Investigating the Causes of Maternal Mortality in Abadan School of Medical Sciences During 2012 - 2017

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Abstract

Introduction and Background: : Maternal mortality is one of endangering hazards of human life and is the index of women health in society. The purpose of this study was investigating causes of maternal mortality in Abadan School of Medical Sciences during 2012 - 2017.

Material and Methods: : This is a cross sectional study that all maternal death during 2012 – 2017 were assessed by a questionnaire and information obtained from investigation files and autopsy report. data were analyzed through SPSS software and descriptive statistics reports. Chi-Square and logistic regression were employed.

Finding: the maternal mortality ratio was 27 per 100000 live births in 2012 to 2017. The most common cause of maternal mortality was bleeding. In 70% of deaths, the way of childbirth was cesarean. Fifty percent of dead mothers were illiterate or had primary study degrees and 58% were urbane residents. Seventy-two percent of this mothers lacked cares before pregnancy and in 71% of deaths, prenatal care was low.

Conclusion: Increasing support and quality of cares before pregnancy, during pregnancy and after pregnancy and optimizing the skills and knowledge of medical and midwifery staff in caring and optimal treatment of mothers will be of the most important effective actions in reducing maternal mortality.

Keywords*: Health index, maternal mortality, Pregnancy period, Postpartum*

Introduction and Background

Maternal mortality during pregnancy or during childbirth and 42 days after childbirth because of any cause except for events is assumed as maternal death caused by pregnancy and childbirth[1]. MMR[1] associated with complications of pregnancy and childbirth is one of the most important development indexes that show the developing status of each country through quantifying the number of pregnant mothers' death per 100000 live births[2-4] . In Iran, in 1975, this index has been 274 and in the latest report in 2014, it has reached to 25 per 100000 alive births[3-5]. The difference of number of maternal mortality between under-developed and developed countries is higher than the difference of any other health problem[6]. This issue testifies this message that maternal death is a fundamental problem of public health in these countries[7]. The maternal mortality ratio in Mexico has been reported 72 per 100000 live births and the most common causes of maternal death have been preeclampsia, eclampsia and then obstetric hemorrhage respectively[8]. Another study in Sudan showed that the most common causes of maternal mortality were blood disseminated infection, bleeding, embolism and malaria, respectively[9]. A great number of maternal mortalities

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happen immediately after childbirth or at the beginning of puerperium that mostly the cause is bleeding[10]. in Iran, the four main reason of maternal mortality have been reported, respectively, bleeding, hypertension, infection[11]. In Mohammadinia et al. study, the causes of maternal mortality were reported, respectively, bleeding, preeclampsia and underlying diseases[12]. Different studies in the world and Iran reported that mother's literacy level, pregnancy more than four times, living in rural areas; lack of receiving intensive cares during pregnancy and lack of accessibility to emergency obstetric services are the most important effective factors on maternal mortality[13-16]. Other studies showed that unwanted pregnancy had the main role in death of pregnant mothers and the most common causes of death were bleeding 25% and amniotic fluid embolism 17.5%[17-21]. Therefore, with regard to the importance of maternal mortality in the country's health care system and insufficient classified information in line with preventing avoidable maternal deaths, necessity of determining the spread and exact causes of maternal mortality and effective factors on it with the aim of running an intervention program is felt. So, this study is done with the purpose of determining the causes of pregnant mothers' death associated with pregnancy complications and childbirth during years 2012-2017 at the level of Abadan School of Medical Sciences.

Material and Methods

In a cross sectional study, all files related to the death of all mothers during pregnancy and 42 days after childbirth at Abadan School of Medical Sciences through census sampling were investigated. In a way that the list of all dead patients from the April 2012 till March 2017 were taken from deputy treatment and the file of each patients was received. Each file was scrutinized from the reception of patient by the first center until his or her death in that hospital or another center. In investigating each file, all points such as demographic characteristics, biography, autopsy report and proceedings of maternal mortality were collected to determine the real cause of death clearly. Collecting data done by using maternal mortality table that has been extracted from 2001 maternal mortality surveillance system has been implemented in Iran[22]. Also, by investigating autopsy report a harmony between the clinical causes of death and autopsy was determined. It should be mentioned that in this study, related policies to saving information has been fulfilled. To determine the relationship between demographic factors and maternal death χ^2 test and logistic regression were used. This article obtained from project with NO IR.IGUMS.REC.1394.96.

