



Social Determinants of Women's Reproductive Health: A Systematic Review

Maryam Biglari Abhari ¹, Hamideh Sabetrohani ², Samaneh Saghfian Larijani ³, Ronak Ghafari ⁴ and Ayoub Nafei ^{1,*}

¹Academic Center for Education, Culture and Research (ACECR), Shahid Beheshti University of Medical Sciences, Tehran, Iran

²Student Research Committee, School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran

³Research and Clinical Development Center, Firoozabadi Hospital, Iran University of Medical Sciences, Tehran, Iran

⁴Education Department, Ministry of Education, Tehran, Iran

*Corresponding author: Academic Center for Education, Culture and Research (ACECR), Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: nafei.un@gmail.com

Received 2023 September 18; **Revised** 2023 November 08; **Accepted** 2023 December 15.

Abstract

Context: Health, in all its aspects, is an important human right. There are various factors for the health of individuals with complex relationships with other cultural and social characteristics of a society that lead to inequality in health. Social determinants of health have a critical role in health matters; their impact on women's fertility and childbearing must be viewed as an important field to macrolevel and microlevel health scope decision-making and policy development.

Objectives: This study aims to extract and determine the social determinants that affect women's reproductive health based on existing studies and strong evidence.

Methods: This study was a systematic review that searched reputable medical databases and sites, including PubMed, Scopus, ISI, IranDoc, and SID, utilizing keywords like "social," "reproductive health/fertility/childbearing," and "women/female/woman". The scope of the study was limited to articles published between 2010 and 2019 due to the large volume of data available, and articles written in languages other than English or Persian were excluded from the review. The segregated articles concerning the abstract content were screened by two independent individuals to match the research objectives and keywords. The relevant abstracts were separated for review in the next step, and the full text of the obtained articles was read separately by two independent individuals to ensure their alignment with the research objectives. The articles were reviewed for quality and accuracy using the CASP tool, and those scoring above 75% entered the final stage of the study.

Results: In the initial database search, 1731 articles were found, and after removing duplicates, 1516 remained. Of these, 1313 were removed for not meeting the research objectives, leaving 203 articles for the next stage. After further review, 92 articles were excluded, resulting in 107 articles for further review. Out of these, 84 articles were evaluated for compliance with research objectives, with 26 articles entering the critical evaluation stage. All articles scored above 75% on evaluation tools and entered the final stage of information extraction.

Conclusions: The social determinants that impact women's reproductive health and childbearing, based on studies worldwide, include racial, ethnic, and national discrimination (for immigrants and minorities), micro and macroeconomic factors (income, costs of living, and healthcare), socio-cultural factors (education, employment, family norms), and socio-geographical factors (residence and urban status).

Keywords: Social Determinants, Reproductive Health, Women

1. Context

Health, in all its aspects, is a fundamental human right. Health and welfare organizations worldwide strive to achieve the best health outcomes possible for their societies (1). Various determinants of people's health have a complex relationship with other cultural and social

properties of a community, leading to health inequities (2). According to the definition of the World Health Organization (WHO), "social determinants of health (SDH) are the non-medical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces

and systems shaping the conditions of daily life, including income and social protection, education, employment, and job security, working life conditions, food security, housing, basic amenities, environment, early childhood development, social inclusion and non-discrimination, structural conflict, and access to affordable health services” (3).

Prioritizing women’s health is crucial to achieving the fourth and fifth Millennium Development Goals (MDGs) (4). Women’s health is influenced by physical, mental, sociocultural, and spiritual dimensions that are determined by the biological, social, political, and economic background of the community. It is important to consider the life cycle chart of women to promote their health in all dimensions (1).

Sexual and reproductive health are two approved goals of the world plan for sustainable development (5). The WHO emphasizes reproductive health as the main and basic part of well-being. People should have a responsible, satisfactory, and safe sexual life and freedom in reproductive ability and decision-making. Additionally, they should have access to safe, cost-effective, and acceptable ways for family planning (6).

Studies have shown that social determinants of health have a severe impact on the treatment of gynecological diseases, such as premature labor, unwanted pregnancy, infertility, cancers, and maternal mortality (7). Reproductive health impairment is responsible for 15% of the total burden of diseases and leads to women’s disabilities around the world, accounting for 21.9% of DALY per year for women (8). The WHO has developed a framework to recognize opportunities and threats to encourage sexual and reproductive health services with high quality and accessibility (9).

2. Objectives

Through the current study, we aimed to identify and stratify the social determinants that are effective on women’s reproductive health in order to design better interventions and plans to improve these issues more effectively and equitably.

3. Methods

The present study is a systematic review of all valid and available evidence on the social determinants affecting women’s reproductive health, published between 2010 and 2019. All studies meeting the inclusion criteria were collected within this timeframe.

Inclusion criteria consisted of articles published in Persian and English languages, databases that could be

fully accessed, and articles with accessible full texts. The screening was conducted in multiple stages, and cases that aligned with the research question and purpose in terms of title, abstract content, or the entire article and scored the necessary points in the critical evaluation stage were included in the study.

A structured question was designed using the PICO framework:

P: Women

I: Social components

C: -

O: Reproductive health

Data collection involved an initial search of sources to determine keywords related to the research topic. Keywords included (social), (determinant/indicator/index/indices/marker), (reproductive health/fertility/child bearing), and (women/female/woman). Authentic medical sites and databases, such as PubMed, Scopus, and ISI, and internal databases, such as IranDoc and SID, were searched using these keywords, and a specific search strategy was used for each database (Table 1).

Articles and studies on the social determinants of women’s reproductive health were collected using EndNote 8 software, and numerous sources were reviewed based on the title of the research or article. The articles were separated by relevant titles and according to the keywords. At this stage, the extracted articles were reviewed by two independent researchers in terms of the content of the abstract to ensure alignment with the research objectives and keywords. Articles with relevant abstracts were included for full review. The search was then conducted to find the full text of the included articles in the previous step, and articles with available full text were selected for the next step. The full text of the articles was reviewed separately by two independent researchers, and articles that aligned with the research objectives advanced to the next stage. Cases that were not agreed upon by both researchers in the previous steps were re-examined and resolved by a third party. The articles were then reviewed and scored in terms of quality and accuracy using the CASP and STROBE tools for each type of study. Articles with a score above 75% entered the final stage of the study.

