Death of Women at Reproductive Age in Iran

Mohammad Torkashvand Moradabadi (PhD)[1], Nasrin Babaeian (PhD)[2*]

[1] PhD in Demography, Department of Demography, Faculty of Social Sciences, Yazd University, Yazd, Iran
[2] PhD in Social Work, Department of Social Work and Social Policy, Yazd University, Yazd, Iran

ARTICLE INFO	ABSTRACT
Article type: Original article	***Background & aim:*** Pregnancy complications can lead to the death of some women, most of which are safely preventable . This study aimed to determine the conditions, trends, and main causes of mortality of women of reproductive age in Iran.
Article History: Received: 03-Apr-2023 Accepted: 23-Aug-2023	***Methods:*** In this secondary data analysis, the data on death were extracted in terms of age, sex, and cause of death at the provincial level from the annually published death records registered by the Civil Registration and Vital Statistics system of Iran. The conditions and trends of women's mortality were analyzed from 2006 to 2020 using SPSS 16 software.
Key words: Women Death Maternal Mortality Iran	***Results:*** The death rate of women in Iran reached a very low level in 2020 with 5 deaths of 1000 women and 1 death in 1000 women at reproductive age. The death rate was higher in rural areas. Six primary causes accounted for 70% of deaths, while 10% were indeterminate at reproductive age. Deaths caused by infectious and parasitic diseases increased among women, particularly women aged 15 to 19. Provinces with lower levels of development had higher women mortality, particularly deaths caused by external causes of death and infectious diseases.
	Conclusion: Despite the decrease in women's mortality in the country, the differences in deaths at provincial levels are still significant. The high rate of deaths caused by accidents and infectious diseases and its relationship with economic and social variables shows that it is still possible to improve the health index for women by promoting social policies in less developed areas.

Introduction

In any society, women, especially mothers, play an important role in maintaining the health of the family, and the health status of the mother affects the health status of other family members, and the death of the mother causes irreparable damage to the family and society(1).The slogan "healthy women, healthy society" shows well the role of women in maintaining the health of society (2). Thus, Women's mortality is a significant index of the health of a society that determines the level of development of a country (3-5). Women's mortality, as one of the most important threats to human life, has long left many damages. The death of women means the death and disability of the family and society and endangers public health (6-7). Maternal mortality as a development index has received special attention in most global policies.

The promotion of women's health is among the global goals in the third millennium (8-9). In Millennium Development Goal 5, the improvement of maternal health was emphasized. According to the Sustainable Development Goals, a two-thirds reduction in maternal mortality is expected to occur from 2010 to 2030. The Healthy People 2020 program required a 34% reduction in maternal mortality between 2018 and 2020 (10).

Most research indicates that women's mortality is the death caused by pregnancy or childbirth

* *Corresponding author:* Nasrin Babaeian, PhD in Social Work, Department of Social Work and Social Policy, Yazd University, Yazd, Iran. Tel; 0353123546; Email: babaeian.n@yazd.ac.ir

complications (11-13), however, there are other causes of such deaths, which call for further in-depth studies. Although many efforts have already been made to reduce women's mortality, and there is a strong aspiration for its reduction, the death rate is still high in underdeveloped countries. More than 85% of Women's mortality occurs in poor societies in Africa and Asia. Mother's death leaves stronger effects on vulnerable families (11). Most of the previous studies on the death of women focused on death caused by pregnancy and childbirth, under the title of maternal mortality, referring to factors such as pregnancy at very young and old ages, abortion, and unwanted pregnancy (14-15). They also indicate that 99% of deaths caused by pregnancy and childbirth have occurred in developing countries (16). Moreover, the annual rate of abortion in the world increased from 55.7 million between 2010 and 2014 to 73.3 million from 2015 to 2019 (12-13, 17). About 4.7-13.2% of maternal deaths are related to abortion, which is most common in Asia and Africa (18). In line with the epidemiological transition, however, more recent studies have underscored the role of other causes and chronic diseases such as circulatory system diseases, breast cancer, infectious diseases, and digestive diseases in the death of women (19-23). Abdollahpour et al. (2019) and Abdollahpour et al. (2020) believe that maternal morbidity and mortality need more attention in Iran, and it is necessary to identify the factors related to them (24-25).