Finding

According to the findings of the study, the most amount of maternal mortality in Abadan School of Medical Science was occurred in 2015 (8 deaths) (Table 1). The maternal mortality ratio in this study was 27 per 100000 live births in a 5-year period between 2012 to 2017. Other finding of the study was reported in Table 2 And Figure 1 and 2. In this study, the chi-square test demonstrated significant relationship between cause of maternal mortality and underlying diseases, high risk pregnancy and having optimal pregnancy and postpartum care (P>0.001).

Table1- The Maternal Mortality rate in Abadan School of Medical Sciences in 2012-2017

Number of deaths	Number of Births	Year
3	15137	2012
3	14513	2013
5	14969	2014
8	15189	2015
4	15038	2016
23	74846	2012-2017

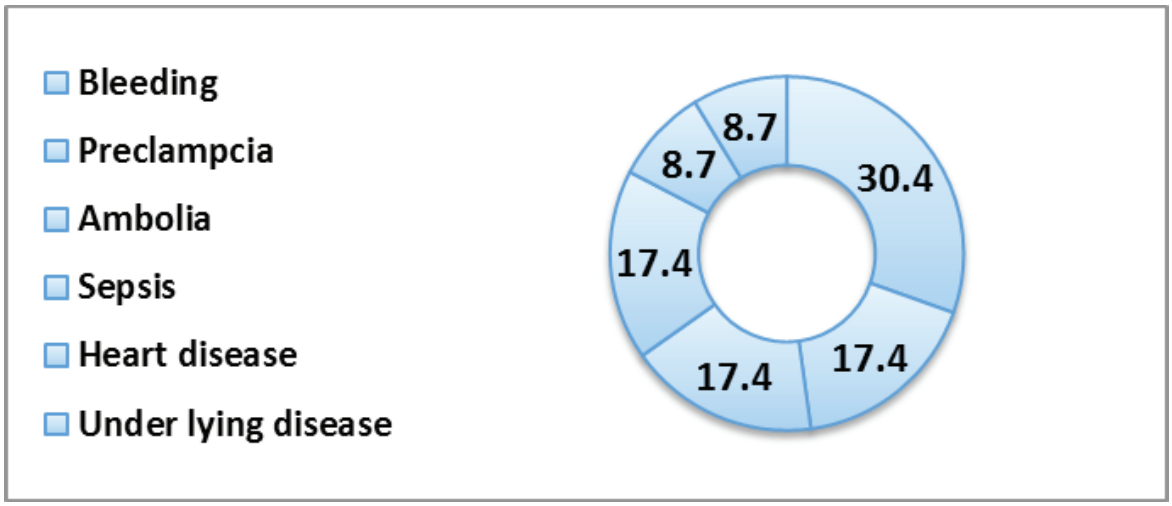

Figure1- The relative frequency of different causes of death of pregnant women in Abadan School of Medical Sciences in 2012-2017.

MMR

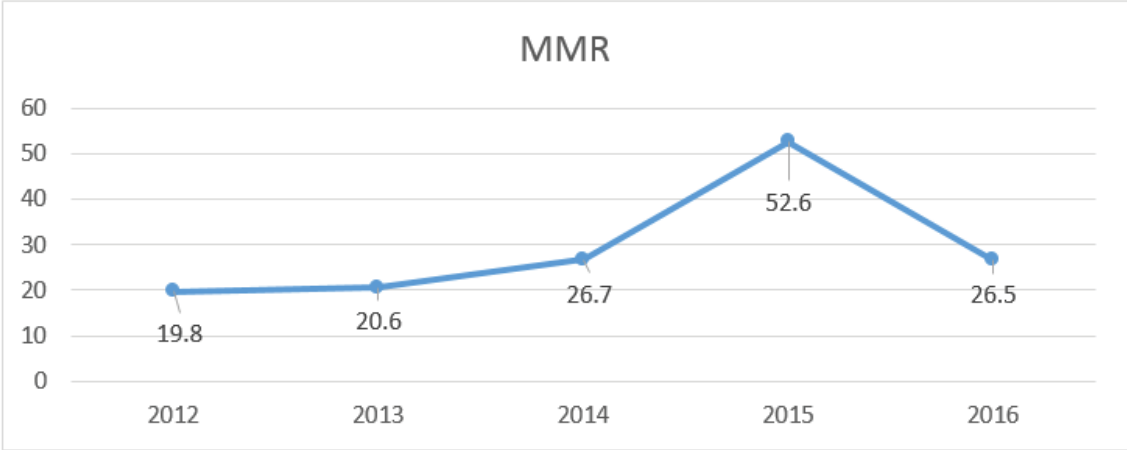

Figure2- The Maternal Mortality rate in Abadan School of Medical Sciences in 2012-2017.