4. Results

In the initial phase of database searching, 1731 articles were obtained, but no relevant articles were found in Iranian databases. After removing the duplicates (215), 1516 articles remained. These articles were screened for title alignment with the research questions and

Table 1. Search Strategy Conducted for Databases

Database	Search Strategy
PubMed	("social" [tiab] AND ("determinant" [tiab] OR "indicator" [tiab] OR "index" [tiab] OR "indices" [tiab] OR "marker" [tiab]) AND ("reproductive health" [tiab] OR "fertility" [tiab] OR "child bearing" [tiab]...) AND ("women" [tiab] OR "woman" [tiab] OR "female" [tiab])). *No filters were applied to increase search sensitivity except for the year of publication (2010 - 2019)
Scopus	((ALL (social)) AND (ALL (determinant OR indicator OR index OR indices OR marker))) AND (ALL (reproductive health OR child bearing OR fertility)) AND (ALL (women OR female OR woman))) AND pubyear 2010 - 2019)
Web of knowledge	(Ts = (determinant OR indicator OR index OR indices OR marker) AND (TS = (reproductive health OR child bearing OR fertility) AND (TS = (women OR female OR woman))) AND (TS = (social). Refined by: Publication Years: (2019 OR 2018 OR 2017 OR... OR 2010)

objectives, resulting in the exclusion of 1313 articles. The remaining 203 articles were screened for abstract alignment, resulting in the exclusion of 3 articles due to lack of abstracts, 1 article due to non-Persian and English language abstracts, and 92 articles due to lack of content relevance. One hundred seven articles were selected for full-text review, but 13 articles were excluded due to unavailability of the full text.

Eighty-four articles remained for full-text review and compliance assessment with the research, resulting in the exclusion of 58 articles and the inclusion of 26 articles for critical appraisal. These 26 articles included 1 qualitative study, 19 cross-sectional studies, 1 review, 2 systematic reviews, 2 cohort studies, and 1 case-control study. Cross-sectional articles were reviewed using the STROBE tool, while other articles were assessed using the CASP critical appraisal lists, with all scoring above 75% and entering the final stage of data extraction.

The extracted determinants were categorized into four subgroups related to reproductive health:

1. Fertility, which was directly mentioned in articles code 2, 4, 11, 12, 13, 14, and 15.
2. Family planning, which affects reproductive health and fertility, was discussed in articles code 1, 6, 7, 9, 16, 17, 18, 19, and 20.
3. Teen motherhood and pregnancy, which can indirectly affect reproductive health, were discussed in articles codes 3, 5, 21, and 22.
4. Healthcare equity, which has effects on various aspects of reproductive health over short, medium, or long durations, was discussed in articles code 8, 10, 23, 24, 25, and 26.

Social determinants should affect reproductive health through direct or proximate components, including sexual activity (start time and frequency), contraceptive use (family planning), and history of complete pregnancy and full-term birth (10). The social indicators and components and their effects on reproductive health are presented in Tables 2 - 5, according to the groups defined above. Please see Appendix 1 for details of the extracted articles and data. The PRISMA diagram illustrating the

study selection process is shown in Figure 1.

5. Discussion

Indicators that affect the early onset of sexual activity and early marriage can also impact other factors, such as early pregnancy, induced abortion rates, and contraceptive use, ultimately affecting reproductive health and fertility rates. Indicators such as adolescent pregnancy and early motherhood, while potentially increasing fertility rates, can paradoxically decrease maternal and child care and reduce overall reproductive health. Therefore, all physiological and socio-economic components of reproductive health and childbearing are interconnected.

In this section, we can integrate the previous classifications to understand the results of the studies better and mention the determinants in general.

5.1. Social determinants that affect reproductive health status (regardless of the rate of childbearing)

5.1.1. Immigration

A higher level of education in the family, high levels of support and family cohesion, favorable access and compliance with the school environment, and living with other immigrants can have a protective effect against sexual activity or early marriage, improving reproductive health (10). However, immigrants generally have lower levels of reproductive health (16).

5.1.2. Education Level in Women

Reproductive disorders have been observed in women with higher levels of education. However, due to less access to reproductive health services in uneducated and low-educated women, their reproductive health status is not favorable (11, 20).

5.1.3. Ethnic-Racial-National Discrimination

Minorities generally have lower levels of reproductive health. Blacks in the United States have lower levels of reproductive health due to poorer financial conditions