Most of the studies conducted on maternal mortality emphasize the role of economic, social, and political factors (26). The risk of Women's mortality is higher in deprived areas. Absolute and relative differences in mortality caused by deprivation increased between 2002 and 2018 (27). The level of education, unemployment, and unsuitable social and economic status have been mentioned as potential causes of the death of women (28-30). Age, race, and ethnicity are the major spurs of the economic burden for the death of women in the United States (31). Therefore, Women's mortality represents injustice, and, undoubtedly, without improving these conditions, it will be almost impossible to reduce the death of mothers (32).

The United Nations Human Rights Association has a special view on the issue of women's death not from the perspective of the development of societies, but from the perspective of human rights (33-34). There is always a debate about how to make a reliable index for the under-recording of women's mortality and the comparability of indicators at the global level. Increased ambiguity in the rate of women's mortality has become a major global health challenge now (35-36).

Iran is one of the countries that could achieve the goal of maternal health by designing effective programs and measures before 2012 and reducing the maternal death rate from 121 cases (per hundred thousand live births) in 1991 to 21 cases (per 100,000 live births) in 2012 (37). Despite the decrease in the rate of mortality in women, there are still differences in maternal mortality in terms of age, geographical location, and cause of death. Detecting these differences and identifying the target groups can help policymakers improve women's health status and reduce regional inequalities. However, few studies have been conducted on maternal mortality. This study is an attempt to determine the conditions, trends, and main causes of mortality of women of reproductive age in Iran.

Materials and Methods

The research method is the secondary analysis of the data obtained from the National Organization for Civil Registration of Iran. The data on population was adopted from the censuses in 2006, 2011, and 2016, and the data on death was taken from the annually published death records in terms of age and sex in 2006 to 2020 registered by the Civil Registration and Vital Statistics (CRVS) system. The data is published in statistical yearbook by the Civil Registration Organization of Iran including all deaths of women by cause at reproductive age. First, the data were classified according to the International Classification of Diseases (ICD10). Then the age groups of women from 15 to 49 years were classified by five-year intervals both in terms of population and number of deaths.

The death rate was calculated by dividing the number of deaths by the population, which was used for comparison at the provincial level and different time periods. At the provincial level,

we used census data to examine the economic and social indicators such as literacy, urbanization, life expectancy, higher education, and household size were analyzed using census data. Other indicators of development included gross product, human development index, and rate of medical insurance and social insurance obtained from other studies (38-40). The relationship between economic and social development variables and the death rates of women at reproductive age was achieved through Pearson's correlation coefficient. Calculations of rates and indicators were done through Excel 2016 and correlation analysis was done using SPSS 16 software.

Results

Table 1 shows the deaths of women of reproductive age in the country from 2006 to 2020.

Table 1. Number and rate of death of women in Iran over the years from 2006 to 2020 by place of residence

death rate per 1000				death				year
women aged 15 to 50		all women		women aged 15 to 49		all women		
rural	urban	rural	urban	rural	urban	rural	urban	
1.1	0.9	3.3	3.8	5855	12861	36666	89655	2006
1	0.9	3.5	4	6324	14832	37435	106937	2011
0.9	0.7	3.7	3.8	5021	12843	37866	111641	2016
1	0.9	5	5.1	5125	16588	50652	158456	2020

The crude death rate per total female population shows a very low level of mortality in Iranian women both in urban and rural areas. A death rate of about 5 deaths per total population is known as the lowest level of mortality, and values lower than that can be attributed to under-recording errors in death data. However, the results display that Women's mortality in Iran has passed the transition and is at the lowest level. The death rate of women in rural areas is lower than that in urban areas due to more under-recording of death in rural areas, the grossness of the raw death rate, and the younger population in the rural community that will lead to a lower death rate. In addition to the crude death rate, the death rate of women at reproductive age (14 to 49 years old) was calculated in 1000 of their population. The difference between urban and rural areas looked more logical and the death rate of women at reproductive age in rural areas was found to be higher than that in urban areas. As can be seen, both the crude rate of death and the rate of death of women at reproductive age, from 2006 to 2016, were at a low level, but there was an increasing trend in 2020 due to the COVID-19 pandemic.

Figure 1 shows the death rate of women at reproductive age by age and place of residence.

