71*
									Heydari(2023)	*72*
									Malmir(2023)	*73*
									Yarger.etal(2024)	*74*
									Dorahaki(2024)	*75*
									Khosravi.atal (2024)	*76*
									Zhou.etal (2024)	*77*
									Baizan.etal(2024)	*78*
									Afreen.etal (2024)	*79*
									Juárez.etal(2024)	*80*
									Alizadeh Aghdam(2024)	*81*
									Wang(2024)	*82*
									Sadeghi(2024)	*83*

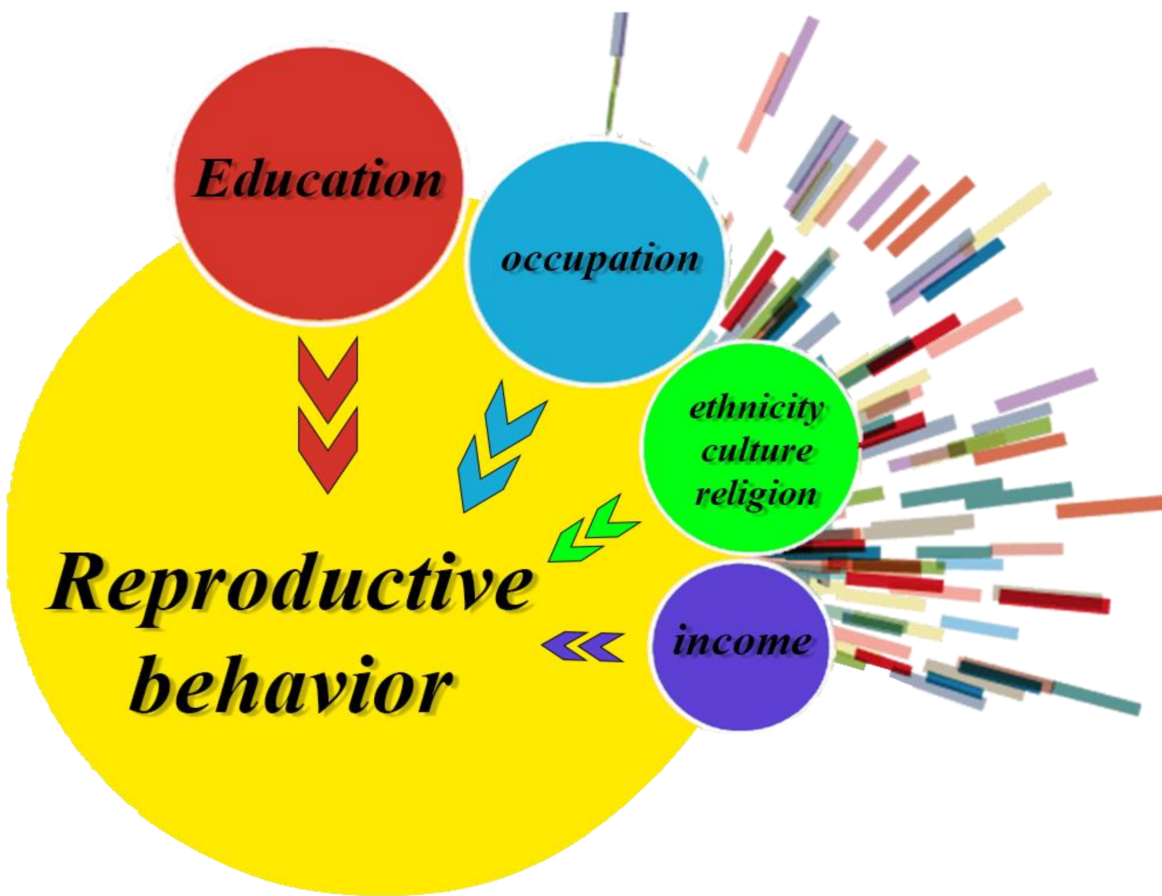

Figure _2. Summary of results of the relationship between social factors affecting health and reproductive behavior