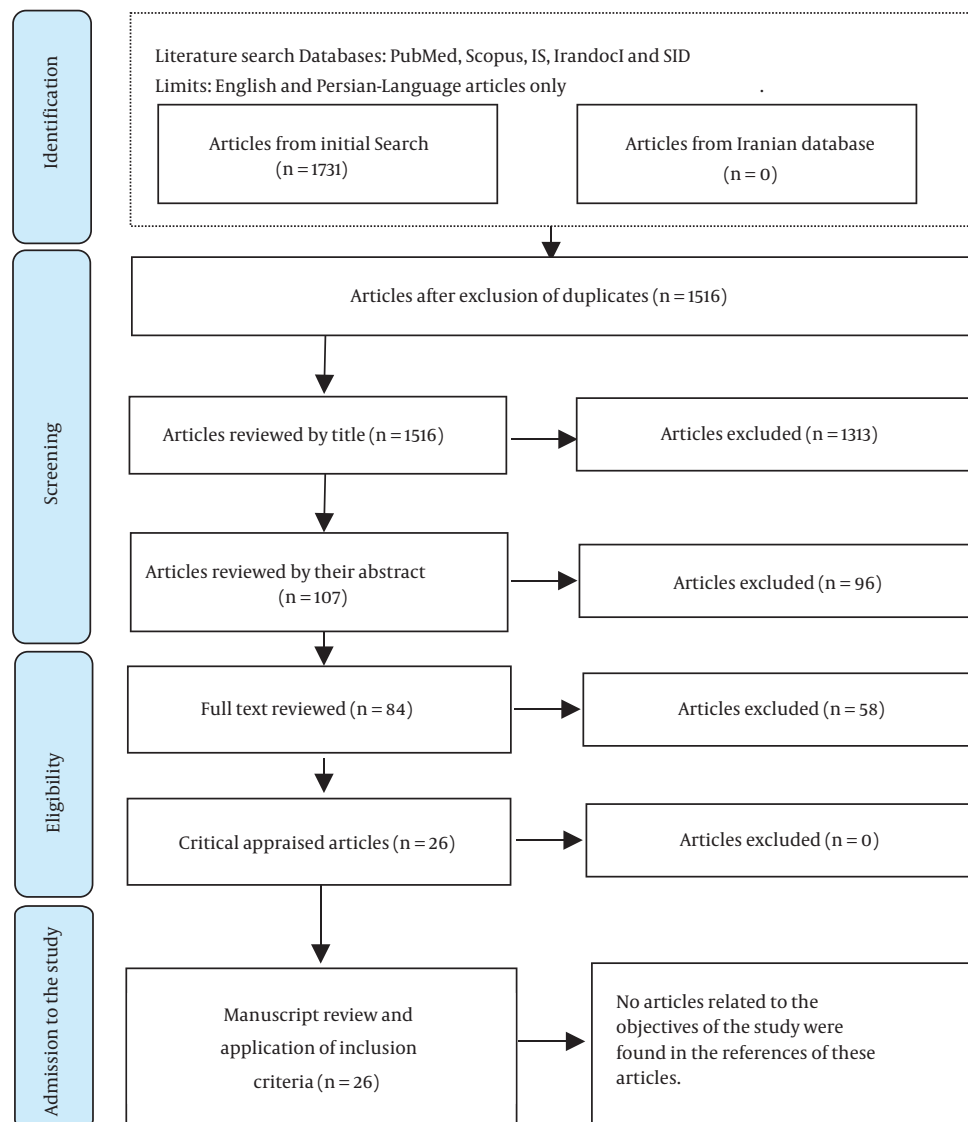


Figure 1. PRISMA flow diagram of literature search and selection process.

and perpetual poverty in their generations, as well as a lack of access to reproductive health services. In Brazil, the fertility rate of blacks has also declined over time (21).

5.2. Social Determinants That Affect the Rate of Childbearing

5.2.1. Women's Empowerment Index in Society

A higher index of economic and socio-cultural empowerment increases childbearing (27).

5.2.2. Household Empowerment Index

A higher household empowerment index increases childbearing (18).

5.2.3. Women's Education Level

A higher level of women's education reduces fertility (12, 13).

5.2.4. Husband's Level of Education

A higher level of education reduces childbearing (23, 27, 28).

5.2.5. Religion

Religion affects the level of access (23) and the use of family planning services, religious beliefs (17), and authority in decision-making, affecting childbearing (29). Various studies have associated Buddhism and Christianity with the highest rate of induced abortion (24, 30). However, in Burkina Faso, Islam and Christianity were associated with increased fertility (21). In Iran, childbearing is more common among the Sunni population (21).

5.2.6. Index and Degree of Women's Authority in Making Decisions About Reproductive Health and Childbearing

Increasing women's authority and autonomy in various aspects of decision-making, such as fertility and childbearing, disagreement with couples in decision making, and less age gap between couples with reduced pregnancy in adolescence, reduce childbearing (14, 15, 31).

5.2.7. Index and Degree of Family Authority in Decision-Making About Childbearing

Increasing the authority index in family decision-making leads to a decrease in childbearing (25).

5.2.8. Minimum age at First Marriage, Sexual Activity, or the Birth of the First Child in the Community

A lower age at which a woman gets married, starts having sex or gives birth to the first child leads to higher childbearing rates in that population.

5.2.9. The Rate of use of Mass Media and the Rate of Receiving Reproductive Health Education and Family Planning Messages from Mass Media

Increasing the overall rate of mass media use or receiving family planning messages reduces childbearing (24, 27).

5.2.10. Micro and Macroeconomic Determinants

A low level of national income (26), low socioeconomic class, poor socioeconomic situation of the province of residence, an increase of household expenditure, an increase of per capita cost of education, an increase of average cost or rent of housing in residential areas, reduce fertility. In some societies, a lower wealth quintile has led to a decrease in fertility by increasing unsafe abortions and compromising reproductive health (30). On the other hand, the lowest quintile welfare in some communities, due to a 40% reduction in the possibility of using long-term contraceptive methods and access to family planning services, had more children (13). However,

in other societies, the poor had fewer children due to more use of contraceptive methods (19). Paradoxical effects require specific studies for each region and community.

5.2.11. Average Ideal Number of Children in the Community and the Place of Residence

The higher the ideal number of children and desired size of the family in the norm of society, the higher the childbearing rate in that society (19, 25, 27).

5.2.12. Status and Employment Rate of Women

In working women and societies that have a higher average of women's employment, childbearing decreases (24, 26).

5.2.13. Status, Class, and Employment Rate of Men

Unemployment or a lower occupational class or employment rate in men reduces childbearing. However, another study showed that unemployment in the family increases the rate of adolescent pregnancy (22).

Different employment conditions can have varying effects on reproductive health and the level of expenditures, which should be carefully and separately examined in different communities.

5.2.14. Child Sex Preference and the Number of Children in the Family

Child sex preference and the number of children in the family, as well as the decision of the family to have children in the future, have been shown to affect childbearing rates. Studies indicate that when the number of children in the family reaches 2 or 3, childbearing decreases (19, 31). Additionally, having a son in the family reduces the likelihood of further childbearing (19). However, couples who have a decision to have children in the future and do not plan to have them at the moment may intermittently use contraceptive methods, resulting in a decrease in childbearing (13).

5.2.15. Women's Age

Women's age is a crucial factor that affects reproductive health outcomes. The highest rate of contraceptive method use is observed in the age group of 25 to 35 years (19). However, the rate of long-term contraceptive method use among this age group is lower (13), and the rate of induced abortion or termination of pregnancy is higher among older women, particularly those over the age of 35 (24). The highest rates of pregnancy and premature birth occur between the ages of 18 and 19 (15). Women's decision-making authority about pregnancy is lowest in the age group of 15 to 19 (29). Women in the

age group of 10 to 19 have the least access to reproductive health services and prenatal care (32). Therefore, this age group is one of the most vulnerable in terms of reproductive health and requires targeted interventions.