The trend of female death at 5-year intervals (2007-2011, 2012-2016, 2017-2021, 2022) indicates a decrease in the death of women over time from 2008 to 2021 and by age. The death rate of women increased in 2021 due to the COVID-19 pandemic, especially at the age of 30 and over. The comparison of urban and rural areas shows that in the early years, in rural areas, the death rate of women between the ages of 20 and 30 is higher than in urban areas, but it does not follow the trend of increasing death over age. The figure at the bottom shows the deaths of women aged 15 to 19. The results show a decrease in the death of women aged 15 to 19 in both urban and rural areas for the years after 2008 and a decrease in the difference between the city and the countryside. However, since 2016 and 2017, this trend changed and increased for both areas. Due to the death increase in rural areas, the difference between the urban and rural areas increased. This trend continued until the end of the period and was even intensified by the spread of the COVID-19 pandemic.

Table 2 demonstrates the seven main causes of death, which account for 90% of deaths for women aged 15 to 49.

What looks amazing at first glance is the presence of the indeterminate and ill-defined cause of death as the second cause of death for

Table 2. The seven main causes of death for women aged 15 to 49 and 15-19 years old in Iran from 2011 to2017

Age of women	Year	Circulatory system diseases	Indeterminate and ill-defined	Neoplasms	External causes of death (Unintentional)	Respiratory system diseases	Infectious and parasitic diseases	Digestive system diseases	All deaths of women 15-49 years old
15-49	2017	4086	3579	3431	3178	1555	906	598	19501
	2016	3848	3201	3185	2746	1237	813	518	17610
	2015	3837	3032	3181	2847	1215	714	441	17371
	2014	3961	3187	3083	2971	1065	626	430	17613
	2013	3891	4107	2925	2981	927	619	327	17997
	2012	3756	4660	2737	2985	1057	564	429	18741
	2011	4280	4602	2881	3207	1288	613	550	20350
	2011-2013	11927	13369	8543	9173	3272	1796	1306	57088
	2015-2017	11771	9812	9797	8771	4007	2433	1557	54482
	Percentage of changes in period 2011-2013 to 2015-2017	-1	-27	15	-4	22	35	19	-5
15-19	2016	179	300	89	317	82	63	33	1272
	2017	222	389	87	401	112	100	31	1614
	Absolute changes from 2016 to 2017	43	89	-2	84	30	37	-2	342
	Relative changes from 2016 to 2017	24	29.7	-2.2	26.5	36.6	58.7	-6.1	26.9

registering deaths in the country. The other six causes, in order of deadliest, include circulatory system diseases, neoplasms, external causes of death (unintentional), respiratory system diseases, infectious and parasitic diseases, and digestive system diseases among which infectious and parasitic diseases as the fifth deadliest cause of death in women is notable. Although the epidemiological transition has already occurred in Iran and the burden of infectious and parasitic diseases has decreased in the country, the results show that among women aged 15 to 49, such diseases still make a large contribution (about 5%) to the deaths of women of reproductive age.

There are significant differences in the number of deaths towards the end of the period from 2015 to 2017 as compared to the beginning years of the period 2011-2013. Although the death rate for women aged 15 to 49 decreased to 4.6% in this period, the
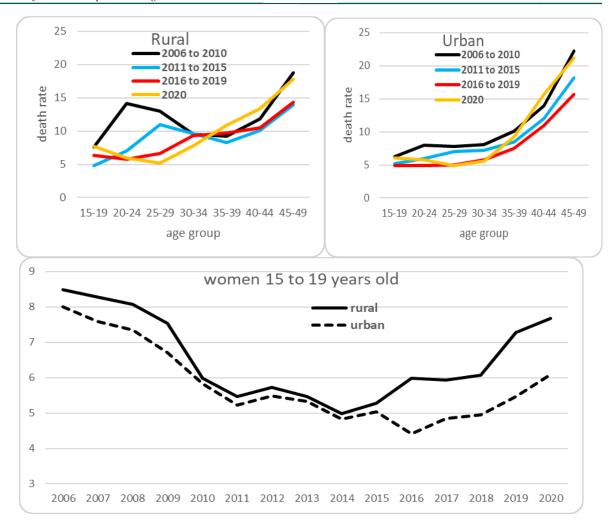
Figure 1. The death rate of women at reproductive age and women aged 15 to 19 by place of residence from 2007 to 2021

causes changed. Fortunately, the rate of death caused by indeterminate and ill-defined decreased by 26.6%. external causes of death (unintentional) and circulatory system diseases also decreased. On the contrary, the number of deaths caused by infectious and parasitic diseases increased by 35.5%, respiratory system diseases by 22.5%, digestive system diseases by 19.2%, and neoplasms by 14.7%.