Table2- The relationship between some demographic factors and maternal death

Variable		Number	Present	p- Value	EXP(B)	CI 95%
Age Of Maternal Death	>18	0	0	0. 3		
	18-35	20	86%			
	<35	3	13%			
Education	No Formal or Primary Education	11	48%	0.5		
	Secondary	12	52%			
Living Area	Rural	35	38%	.159		
	Urban	15	65%			

Cont... **Table2- The relationship between some demographic factors and maternal death**

parity	0	6	26%	0.03	2.3	(1.2,4.6)
	>4	5	22%			
Wanted Pregnancy	Yes	18	78%	0.2		
	No	5	22%			
Preconception Care	Yes	9	39%	0.2		
	No	14	60%			
Adequate Number of Pregnancy Care	Yes	15	65%	0.119		
	No	8	34%			
Having optimal pregnancy care	Yes	7	29%	0.005	0.93	(0.03,0.3)
	No	16	71%			
Having optimal Delivery care	Yes	11	48%	0.15		
	No	12	52%			
Having optimal postpartum care	Yes	11	78%	0.012	2.0	(1.0,4.0)
	No	12	52%			
Delivery mode	Vaginal	6	20%	0.148		
	Caesarean section	13	56%			
Death location	Hospital	20	90%	0. 2		
	Home/other	3	13%			
Period of Death	pregnancy	4	17%	0.08		
	<24hr of Delivery	6	26%			
	>24 hr. of Delivery	13	56%			
Having Underlying Disease	Yes	13	34%	<0.001	20.803	(6.6,65.8)
	No	10	67%			
Drug Addiction	Yes	3	13%	0.372		
	No	20	90%			
Having Risk Factors	Yes	20	87%	<0.001	4.8	(1.3,18.1)
	No	3	13%			

Generalized linear models were used to evaluate the relationship of potential factors and maternal mortality and to develop point and interval estimates of relative risk associated with these factors.

Discussion

Based on the findings of the present study, maternal mortality ratio at the level Sciences Abadan School of Medical Science in a four-year period was reported 27 per 100000 live births. The mentioned index has reported the following ratio in different provinces

of Iran, 17/2 per 100000 in ChaharMahal Bakhtiari province in a 10-yeaar period (2002-2011) (23), 53.3 in Semnan city in a 10-year period (2000-2009)[24], 57.7 in kohkiluye and Boiyer Ahmad in a 10-year period (1997-2007)[15], 82.6 in Sistan and Baloochestatn in an eight-year period[12], 39.8 in Hormozgan in a five-year period (2007-2011)[25]. However, with regard to the date of doing studies, health conditions and quality promotion of cares in recent decades has led to reduction in death all around the country. in other countries, different ratios have been reported, such as, a study was done in Jordan this ratio was 19.1[26]. 20 in South Korea in 2009 and has been reported 10 in France and 9 in Japan. According to the latest repot of the world Health Organization in 2014, in the world in general, this index was less than 16 in developed the countries and was 400 in the under-developed countries[2].

It can be mentioned that complications of pregnancy and childbirth are observable in the developed countries. But, because of more facilities and immediate treatment its ratio in these countries is lower[11].

Unfortunately, trend of death in medical Sciences University of Abadan has had an ascending trend and it has got to 8 deaths in 2016 while it was 3 in 2012 that according to the analyses, the 37.5 percent deaths are because of N1H1 flu virus. Other causes of death were similar to the past ones. This issue shows the need for vital intervention for reduction of the related index.

Therefore, bleeding and hemorrhagic shock with DIC were recognized as the most common causes of death. The most used way of childbirth was emergency cesarean (61%) and of predisposing causes of death associated with bleeding, the most common was the age between 18-35 years. Doctor and midwife's lack of knowledge and information, shortage and inappropriate use of blood and blood products, delay in recognizing bleeding by midwife, volume replacement, realization and DIC treatment, and bleeding control by operation were of the main predisposing causes of maternal mortality because of midwifery bleeding.