5.2.16. *Indigeness or Immigration*

Indigeness or immigration can affect reproductive health outcomes. Migration can lead to numerous discriminations and deprivations for the immigrant population, with reproductive health, such as early marriage, early sexual activity, and unintended pregnancy, being more prevalent among immigrants (26, 33). However, as immigrant generations advance, such as the children and grandchildren of early immigrants, these inequalities decrease, and the reproductive health status improves (33).

5.2.17. *Residence*

Residence, i.e., urban or rural, can also affect reproductive health outcomes. Urban life, despite better access to reproductive health services (34) and greater women's authority in making reproductive health decisions (29), may lead to lower fertility rates due to the increased use of contraceptive methods (35) and intentional termination of pregnancy (26). Total fertility rates are higher in rural areas (12).

5.2.18. *The Marital Status of Women*

The marital status of women is also associated with increased fertility in more favorable and healthier conditions (24).

As mentioned, social determinants can increase inequality in the use and access to reproductive health services, family planning, and prenatal care, leading to disparities in reproductive health outcomes and optimal childbearing of women. Although some inequalities in access to services, such as those between rural and urban areas or different levels of family income, have decreased over time due to local health system interventions, rural-urban inequalities in fertility rates and among different income groups persist (35). Racial-ethnic-national discrimination has also been identified as an important factor of inequality in reproductive health. The issue of racial discrimination, especially as it pertains to minorities, is rooted in slavery. Black slave women were sexually abused to provide more economic benefits to their masters by giving birth to more slaves. Still, the fertility rate of blacks has steadily declined over time (11). Racism in its various aspects, such as structural racism, interpersonal racism, and racism in midwifery, perpetuates health disparities. More employment of women in providing services without

controlling racist beliefs and cultures, disproportionate distribution of forces in urban and rural areas, and racial incompatibility of the workforce providing health services with residents of areas, especially rural areas, are among the reasons for not reducing health inequalities (36). The issue of minorities can also be considered from other perspectives in some countries, as membership in certain groups or tribes or belief in a particular religion can lead to the unjustified superiority of one group over others and exacerbate health inequalities (29). Cultural and belief differences must be taken into account.

Another important component that affects childbearing rates is the economic determinant, which can have an impact at the micro and macro levels. Factors such as maternity costs and related services should also be considered; as the average cost of these services increases, families desire to have more children, and childbearing decreases (37). Inadequate access to healthcare facilities due to long distances from the place of residence to health service providers is another important reason for reduced access and, consequently, reduced reproductive health (17). Some areas experience lower access to health services, leading to increased inequality and reduced reproductive health (17). Road problems, lack of transportation facilities, and lack of security, despite the lack of significant distance from service centers, are also important barriers to accessing health services and lead to increased inequality and reduced reproductive health in some areas (17, 36).

In addition to all of the above, non-health sector factors play a crucial role in reducing inequality in reproductive health. Policies developed to govern the country must be reviewed and adjusted for their effects on population health conditions. "Health in All Policies" is a critical issue that is a main pillar of community health promotion interventions. Local policymakers must address inequalities in health in their region by developing innovative and localized policies (38).

5.3. *Limitations in the Study*

1. The scope of this study was restricted to articles published between 2010 and 2019 due to the extensive volume of data available.
2. Articles that were written in languages other than English or Persian were excluded from the review.
3. A few extracted articles could not be accessed in their entirety or abstract form and, therefore, were excluded from the study.

5.4. *Study Strengths*

This study has a distinctive approach in which all facets of women's reproductive health and childbearing, along

with the social determinants that influence them, were comprehensively examined.

Authors' contributions: All authors contributed equally to all stages of the study.

5.5. Conclusions

To promote women's reproductive health and childbearing, it is necessary to consider the social determinants that indirectly and significantly impact their health, as with other health aspects. Various studies worldwide have identified the most important social determinants that affect reproductive health and childbearing, including racial-ethnic-national discrimination (in the case of immigrants, racial and religious minorities), micro- and macro-economic factors (household welfare index, average family income, national income level, costs of living and education, costs of reproductive and obstetric health services), socio-cultural determinants (level of education, employment, socio-economic-cultural class of the family, socio-cultural norms such as the ideal number of children in the family, child sex preference, common age for marriage and sex, and marital status), and socio-geographical factors (country, province and region of residence, and urban status).

In the formulation of health-oriented policies across the country, special attention should be given to these determinants.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

Authors' Contribution: M. B. A. conceived and designed the study and drafted the manuscript. H. S. participated in designing the evaluation, performed parts of the statistical analysis, and helped to draft the manuscript. S. S. L. re-evaluated the data, revised the manuscript, performed the statistical analysis, and revised the manuscript. S. S. collected the clinical data, interpreted them, and revised the manuscript. R. Gh. re-analyzed the statistical data and revised the manuscript. A.N. conceived and designed the evaluation, drafted the manuscript, re-analyzed the statistical data, and revised the manuscript. All authors read and approved the final manuscript.

Conflict of Interests: There are no conflicts of interest in the present research.

Data Availability: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval: IUMS Vice Chancellor approved the study for the Research and Ethics Committee. (Ethics code: IR.IUMS.REC 1396.30834).

Funding/Support: This study received no funding.