Another kind of death for women that occurs at reproductive age is the death caused by pregnancy and childbirth, known as maternal mortality. the result shows the death rate for women due to this cause decreased from 1.8 to 0.6 per 100,000 women at reproductive ages from 2011 to 2017.

Figure 1 indicates that the deaths of women aged 15 to 19 increased since 2016. The bottom part of Table 2 is for women aged 15-19 and shows the difference in the burden of death due to the main cause of death of women aged 15 to 19 over the two years. In 2017, the number of deaths of women increased by 342 cases (27%). The results of death due to causes show that 89 cases were caused by indeterminate and ill-defined causes, 84 cases by external causes of death (unintentional), 43 by circulatory system diseases, and 30 and 37 cases were related to respiratory system and infectious and parasitic diseases. The highest increase in the cause of death in 2017 compared to 2016 was related to infectious and parasitic diseases with a 58%

increase, followed by respiratory system diseases.

Finally, Figure 2 displays the death rate of women aged 15 to 49 at the provincial level. The results show that in 2017, the difference in the mortality rate of women in the provinces of the country was very high.

The death rate varies greatly from 5 in Alborz province to 31.9 in Sistan and Baluchistan province. Pearson's correlation coefficient to examine the relationship between economic and social variables and the death rate of women (at the province level) as made by different causes

of death (Figure 2). The relationship between economic and social variables and the total death rate of women at reproductive age and death due to the main causes (i.e. literacy rate, higher education rate, human development index, rate of urbanisation, life expectancy, rate of medical insurance and social insurance, and gross product index) shows that the variables related to development at the provincial level have a negative relationship with the total death rate of women and the higher level of development means less death for women (Table 3).
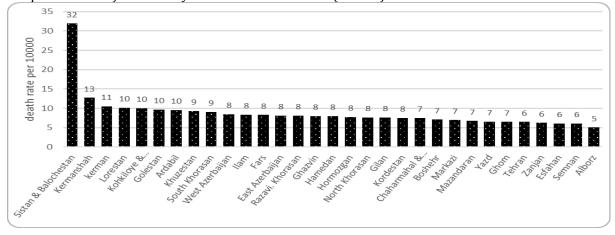

Figure 2. Death rate (per 10,000) in women aged 15 to 49 by province in 2017

The relationship between the death rate as the result of the main causes and the total death of women at reproductive age shows that the two main causes of death (circulatory system diseases and neoplasms) have a negative relationship with the total death rate of women at reproductive age. In contrast, deaths caused by infectious and parasitic diseases and external causes of death (unintentional) show a positive

relationship with the death of women. More developed provinces with a lower death rate, due to the epidemiological transition, have a higher death rate in circulatory system diseases and neoplasms, and less developed provinces with a higher death rate have a higher death rate in infectious and parasitic diseases and external causes of death (Table 3).

Table 3. Bivariate correlation between socio-economic variables and death rate of women at reproductive age (at provincial level) in terms of causes in 2016

Variable	Death rate of women aged 15 to 49 by main cause					
	All death	Circulatory system diseases	Neoplasms	External causes of death (Unintentional)	Respiratory system diseases	Infectious and parasitic diseases
Death rate of women aged 15 to 49 by main causes						
all death	1	-0.129	-0.331	.712**	-0.055	0.156
Circulatory system Diseases	-0.129	1	.444*	0.029	0.182	0.065
Neoplasms	-0.331	.444*	1	-.369*	-0.016	-0.240

Variable	Death rate of women aged 15 to 49 by main cause					
	All death	Circulatory system diseases	Neoplasms	External causes of death (Unintentional)	Respiratory system diseases	Infectious and parasitic diseases
External causes of death (Unintentional)	.712**	0.029	-.369*	1	-0.029	-0.031
Respiratory system Diseases	-0.055	0.182	-0.016	-0.029	1	.547**
Infectious and parasitic diseases	0.156	0.065	-0.240	-0.031	.547**	1
Socio-economic indicators						
Gross production	-.380*	-0.019	0.141	-0.337	0.098	0.291
Penetration rate of medical insurance	-.537**	0.175	0.243	-.556**	0.167	0.289
Social insurance penetration rate	-.422*	0.087	-0.064	-0.330	0.137	0.300
Family size	.691**	-.390*	-.588**	.711**	-0.171	-0.089
women's Urbanization ratio	-.497**	0.118	0.158	-.612**	0.324	.386*
women's Life expectancy	-.428*	0.298	.600**	-.636**	0.193	0.256
women's Literacy rate	-.901**	0.267	.451*	-.568**	-0.085	-0.273
women's Higher education rate	-.532**	0.341	.364*	-.578**	.370*	0.254
Women's Human Development Index	-.528**	0.136	0.317	-.623**	0.226	0.341

**Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)

Discussion

The purpose of this study was to determine the conditions, trends, and main causes of mortality of women at reproductive age in Iran. It is important to learn about the situation and causes of mortality of women as a strategic index of health in a society. The health of women at reproductive age is a prerequisite for achieving sustainable development and preventing the crisis of population decline and aging. Statistical reports indicate that the death rate of around 5 deaths per total population is the lowest level of mortality, but values lower than that can be attributed to under-registration errors in the death data (41). A closer examination of death records in Iran can indicate under-recording of death, especially for women (42-44). However, the results show that Women's mortality in Iran has passed the transition period and is now at the lowest level. The death rate of women in rural areas shows to be lower than that in urban areas mostly due to

more under-recording of deaths in the rural areas and the grossness of the crude death rate as well as the younger population in the rural community. Failure to register women's births can also be one of the reasons for the low rate of women's deaths in rural areas (45). The data also show that although the death rate of women aged 15-19 in rural and urban areas decreased after 2006, it increased in 2015 and 2016, and was even intensified by the spread of the COVID-19 pandemic in 2020. Rural areas in developing countries result in many problems for development due to the underdeveloped health infrastructure and the inefficient capability of the government to control infection and poverty (46). Figures about the US during the pandemic show that the death rate in rural areas exceeded that of urban areas due to weak health insurance, underlying diseases, and disabilities, and women were also largely affected by these problems due to the lack of timely vaccination (47). The findings of this

study show that the seven main causes (circulatory system diseases, unspecified, neoplasms, external causes of death (unintentional), respiratory system diseases, infectious and parasitic diseases, and digestive system diseases) are the causes of the death of women aged 15-49 in Iran. What was remarkable is that 20% of the unspecified cause for the death of women at reproductive age is due to death registration error in the country, but the other 80% of it should be taken into statistical and research consideration by policymakers and researchers. Under-registration and misregistration of women's deaths can be attributed to out-of-hospital deaths, unregistered cemeteries, and women's lack of ownership of assets, and thus no need for the inheritance monopoly certificate (42). Nurses' carelessness in accurately recording death codes, deaths caused by unrecognized anemia, and unreported violent deaths are other examples of misregistration of women's causes of death (48). Although Iran has experienced the epidemiological transition and the decrease in the burden of infectious/parasitic diseases, the results show that among women aged 15 to 49, such diseases still cause a high number of deaths (about 5%) of women of reproductive age. Despite the 4.6% decrease in the death of all women aged 15 to 49 in this period, the changes in the causes are different. Fortunately, the burden of unspecified causes has decreased by 26.6%, and external causes of death (unintentional) and circulatory system diseases have also decreased. In contrast, death due to infectious/parasitic diseases increased by 35.5%, respiratory system diseases by 22.5%, digestive system diseases by 19.2%, and neoplasms by 14.7%. Other causes of death that are on the decrease in Iran are pregnancy, childbirth, and post-natal care. Although the death rate of women aged 15-19 has increased since 2016 in all the causes of death, infectious/parasitic and respiratory diseases have a significant contribution to the death of women aged 15-19. This result is in line with those obtained by (22). Abdollahpour et al.(2019) believe that maternal care needs more attention in Iran and it is necessary to identify the factors related to maternal morbidity and implement suitable strategies to reduce the risk factors of maternal care (24).