In studies in other provinces, the similar results have been attained. In a study by Gholami (2008) in kohkiluye and Boiyer Ahmad[20], the most common cause of maternal mortality was bleeding. Sedighani et al. (2002) in Azerbaijan Gharbi, bleeeding was 54%, hypertension was 21% and infection was 6.6%. In Mansouri (2005) in Mashhad, bleeding, Eclampsia and embolism, respectively, were mentioned[27]. With regard to the report of the office of Maternal Health Ministry in 2015, bleeding was the first cause of death and preeclampsia and eclampsia were in the next ranks.

The results of the present studies were a manifestation that a high percentage of deaths (83%) have happened Postpartum. In Mohammadi's study, most of cases of death were reported after childbirth which is in line with the result of the present study[12].

As it was mentioned, in the most cases, childbirth had been done through cesarean that in 34 percent cases, maternal underlying diseases and in 12.5 percent mothers' previous cesarean were the reason of cesarean. It should be mentioned that childbirths associated with cesarean are mostly those kind of childbirths that health of mother and embryo are at risk which are called high risk childbirth. Moreover, childbirth through cesarean surely will have repeated cesarean in follow and these repeated cesareans increase some complications such as adhesions pair, bleeding and death in the end.

According to the results of this study, 71 percent of dead mothers lacked pre-pregnancy cares. 34 percent of them had underlying diseases and a significant relationship among underlying diseases; high risk pregnancy and cause of death were observed. This issue shows the importance of improving the qualitative and quantitative cares and consulting before the pregnancy since with appropriate consulting and realizing the mother with underlying disease, the pregnancy is prevented until disappearing the disease[28].

According to the findings of this study, 50 percent of dead mothers were illiterate or with primary degrees. These findings are in line with Emami Afshar et al. work. Therefore, high rate of illiterate dead mothers in country is a manifestation of importance of the role of literacy in promotion the maternal health level[17].

The current research was contained all numbers of maternal death, which is a strentgh of this study. However, if the duration of data collection was longer, this study could be strengther, which highlights the importance of performing further studies. Finally, another limitation was lack of control over the mothers' condition because

it was a cross sectional study that limits researchers to monitor mothers condition.

Conclusion

With regarding high number of death in postpartum and bleeding period, to optimize present services including increasing services' quality related to postpartum, accessibility to blood products, accessibility to expert staff, optimized caring, balance between the clients and personnel, improving hospital instruments, being careful in recording patients biography and treating the patients, careful and complete recording of information, and necessary consulting in appropriate time can be useful in reducing maternal mortality.

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References

1. Farrokh EslamlooH, Nanbakhsh F, Heshmati F, Amirabi A. [An epidemiological research of maternal mortality in East Azerbaijan 2001-2005 (Persian)]. Urmia Medical Journal. 2006; 17(1):23-31.
2. World Health Organization. The WHO application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD-MM. World Health Organization.2012.
3. World Health Organization, & Unicef. Trends in maternal mortality: 1990 to 2013: estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division: executive summary. 2014.
4. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, Makela SM. Maternal mortality for 181 countries, 1980–2008: A systematic analysis of progress towards Millenniums Development Goal 5. Lancet. 2011; 375(9726): 1608–1623.
5. Bauserman M, Lokangaka A, Thorsten V, Tshefu A, Goudar SS, Esamai F, Bose CL. Risk factors for maternal death and trends in maternal mortality in low-and middle-income countries: a prospective longitudinal cohort analysis. Reproductive health, 2015 ;12(l 2): 5.
6. Farrokh Eslamloo H, Nanbakhsh F, Heshmati F, Amirabi A. [An epidemiological research of maternal mortality in East Azerbaijan 2001-2005 (Persian)]. Urmia Medical Journal. 2006;17 (1):23-31.
7. World Health Organization. Trends in maternal mortality in 1990 to 2008. Geneva: WHO, UNICEF, UNFPA and the World Bank; 2010.
8. Angulo Vazquez J, Cortes Sanabria L, Torres Gomez LG, Aguayo Alcaraz G, Hernandez Higareda S, Avalos Nuno J. [Analysis of maternal mortality during three periods at Hospital de Ginecologia y Obstetricia del Centro Medico Nacional de Occidente]. Ginecologia y obstetrician de Mexico. 2007; 75(7): 384-93
9. Ali AA, Okud A, Khojali A, Adam I. High incidence of obstetric complications in Kassala Hospital, Eastern Sudan. Journal of obstetrics and gynecology: The journal of the Institute of Obstetrics and Gynaecology. 2012; 32(2): 148-9.
10. Azemikhah A, Amirkhani MA, Jalilvand P, Emami Afshar N, Radpooyan L, Changizi N. National maternal mortality surveillance system in Iran. Iranian Journal of Public Health. 2009; 38(1):90-2.
11. Zolala F, Heidari F, Afshar N, Haghdoost AA. Exploring maternal mortality in relation to socioeconomic factors in Iran. Singapore Med J. 2012; 53(10):684-9.
12. Mohammadi nia N, Samiei zadeh T, Rezaei M, Rostaei F. [Prevalence and risk factors of maternal mortality in Sistan-bluchestan Province (2002-2009) (Persian)]. The Iranian Journal of Obstetrics, Gynecology and Infertility. 2013; 16(44):28-34.
13. Aghajanian A, Mehryar AH. The pace of fertilitydecline in Iran: Finding from the demographic and Health Survey. Journal of Comparative Family Studies.2007; 38(2): 255.
14. Yavangi M, Sohrabi M. Effect of Iranian ministry of health protocols on cesarean section rate: a quasi-experimental study. Journal of research in health sciences. 2012; 13(1): 48-52.
15. Gholami-Taramsari M. Ten-Year Evaluation of Maternal Mortalities in Kohgiluyeh and