References

1. Rezaee N, Salar A, Ghaljaei F, Seyedfatem N, Rezaei N. Understanding the contextual factors affecting women's health in sistán and baluchestan province in Iran: A qualitative study. *Int J Community Based Nurs Midwifery*. 2017;5(4):317-28. [PubMed ID: 29043278]. [PubMed Central ID: PMC5635552].
2. Artiga S, Hinton E. Beyond health care: The role of social determinants in promoting health and health equity. *Kaiser Fam Fndn*. 2019;10:1-13.
3. WHO. *Social determinants of health*. 2022. Available from: <https://www.who.int/health-topics/social-determinants-of-health#tab=tab.1>.
4. Baheiraei A, Bakouei F, Mohammadi E, Montazeri A, Hosseni M. The social determinants of health in association with women's health status of reproductive age: A population-based study. *Iran J Public Health*. 2015;44(1):119-29. [PubMed ID: 26060783]. [PubMed Central ID: PMC4449998].
5. Starrs AM, Ezeh AC, Barker G, Basu A, Bertrand JT, Blum R, et al. Accelerate progress-sexual and reproductive health and rights for all: report of the Guttmacher-Lancet Commission. *Lancet*. 2018;391(10140):2642-92. [PubMed ID: 29753597]. [https://doi.org/10.1016/S0140-6736\(18\)30293-9](https://doi.org/10.1016/S0140-6736(18)30293-9).
6. Downey MM, Gomez AM. Structural competency and reproductive health. *AMA J Ethics*. 2018;20(3):211-23. [PubMed ID: 29542432]. <https://doi.org/10.1001/journalofethics.2018.20.3.pearl-1803>.
7. Committee on Health Care for Underserved W. Acog committee opinion no. 729: Importance of social determinants of health and cultural awareness in the delivery of reproductive health care. *Obstet Gynecol*. 2018;131(1):e43-8. [PubMed ID: 29266079]. <https://doi.org/10.1097/AOG.00000000000002459>.
8. Ravindra Sarwade R, Hankare J, Chavan T. Issues of reproductive health after child marriage: A study among NT-DNT community in Nashik district of Maharashtra. *Panacea J Med Sci*. 2020;9(3):117-22. <https://doi.org/10.18231/j.pjms.2019.025>.
9. Rao TS, Gopalakrishnan R, Kuruvilla A, Jacob KS. Social determinants of sexual health. *Indian J Psychiatry*. 2012;54(2):105-7. [PubMed ID: 22988315]. [PubMed Central ID: PMC3440902]. <https://doi.org/10.4103/0019-5545.99527>.
10. Bongaarts J. Modeling the fertility impact of the proximate determinants: Time for a tune-up. *Demographic Res*. 2015;33:535-60. <https://doi.org/10.4054/DemRes.2015.33.19>.
11. Asamoah BO, Agardh A, Pettersson KO, Ostergren PO. Magnitude and trends of inequalities in antenatal care and delivery under skilled care among different socio-demographic groups in Ghana from 1988 - 2008. *BMC Pregnancy Childbirth*. 2014;14:295. [PubMed ID: 25169877]. [PubMed Central ID: PMC4155087]. <https://doi.org/10.1186/1471-2393-14-295>.
12. Ariho P, Kabagenyi A, Nzabona A. Determinants of change in fertility pattern among women in Uganda during the period 2006-2011. *Fertil Res Pract*. 2018;4:4. [PubMed ID: 29983990]. [PubMed Central ID: PMC6020355]. <https://doi.org/10.1186/s40738-018-0049-1>.
13. Penman-Aguilar A, Carter M, Snead MC, Kourtis AP. Socioeconomic disadvantage as a social determinant of teen childbearing in the U.S. *Public Health Rep*. 2013;128 Suppl 1(Suppl 1):5-22.