The results of this study show that there are very high differences in women's death rates at the provincial level. Variables related to development have a significant relationship with the death rate of women at reproductive age, and provinces with a higher level of economic and social development show a lower death rate for women. It should be noted that deaths related to chronic diseases occur more in developed provinces and deaths due to accidents and infectious/parasitic diseases are less in these provinces. There are many influential economic, social, and cultural reasons for the high death rate of women in the deprived areas, especially in Sistan and Baluchistan province, and its significant difference with other provinces to be addressed in future studies. The improvement of management and sustainable development depends on the health status of women at reproductive age and the reduction of their mortality. The relationship between economic and social variables such as urbanization, the level of literacy, and the penetration of insurance shows that it is still possible to improve women's health by providing insurance services and increasing women's awareness about care. Moreover, it is important to achieve health goals such as wide fair access to quality medical services in all provinces of the country, as part of the sixth development plan of the Ministry of Health, Treatment and Medical Development. There is a need to conduct separate studies on women's health care, health status, and women's access to health care services in less developed provinces such as Sistan and Baluchistan, Kermanshah, Lorestan, Kerman and Kohgiluyeh, and Boyer Ahmad. In this way, the target groups of women who need to provide health services are identified and women's access to health services should be improved by removing the restrictions they meet. This study also had some research limitations common in the secondary analysis method and use of available data including the death registration error that required us to take caution for the analysis and the comparison of provinces.

Conclusion

Despite the decrease in mortality, there are still differences in the mortality rate of women in terms of poverty, age, geographical location, existing inequalities, and causes of death. Identifying these differences can help policy makers and public health managers to improve the health status of women, reduce provincial inequalities and recognize the target groups for policy making. Death caused by infectious/parasitic diseases is still significant among women, especially in the less developed provinces of the country. Accidents, which can be largely prevented through making proper social policies, are the main cause of death of women at reproductive age in the less developed provinces of the country.

Declerations

Acknowledgments

Conflicts of interest

The authors declared no conflicts of interest.

Ethical considerations

The data utilized in our calculations is sourced from the statistical yearbooks of the Civil Registration Organization and has been used without any alterations

Ethical approval

Ethical approval was obtained from the Research Ethics Committees of Yazd University (Ethical code: IR.YAZD.REC.1399.026)

Funding

Authors' contribution

Mohammad Torkashvand submitted the idea or concept ,designed the project, and supervised or gave consulting, and collected and processed the data; Nasreen Babaeian provided analysis and completed the literature review; Mohammad Torkashvand wrote the paper and performed the critical review; Nasreen Babaeian managed resources and fundraising; and Mohammad Torkashvand provided materials. ALL authors read and approved the final article and agreed to be accountable for all parts of the work, including investigating and resolving any accuracy or integrity issues.

References

1. Singh K, Puri S, Chopra G. Maternal mortality in India: an overview of social causes. International Journal of Scientific and Research Publications. 2018; 8 (3): 7-14.
2. Kaczor JW. State of World Population 2005: The Promise of Equality: Gender Equity, Reproductive Health and the Millennium Development Goals/State of World Population 2006: A Passage to Hope: Women and International Migration. Environmental Change and Security Program Report. United Nations Population Fund; Available from: https://www.un-ilibrary.org/content/books/9789210603942. 2006.
3. WHO. Reproductive health indicators: guidelines for their generation, interpretation and analysis for global monitoring. Geneva. World Health Organization; Available from: https://www.who.int/publications/i/item/9789241563154. 2006.
4. Joulaei H, Maharlouei N, Lankarani KB, Razzaghi A, Akbari M. Narrative review of women's health in Iran: challenges and successes. International Journal for Equity in Health. 2016; 15(25): 1-9.
5. Wakewich P, Parker BF. Mapping research on women and health in northwestern Ontario: National Network on Environments and Women's Health. Canada. Women's Health Bureau; Available from: health. nsw.gov.au/ women/Publications/wh-mapping-review. pdf . 2002.
6. Gholampoor H, Pourreza A, Heydari H. The effect of social and economic factors on maternal mortality in provinces of Iran within 2009-2013. Evidence Based Health Policy, Management and Economics. 2018; 2(2): 80-90.
7. Qiu L, Lin J, Ma Y, Wu W, Qiu L, Zhou A, et al. Improving the maternal mortality ratio in Zhejiang Province, China, 1988–2008. Midwifery. 2010; 26(5): 544-548.
8. García-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts C. WHO multi-country study on women's health and domestic violence against women. Geneva. World Health Organization; Available from: https://www.who.int/publications/i/item/9241593512. 2005.
9. Ahmadi B, Babashahy S. Women health management: policies, research, and services. Social Welfare Quarterly. 2013; 12(47): 29-59.

10. Koh HK, Blakey CR, Roper AY. Healthy People 2020: a report card on the health of the nation. Journal of American Medical Association. 2014; 311(24): 2475-2476.