BoyerahmadProvince. Knowledge & Health Journal. 2008; 3(2): 33-7.

16. Khajeian A, Anaraki A, GhaedHamoudy Z. Factors associated with maternal mortality in the province from2000 to 2007 years. Maternal and Infant Health Periodicals 2009; 11: 18.
17. Emamiafshar N, Jalilvand P, Delavar B, Radpouyan L, Azemikhah A, Valafar S. National maternal surveillance system. Iranian J Publ Health. 2009: 38(1): 90-92.
18. Abdolahpour P, Babaei M, GasemiYar M. Causesof Maternal Mortality in Pregnant Women in Urban and Rural Areas of Ilam, Iran. Health System Research. 2012: 7(6): 1278-1287.
19. Zolala F, Heidari F, Afshar N, Haghdoost AA. Exploring maternal mortality in relation to socioeconomic factors in Iran. Singapore Med J. 2012: 53(10): 684-9.
20. Zarean E, Bina R. Investigate the causes of maternal morbidity during 2006-2011 in Isfahan. J Health Syst Res 2014; Health Education supplement: 2056-2063.
21. Asamoah, B. O., Moussa, K. M., Stafström, M., & Musinguzi, G. (2011). Distribution of causes of maternal mortality among different socio-demographic groups in Ghana; a descriptive study. BMC Public Health, 11(1), 159.
22. National Maternal Mortality Surveillance System. 3th Ed (Second Revision) Ministry of Health and Medical Education Department of Health Bureau of health, family and schools Office of Maternal Health 2016
23. Mobasheri M, Khalafian P, Alidosti M, Salehifard A. Study of pregnant women's mortality in Chaharmahal va Bakhtiari province in a 10-year period (2002-2012). J Clin Nurs Midwifery. 2014; 3 (2):21-29.
24. Moradan S, Forouzesh Far M. Prevalence and causes of maternal mortality in a 10-year period in a University Hospital in Semnan. The Iranian Journal of Obstetrics, Gynecology and Infertility. 2012; 15(3): 1-6.
25. Moradi, N. Roozbeh, A. Mobarak Abadi, M. Tadris Hasani, M. Hosseinpoor, M. Rajaei et al. Prevalence and effective factors of maternal mortality in Hormozgan Province from 2007 until 2011. 3. 2015; 19 (1):59-64.
26. Amarin Z, Khader Y, Okour A, Jaddou H, Al-Qutob R. National maternal mortality ratio for Jordan, 2007-2008. Int J Gynaecol Obstet. 2010;111(2):152-6.
27. Mansuri A, Hejazi A, Badiyan Moosavi N. The causes of mortality of pregnant mothers and related factors in referred cases to legal Medical Center in Khorasan province in 1998-2004. Int J Legal Med 2005; 11(37):23(Persian)
28. Jourabchi Z. Ranjkesh F. Asefzadeh S. Sann LM. Impact of integrated maternal health care on reducing pregnancy and delivery complications in Qazvin province (2009-2011).J Qazvin Univ Med Sci . 2013; 16(4): 47-53