- [PubMed ID: 23450881]. [PubMed Central ID: PMC3562742]. <https://doi.org/10.1177/00333549131282S102>.
14. Zewdie T, Azale T, Shimeka A, Lakew AM. Self-medication during pregnancy and associated factors among pregnant women in Goba town, southeast Ethiopia: a community based cross sectional study. *BMC Res Notes*. 2018;**11**(1):713. [PubMed ID: 30305180]. [PubMed Central ID: PMC6180449]. <https://doi.org/10.1186/s13104-018-3821-8>.
 15. Ayele BG, Gebregzabher TG, Hailu TT, Assefa BA. Determinants of teenage pregnancy in Degua Tembien District, Tigray, Northern Ethiopia: A community-based case-control study. *PLoS One*. 2018;**13**(7). e0200898. [PubMed ID: 30044850]. [PubMed Central ID: PMC6059451]. <https://doi.org/10.1371/journal.pone.0200898>.
 16. Akerman E, Ostergren PO, Essen B, Fernbrant C, Westerling R. Knowledge and utilization of sexual and reproductive healthcare services among Thai immigrant women in Sweden. *BMC Int Health Hum Rights*. 2016;**16**(1):25. [PubMed ID: 27724904]. [PubMed Central ID: PMC5057435]. <https://doi.org/10.1186/s12914-016-0100-4>.
 17. Gonié A, Wudneh A, Nigatu D, Dendir Z. Determinants of family planning use among married women in bale eco-region, Southeast Ethiopia: a community based study. *BMC Womens Health*. 2018;**18**(1):50. [PubMed ID: 29530036]. [PubMed Central ID: PMC5848576]. <https://doi.org/10.1186/s12905-018-0539-7>.
 18. Prather C, Fuller TR, Jeffries W, Marshall KJ, Howell AV, Belyue-Umole A, et al. Racism, african american women, and their sexual and reproductive health: A review of historical and contemporary evidence and implications for health equity. *Health Equity*. 2018;**2**(1):249–59. [PubMed ID: 30283874]. [PubMed Central ID: PMC6167003]. <https://doi.org/10.1089/heap.2017.0045>.
 19. Vu LT, Oh J, Bui QT, Le AT. Use of modern contraceptives among married women in Vietnam: a multilevel analysis using the Multiple Indicator Cluster Survey (2011) and the Vietnam Population and Housing Census (2009). *Glob Health Action*. 2016;**9**:29574. [PubMed ID: 26950565]. [PubMed Central ID: PMC4780115]. <https://doi.org/10.3402/gha.v9.29574>.
 20. Correia S, Rodrigues T, Barros H. Socioeconomic variations in female fertility impairment: a study in a cohort of Portuguese mothers. *BMJ Open*. 2014;**4**(1). e003985. [PubMed ID: 24384900]. [PubMed Central ID: PMC3902378]. <https://doi.org/10.1136/bmjopen-2013-003985>.
 21. Coutinho RZ, Golgher AB. Modelling the proximate determinants of fertility for Brazil: the advent of competing preferences. *Revista Brasileira de Estudos de População*. 2018;**35**(1):1–28. <https://doi.org/10.20947/S0102-3098a0041>.
 22. Bobo FT, Yesuf EA, Woldie M. Inequities in utilization of reproductive and maternal health services in Ethiopia. *Int J Equity Health*. 2017;**16**(1):105. [PubMed ID: 28629358]. [PubMed Central ID: PMC5477250]. <https://doi.org/10.1186/s12939-017-0602-2>.
 23. Bhandari R, Pokhrel KN, Gabrielle N, Amatya A. Long acting reversible contraception use and associated factors among married women of reproductive age in Nepal. *PLoS One*. 2019;**14**(3). e0214590. [PubMed ID: 30921403]. [PubMed Central ID: PMC6438478]. <https://doi.org/10.1371/journal.pone.0214590>.
 24. Dickson KS, Adde KS, Ahinkorah BO. Socio - economic determinants of abortion among women in Mozambique and Ghana: evidence from demographic and health survey. *Arch Public Health*. 2018;**76**:37. [PubMed ID: 30034803]. [PubMed Central ID: PMC6052577]. <https://doi.org/10.1186/s13690-018-0286-0>.
 25. Mutumba M, Wekesa E, Stephenson R. Community influences on modern contraceptive use among young women in low and middle-income countries: a cross-sectional multi-country analysis. *BMC Public Health*. 2018;**18**(1):430. [PubMed ID: 29609567]. [PubMed Central ID: PMC5879615]. <https://doi.org/10.1186/s12889-018-5331-y>.
 26. Llorente-Marron M, Diaz-Fernandez M, Mendez-Rodriguez P. Contextual determinants of induced abortion: a panel analysis. *Rev Saude Publica*. 2016;**50**:8. [PubMed ID: 27007684]. [PubMed Central ID: PMC4794768]. <https://doi.org/10.1590/S1518-8787.2016050005917>.
 27. Atake EH, Gnakou Ali P. Women's empowerment and fertility preferences in high fertility countries in Sub-Saharan Africa. *BMC Womens Health*. 2019;**19**(1):54. [PubMed ID: 30953494]. [PubMed Central ID: PMC6451210]. <https://doi.org/10.1186/s12905-019-0747-9>.
 28. Moeeni M, Pourreza A, Torabi F, Heydari H, Mahmoudi M. Analysis of economic determinants of fertility in Iran: a multilevel approach. *Int J Health Policy Manag*. 2014;**3**(3):135–44. [PubMed ID: 25197678]. [PubMed Central ID: PMC4154551]. <https://doi.org/10.15171/ijhpm.2014.78>.
 29. Darteh EKM, Dickson KS, Doku DT. Women's reproductive health decision-making: A multi-country analysis of demographic and health surveys in sub-Saharan Africa. *PLoS One*. 2019;**14**(1). e0209985. [PubMed ID: 30625212]. [PubMed Central ID: PMC6326492]. <https://doi.org/10.1371/journal.pone.0209985>.
 30. Yogi A, K CP, Neupane S. Prevalence and factors associated with abortion and unsafe abortion in Nepal: a nationwide cross-sectional study. *BMC Pregnancy Childbirth*. 2018;**18**(1):376. [PubMed ID: 30223798]. [PubMed Central ID: PMC6142400]. <https://doi.org/10.1186/s12884-018-2011-y>.
 31. Hassan SU, Siddiqui S, Mahmood A. Achieving fertility control through woman's autonomy and access to maternal healthcare: Are we on track? In-depth analysis of PDHS-2012-13. *Pak J Med Sci*. 2015;**31**(6):1355–60. [PubMed ID: 26870096]. [PubMed Central ID: PMC4744281]. <https://doi.org/10.12669/pjms.316.8354>.
 32. Sanneving L, Trygg N, Saxena D, Mavalankar D, Thomsen S. Inequity in India: the case of maternal and reproductive health. *Glob Health Action*. 2013;**6**:19145. [PubMed ID: 23561028]. [PubMed Central ID: PMC3617912]. <https://doi.org/10.3402/gha.v6i0.19145>.
 33. Goldberg RE. Understanding generational differences in early fertility: Proximate and social determinants. *J Marriage Fam*. 2018;**80**(5):1225–43. [PubMed ID: 30455507]. [PubMed Central ID: PMC6238967]. <https://doi.org/10.1111/jomf.12506>.
 34. Mekonnen T, Dune T, Perz J, Ogbo FA. Trends and determinants of antenatal care service use in ethiopia between 2000 and 2016. *Int J Environ Res Public Health*. 2019;**16**(5). [PubMed ID: 30832268]. [PubMed Central ID: PMC6427722]. <https://doi.org/10.3390/ijerph16050748>.
 35. Asamoah BO, Agardh A, Ostergren PO. Inequality in fertility rate and modern contraceptive use among Ghanaian women from 1988-2008. *Int J Equity Health*. 2013;**12**:37. [PubMed ID: 23718745]. [PubMed Central ID: PMC3668986]. <https://doi.org/10.1186/1475-9276-12-37>.
 36. Bawadi H, Al-Hamdan Z, Ahmad MM. Needs of migrant Arab muslim childbearing women in the united kingdom. *J Transcult Nurs*. 2020;**31**(6):591–7. [PubMed ID: 32406807]. <https://doi.org/10.1177/1043659620921219>.
 37. Acharya Y, Hillemeier MM, Sznajder KK, Kjerulff KH. Out-of-pocket medical bills from first childbirth and subsequent childbearing. *Womens Health Issues*. 2021;**31**(1):17–23. [PubMed ID: 32896469]. [PubMed Central ID: PMC7770019]. <https://doi.org/10.1016/j.whi.2020.07.007>.
 38. WHO. Health in all policies (HiAP) framework for country action. *Health Promot Int*. 2014;**29**(suppl 1):19–28. <https://doi.org/10.1093/heapro/dau035>.