11. WHO. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva. World Health Organization; Available from: https://reliefweb.int/report/world/trends-maternal-mortality-2000-2017. 2019.

12. Bearak J, Popinchalk A, Ganatra B, Moller A-B, Tunçalp Ö, Beavin C, et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. The Lancet Global Health. 2020; 8(9): e1152-e1161.

13. Ganatra B, Gerdts C, Rossier C, Johnson BR, Tunçalp Ö, Assifi A, et al. Global, regional, and subregional classification of abortions by safety, 2010–14: estimates from a Bayesian hierarchical model. The Lancet. 2017; 390(10110): 2372-2381.

14. Blanc AK, Winfrey W, Ross J. New findings for maternal mortality age patterns: aggregated results for 38 countries. PloS one. 2013; 8(4): e59864.

15. Campbell OM, Graham WJ. Strategies for reducing maternal mortality: getting on with what works. The lancet. 2006; 368(9543): 1284-1299.

16. Pouyanfar A, Bolourian M, Fazli B, Ghazanfarpour M, Sabaghian M, Shakeri F. Factors Affecting the Maternal Mortality in different Areas of Iran: A Systematic Review. Health Providers. 2022; 1(3): 131-147.

17. Awowole IO, Ijarotimi OA. Restrictive abortion laws, COVID-19, telehealth, and medication abortion in the SDG era. The Lancet Global Health. 2022; 10(1): 14-25.

18. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller A-B, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. The Lancet Global Health. 2014; 2(6): e323-e333.

19. Bozkurt B, Hill JA, Al-Khatib SM. Sixth Annual Go Red for Women Issue. Circulation. 2022; 145(7): 489-490.

20. Dilaveri C, Klassen C, Fazzio R, Ghosh K. Breast cancer screening for women at average risk. Current Breast Cancer Reports. 2019; 11(15): 123-128.

21. Garcia M, Mulvagh SL, Bairey Merz CN, Buring JE, Manson JE. Cardiovascular disease in women: clinical perspectives. Circulation Research. 2016; 118(8): 1273-1293.

22. Giaquinto AN, Sung H, Miller KD, Kramer JL, Newman LA, Minihan A, et al. Breast cancer statistics, 2022. A Cancer Journal for Clinicians. 2022; 72(6): 524-541.

23. Ward JL, Wolfe I, Viner RM. Cause-specific child and adolescent mortality in the UK and EU15+ countries. Archives of Disease in Childhood. 2020; 105(11): 1055-1060.

24. Abdollahpour S, Miri HH, Khadivzadeh T. The Maternal Near Miss Incidence Ratio with WHO Approach in Iran: A Systematic Review and Meta-Analysis. Iranian Journal of Nursing and Midwifery Research. 2019; 24(3): 159-166.

25. Abdollahpour S, Heidarian Miri H, Khademol Khamse F, Khadivzadeh T. The relationship between global gender equality with maternal and neonatal health indicators: an ecological study. The Journal of Maternal-Fetal & Neonatal Medicine. 2022; 35(6): 1093-1099.

26. Zalvand R, Yaseri M, Mosadeghrad AM, Tajvar M. Determinants of maternal mortality in Iran 1990-2015: a longitudinal study. Tehran University Medical Journal. 2019; 77(2): 82-91.

27. Singh GK. Trends and social inequalities in maternal mortality in the United States, 1969-2018. International Journal of Maternal and Child Health and AIDS. 2021; 10(1): 29.

28. Fawole A, Shah A, Fabanwo A, Adegbola O, Adewunmi A, Eniayewun A, et al. Predictors of maternal mortality in institutional deliveries in Nigeria. African Health Sciences. 2012; 12(1): 32-40.

29. Zolala F, Heidari F, Afshar N, Haghdoost AA. Exploring maternal mortality in relation to socioeconomic factors in Iran. Singapore Medical Journal. 2012; 53(10): 684.

30. Malekafzali H, Naieni KH, Rashidian A, Vazirian P, Moradi G, Mirzazadeh A, et al. Tracking the maternal mortality in economic cooperation countries; achievement and gaps toward millennium development goals. Journal of Family and Reproductive Health. 2010; 4(1): 9-14.

31. White RS, Lui B, Bryant-Huppert J, Chaturvedi R, Hoyler M, Aaronson J. Economic burden of maternal mortality in the USA, 2018–2020. Journal of Comparative Effectiveness Research. 2022; 11(13): 927-933.