Table 2. Social Determinants and How They Affect Fertility (Fertility Subgroup)

Reproductive Health Components	Main Social Determinant with Significant Effect	Subgroup Determinants	How to Affect	Code
Premature marriage or sexual activity (reduction of reproductive health level)	Family environment	Family support	Risk reduction (protective effect)	(2)
		Better monitoring by parents	Risk reduction (protective)	
		To use the mother tongue at home	Risk reduction (protective)	
		Better adherence to school	Risk reduction (protective)	
		Living with both biological parents	Risk reduction (protective)	
		Higher level of education	Risk reduction (protective)	
		Separation from family due to immigration laws	Increased risk	
		High-risk behaviors in other family members	Increased risk	
		Family cohesion	Risk reduction (protective)	
	Living	Living in a camp	Risk reduction (protective)	
	The high density of poverty in the neighborhood	Increased risk		
Immigrants' generation	Later generations	Risk reduction (protective)		
Mother desired number of children (childbearing rate)	Women empowerment index	Higher index	Increased childbearing	(4)
	Household empowerment index	Higher index	Increased childbearing	
	level of husband education	Higher level of education	Increased childbearing	
	Family size in the Residence area	Larger size of family	Increased childbearing	
	Religion	Islam-Christianity (in Burkina Faso)	Increased childbearing	
Reproductive health in African-Americans	Racism	Sexual abuse and violence against black women for various non-economic purposes	Decreased fertility over time	(11)
		Sexual abuse of black women to increase fertility and increase the number of slaves	Decreased fertility over time	
		Persistence of poverty in generations	Decreased fertility over time	
		Lack of access to equitable healthcare facilities	Decreased fertility over time	
Changes in fertility rate and pattern in women	The age of women at the time of this study	Older at the time of study	Reduction of fertility and childbearing	(12)
	Age of onset of sexual activity	Increasing age, especially after the age of 20	Reduction of fertility and childbearing	
	Age at first marriage	Older age at first marriage	Reduction of fertility and childbearing	
	Level of Education	Higher level of education	Reduction of fertility and childbearing	
	The ideal number of children from the perspective of women	More ideal numbers	Reduction of fertility and childbearing	
	The rate of receiving family planning messages from social media	Higher receiving messages and family planning training	Reduction of fertility and childbearing	
	Residence	Living in urban areas	Reduction of fertility and childbearing	
	Household welfare index	Higher welfare index	Reduction of fertility and childbearing	
	The rate of use of contraceptive methods	Increasing the use of contraceptive methods during the time faster than other components	Reduction of fertility and childbearing	

Continued on next page

Table 2. Social Determinants and How They Affect Fertility (Fertility Subgroup)(Continued)

Proximate determinants of Reproductive health: TFR and DFS	Household welfare index	Higher welfare index	TFR, DFS reduction	(13)
	Couples' level of education	Higher level of education	TFR, DFS reduction	
	Residence	Living in urban areas	TFR, DFS reduction	
	Race and ethnicity	Black race	TFR, DFS reduction over time	
Fertility impairment	Level of education in women	Higher level of education	Higher rate of impairment (fertility reduction)	(14)
Fertility and childbearing rate	Macro and microeconomic determinants	Higher overall household expenditure	Reduction of childbearing	(15)
		The higher per capita cost of education	Reduction of childbearing	
		Higher average level of house rent in the region	Reduction of childbearing	
		Decimal of household income	No significant effect	
	Other determinants	Higher level of wife's education	Reduction of childbearing	
		Higher average size of family in the residential area(province)	Increasing of childbearing	
		Having one or more living son in the family	Reduction of childbearing	
		Higher Sunni population in the region	Increasing of childbearing	
		Higher rate of polygamy in the region	Increasing of childbearing	

^z Abbreviations: TFR, total fertility rate; DFS, desired family size.

Table 3. Social Determinants and How They Affect Fertility (Family Planning Subgroup)

Reproductive Health Components	Main Social Determinant with Significant Effect	Subgroup Determinants	How to Affect	Code
Induced abortion or pregnancy termination rate	Religion	Buddhist	Abortion, childbearing	(1)
	Higher level of education	Higher than high school, etc.	Abortion, childbearing	
	Find out more about legal abortion cases.		Abortion, childbearing	
	Knowledge of safe and hygienic abortion sites	Higher knowledge	Abortion, childbearing	
	Age	Women aged 25 - 34	Abortion, childbearing	
	Household wealth	Highest quintile	Abortion, childbearing	
Lowest quintile		Abortion, childbearing		
Induced abortion or pregnancy termination rate	National income level	Higher national income level	Abortion, childbearing	(16)
	The existence of detailed monitoring and inspections in public health system		Abortion, childbearing	
	The rate of employment of women in society	Higher rate of women's employment	Abortion, childbearing	
	Residence	Living in an urban area	Abortion, childbearing	
	Indigenous or immigrant population	Immigrants	Abortion, childbearing	
	The extent of access to Health services	Higher access to Health services	Abortion, childbearing	
	Age at pregnancy	Age lower than 20	Abortion, childbearing	
The existence of approved and guaranteed laws about abortion		Abortion, childbearing		
Induced abortion or pregnancy termination rate	Women's education level	primary and higher level of education	Abortion	(17)
	Age during pregnancy	Older age	Abortion	
	Employment status of women	Working women	Abortion	
	Religion	Christianity	Abortion	
	Utility of mass media	Increase the use of mass media	Abortion	
	Marital status	Married women	Abortion	
Having control over the birth rate in women (Improving reproductive health despite reduced fertility)	Women's authority in decision making	Higher authority	Improved reproductive health	(6)
	Age	Higher age	Improved reproductive health	
	Number of children in the family	Less than 2-3 children	Improved reproductive health	
	Access to maternal care services	Better access to services	Improved reproductive health	
Rate of using family planning services	Couple agreement on the decisions	Disagreement	Usage, childbearing	(7)
	Religious beliefs		Usage, childbearing	
	Fear of adverse effects of family planning processes		Usage, childbearing	
	Distance from family planning service centers	Longer distance	Usage, childbearing	
Rate of using modern contraception	The average age of marriage in the community	Higher average age	Usage, childbearing	(9)
	The average age at birth of the first child in the community	Higher average age	Usage, childbearing	

Continued on next page

Table 3. Social Determinants and How They Affect Fertility (Family Planning Subgroup) (Continued)

	The average age of onset of sexual activity in the community	Higher average age	Usage, childbearing	
	The average ideal number of children in a family in the community	Higher average	Usage, childbearing	
	The average duration of mass media use in the community	Higher average	Usage, childbearing	
	Average score of family authority in decision-making in the community	Higher average	Usage, childbearing	
	The average level of women's education in the community	Higher average	Usage, childbearing	
	The average scale of household welfare in the community	Higher average	Usage, childbearing	
	Distrust about sexual partner violence in the community	Higher level of distrust	Usage, childbearing	
Rate of using modern contraception	Residence	Living in an urban area	Usage, childbearing	(18)
	Women's education level	Higher level of education	Usage, childbearing	
	Family income level	Higher level of income	Usage, childbearing	
Rate of using modern contraception	Woman's age	Age 25-35	The highest rate of usage	(19)
	Socio-economic status of the household	Lower SES of household	Usage, childbearing	
	Socio-economic status of the province of residence	Lower SES of the province of residence	Usage, childbearing	
	Having at least one son in the family		Usage, childbearing	
	Number of children in the family	Higher Number of children (more than 2 - 3)	Usage, childbearing	
Rate of using LARCs	Woman's age	Age group under 35	Usage	(20)
	Deciding to have a child in the future		Usage	
	Number of children in the family	Less than or equal to 2 children	Usage	
	Husband's education level	Higher level of education	Usage	
	Occupational status of the husband	Low-level jobs and husband's unemployment	Usage	
	Welfare status of the family	The lowest welfare quintile	40% reduction in use rate compared with the highest quintile	

^z Abbreviation: LARCs, long-acting reversible contraceptives

Table 4. Social Determinants and how They Affect Fertility (Teen Pregnancy Subgroup)

Reproductive Health Components	Main Social Determinant with Significant Effect	Subgroup Determinants	How to Affect	Code	
Teen pregnancy and childbearing	Monthly family income	Higher monthly family income	Pregnancy and childbearing	(5)	
	Marital status	A teenage girl who is married	Pregnancy and childbearing		
	Age	Age group 18 to 19 years	The highest rate of pregnancy		
	Communicating with the family about reproductive health issues	Existence of desirable and effective communication	Pregnancy and childbearing		
	History of teen pregnancy in mother	The existence of a positive history in the mother	Pregnancy and childbearing		
Teen pregnancy and childbearing	Couple age gap	Lower gap	Pregnancy and childbearing	(3)	
	Level of women's education	Uneducated	5 times increasing in Pregnancy and childbearing		
	Level of husband's education	Higher level of education	Pregnancy and childbearing		
	Household welfare index	Lowest welfare index	The highest rate of teen Pregnancy and childbearing		
	Residence		Different rates in different areas		
	The extent of access to mass media	Higher access to mass media	Pregnancy and childbearing		
	Time of data collection in the study		Reduction of pregnancy and childbearing over time		
Teen pregnancy and childbearing	Socio-economic status	Lower socio-economic class	Pregnancy and childbearing	(21)	
	Employment status	Unemployment	Pregnancy and childbearing		
	Family income	Lower level of family income	Pregnancy and childbearing		
	Level of Education	Lower level of education	Pregnancy and childbearing		
	Deprivations in the place of residence		Pregnancy and childbearing		
	Physical disorders in the neighborhood		Pregnancy and childbearing		
	The rate of income inequality in the place of residence	Increasing inequalities	Pregnancy and childbearing		
Teen pregnancy and childbearing	Deprivation measured by the employment index		Increasing deprivation in any of the dimensions: Pregnancy and childbearing	(22)	
	The Carstairs index measures deprivation.	Excessive family density in confined spaces			
		Not having a personal car			
		Unemployment of men of the family			
		Lower social class			
	Deprivation measured by the Scottish Index of Multiple Deprivation	Family income			
		Employment status			
		Level of education			
		General health status			
		Access to services			
Housing situation					
Crime					

Table 5. Social Determinants and How They Affect Fertility (Healthcare Equity)

Reproductive Health Components	Main Social Determinant with Significant Effect	Subgroup Determinants	How to Affect	Code
Women's knowledge and utility of sexual and reproductive health services (in immigrants)	Age	46 years and older	The least utility	(8)
	Marital status	Not married	Lower utility	
	Migration time	Immigration in recent years	Higher utility	
	Cash reserves	Lack of cash reserves	Lower utility	
	Status of social capital	Lack of trust in others	Lower utility	
		Dominance of bounding relationships	Lower utility	
	Knowledge about sexual health and fertility	Lack of knowledge	Lower utility	
Women's utility of antenatal care	Urbanicity	Living in an urban area	Higher utility	(10)
	Household welfare index	Medium and high welfare index	Higher utility	
	Women's education level	High school and higher education	Higher utility	
	History of contraception before pregnancy	Positive history of contraception before pregnancy	Higher utility	
	Deciding to have more children in the future	The decision not to have more children	Higher utility	
Women's decisions about Their reproductive health: Deciding about sex, deciding on the use of condoms, decision-making index for reproductive health	Residence	Living in a rural area	Reduction in all dimensions of decision-making score	(23)
	Household welfare index	Higher welfare index	Higher scores in all dimensions of decision-making	
	Age	Ages 15 to 19	The least decision-making score	
		20 years and older	Increasing in all dimensions of decision-making score	
	wife's education level	Higher level of education	Higher scores in all dimensions of decision-making	
	Husband's education level	Higher level of education	Higher scores in all dimensions of decision-making	
	Religion	Islam	The least decision-making score	
Inequality in the use of Antenatal care: Less than 4 prenatal visits, low-skilled midwife	Residence	Living in a rural area	Higher inequality, lower utility	(24)
	Income level	Lower-income	Higher inequality, lower utility	
	Parity	Third and more	Higher inequality, lower utility	
	Level of education	Illiteracy	Higher inequality, lower utility	
Inequality in the use of reproductive health services and antenatal care	Residence	Living in a rural area (lower economic class)	Increasing inequality - reducing service use (lower level of reproductive health)	(25)
	Socio-economic status	Registered caste or tribe	Decreasing inequality - more service use (higher level of reproductive health)	
	Gender	Female	Increasing inequality - reducing service use (lower level of reproductive health)	
	Level of education	Lower level of education	Decreasing inequality - more service use (higher level of reproductive health)	
	Age	Adolescence age group (10 - 19 years)	The highest inequality (the least service use and lower level of reproductive health)	

Continued on next page

Table 5. Social Determinants and How They Affect Fertility (Healthcare Equity) (Continued)

	Religion	Islam	The highest inequality (the least service use and lower level of reproductive health)	
Inequality in the use of reproductive health services and antenatal care	Wealth index	Lower index	Increasing inequality - reducing service use (lower level of reproductive health)	(26)
	Residence	Living in a rural area	Increasing inequality - reducing service use (lower level of reproductive health)	
	Level of education	Lower level of education	Increasing inequality - reducing service use (lower level of reproductive health)	