32. Tajik, P., Nedjat, S., Afshar, N. E., Changizi, N., Yazdizadeh, B., Azemikhah, A., Aamrolalaei, S., & Majdzadeh, R. Inequality in maternal mortality in iran: an ecologic study. International Journal of Preventive Medicine. 2012; *3*(2): 116–121.

33. Bueno de Mesquita J, Kismödi E. Maternal mortality and human rights: landmark decision by United Nations human rights body. Bulletin of the World Health Organization. 2012; 90(2): 79-86.

34. Damadi B, Tabasinrghad N, Safizadeh M, Sbermahani M, Hasanzadeh M, Amirzadeh R. An Epidemiologic Study of Maternal Mortality in Kerman University of Medical Sciences. Journal of Health Based Research. 2019; 4(4): 361-369.

35. Fukuda-Parr S, Yamin AE, Greenstein J. The power of numbers: a critical review of millennium development goal targets for human development and human rights. Journal of Human Development and Capabilities. 2014; 15(2-3): 105-117.

36. Storeng KT, Béhague DP. Playing the numbers game: evidence-based advocacy and the technocratic narrowing of the safe motherhood initiative. Medical Anthropology Quarterly. 2014; 28(2): 260-279.

37. WHO. Trend in maternal mortality: 1990 to 2010: Geneva. World Health Organization; Available at: https:// www. unfpa.org/ sites/default/files/pub-pdf/ Trends _in_maternal_mortality_A4-1.pdf. 2012.

38. Afghah SM, Ahangari A, Askari por H. Estimating Human Development Index of Iranian Provinces and Investigating its Impact on Economic Growth Using Fuzzy Logic. Quarterly Journal of Quantitative Economics. 2020; 17(2): 89-121.

39. Sharifi S, Rezazad-Bari M, Alizadeh M, Almasi H, Amiri S. Use of whey protein isolate and gum Arabic for the co-encapsulation of probiotic Lactobacillus plantarum and phytosterols by complex coacervation: Enhanced viability of probiotic in Iranian white cheese. Food Hydrocolloids. 2021; 1 (113): 106-129.

40. Shayan H, Erfani Z, Sojasi qeidari H. Analysis of the Relationship between Early Employment and Human Development Index in Iranian Provinces. Spatial Planning. 2021; 11(4): 111-128.

41. Mikkelsen L, Moesgaard K, Hegnauer M, Lopez AD. ANACONDA: a new tool to improve mortality and cause of death data. BMC Medicine. 2020; 18(1): 1-13.

42. Hosseini H, Torkashvand-Moradabadi M, Azizi Shaker A. Estimation of death registration coverage and construction of direct life tables for iranian provinces during 2011-2016. Journal of Population Association of Iran. 2020; 15(30): 75-105.

43. Torkashvand Moradabadi M, Falah H. The Evaluation of the Death Registration Coverage in the Civil Registration Organization of Iran (Case Study of Yazd Province, 2016). Journal of Applied Sociology. 2020; 31(3): 21-34.

44. Torkashvand-Moradabadi M. Estimation of Adult Death Registration Coverage in Iran's Civil Registration System during the period 1996 to 2016: Application of the Extended Synthetic Extinct Generations Method. Journal of Population Association of Iran. 2021; 16(31): 287-313.

45. Buvinic M, Carey E. Leaving no one behind: CRVS, gender and the SDGs. Ottawa, Canada: Centre of Excellence for Civil Registration and Vital Statistics Systems, International Development Research Centre, Ottawa, ON; 2019.

46. Dutta A, Fischer HW. The local governance of COVID-19: Disease prevention and social security in rural India. World Development. 2021; 138(1): 105234.

47. Murthy BP, Sterrett N, Weller D, Zell E, Reynolds L, Toblin RL, et al. Disparities in COVID-19 vaccination coverage between urban and rural counties—United States, December 14, 2020–April 10, 2021. Morbidity and Mortality Weekly Report. 2021; 70(20): 759.

48. Donati S, Maraschini A, Lega I, D'Aloja P, Buoncristiano M, Manno V, et al. Maternal mortality in Italy: results and perspectives of record-linkage analysis. Acta Obstetricia et Gynecologica Scandinavica. 2018; 97(11): 1317-1324.