

# Prevalence and effective factors of maternal mortality in Hormozgan Province from 2007 until 2011

Soheila Moradi<sup>1</sup> Nasibeh Roozbeh<sup>2</sup> Arezoo Mobarak Abadi<sup>1</sup> Mehdi Tadrir Hasani<sup>3</sup> Mahmood Hosseinpoor<sup>4</sup>  
Minoo Rajaei<sup>5</sup> Abdol Hossein Madani<sup>6</sup>

BSc of Midwifery<sup>1</sup>, BSc of Public Health<sup>3</sup>, General Practitioner<sup>4</sup>, Social Factors in Health Improvement Research, Associate Professor Department of Obstetrics and Gynecology<sup>5</sup>, Associate Professor Department of Epidemiology<sup>6</sup>, Research Social Factors in Health Promotion, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. PhD Student of Reproductive Health<sup>2</sup>, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

(Received 18 May, 2013)

Accepted 5 Oct, 2013)

## Original Article

### Abstract

**Introduction:** Maternal death caused by pregnancy and childbirth complications is one of the most important indicators of development of a society, and most countries are committed to reduce its rate. The reason for choosing this index as a development profile is the impact of various social and economic factors on it. Maternal mortality in Hormozgan Province, as one of the most disadvantaged provinces of Iran according to national indicators and targets of the World Health Organization, has an undesirable situation. Therefore, this study aimed at determining the prevalence and risk factors of pregnant women mortality in the province during 2007-2011.

**Methods:** In this cross-sectional study, the data were collected from prenatal care files, hospital records, and completed standard questionnaires of the National System of Maternal Mortality Care. The causes of mothers' death were identified according to the autopsy report (in case of autopsy), comments of members of the University Committee, and final decision of the National Committee about mothers' death. Morally, all extracted information were collected and coded anonymously. The data were analyzed using SPSS through t-test.

**Results:** The rate of maternal mortality during 5 years of the study was 39.81 per hundred thousand live births; mostly occurred in the age group of 18-35 years (76.11%), with the highest number living in rural areas (85.93%). The most and less prevalent causes of maternal death were bleeding (25.37%) and infection (2.98%), respectively; 20.89% of mothers had 5 or higher pregnancies, and in 34.32% of them, two recent pregnancies were occurred in less than three years; 47.76% of the dead mothers suffered from an underlying disease from the beginning of pregnancy; 76.11% of mothers have died during and after pregnancy, and 23.89% during childbirth; and 76.11% of them had age-appropriate care during pregnancy, and the remaining had incomplete or no care (23.89%).

**Conclusion:** The results showed that the maternal mortality rate in Hormozgan Province was far from the national average. It seems that raising awareness of society regarding the warning signs of pregnancy and postpartum, increasing coverage of prenatal, pregnancy, and postnatal care, and improvement of the quality of family planning counseling can be effective in reducing maternal mortality.

**Key words:** Maternal Mortality – Bleeding - Hormozgan

Correspondence:  
Soheila Moradi, BSc.  
Health Center,  
Hormozgan University of  
Medical Sciences.  
Bandar Abbas, Iran  
Tel: +98 917 1622118  
Email:  
moradi\_1469@yahoo.com

**Citation:** Moradi S, Roozbeh Z, Mobarak Abadi A, Tadrir Hasani M, Hosseinpoor M, Rajaei M, Madani AH. Prevalence and effective factors of maternal mortality in Hormozgan Province from 2007 until 2011. *Hormozgan Medical Journal* 2015;19(1):53-58.

## Introduction:

Nowadays maternal death caused by pregnancy and childbirth complications is one of the most important indicators of development of a society and most countries are committed to reduce its rate. The reason for choosing this index as a development profile is the impact of various social and economic factors on it (1). This index is undoubtedly a function of the status of women's education, rural roads network, access to obstetrics and gynecology emergency, health care costs, telecommunication networks, household income, etc. (2). The rate and causes of maternal mortality have been differently reported in several studies. In a study by Taromsari during the ten-year period of 1997-2007 in Kohgiluyeh Boyer-Ahmad Province, the mean maternal mortality rate was 57 per hundred thousand live births, and bleeding was the most common cause of death (41%) (2). In a study by Khodai *et al.* in Khorasan Province, the major causes of maternal death were hemorrhage, preeclampsia, cardiovascular complications, disseminated intravascular coagulation, infection, postpartum infections, and complications of abortion (4).

Given that maternal mortality rate should be reduced by 75% in 2015 compared to the baseline (1990) according to the UN Millennium Development Goals, and with regard to the importance of maternal deaths due to pregnancy and childbirth complications, countries have designed and implemented good operational programs in recent years to reduce maternal mortality, to develop reproductive health services, and to maintain and improve women's health especially during pregnancy and childbirth (5). In this regard, many measures have been taken in Iran, one of which is the establishment of the National System of Maternal Mortality Care in all universities in the country. The data from this system are used to implement appropriate interventions for improving maternal death nationwide (3). Maternal mortality in Hormozgan Province, as one of the most disadvantaged provinces, has no steady trend and has an undesirable situation in comparison with national indicators and targets of the World Health Organization. Therefore, this study aimed at determining the prevalence and risk factors of

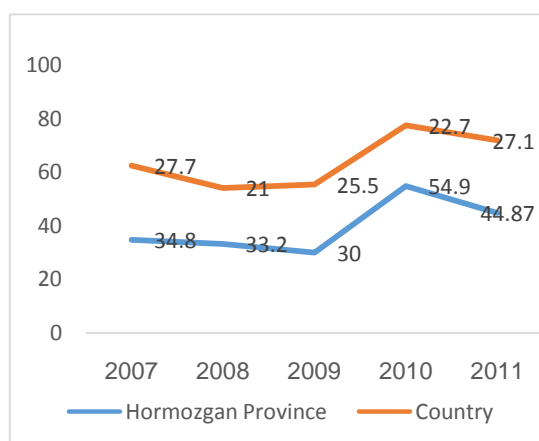
pregnant women mortality in Hormozgan Province during 2007-2011, in order to identify and prioritize factors that influence maternal mortality and to take effective steps for improvement of maternal health through designing interventions and adopting preventive measures.

## Methods:

This descriptive, cross-sectional study was carried out on 67 women living in the geographic area of Hormozgan Province, who have died due to complications of pregnancy and childbirth from 2007 to 2011 at home, on the way, and at hospital. The data were collected from prenatal care files, hospital records (in case of hospitalization), and completed standard questionnaire of the National System of Maternal Mortality Care. This questionnaire comprises four parts (demographic and socioeconomic indicators, indicators related to family planning services and access, indicators related to delay, and indicators related to pregnancy, delivery, and postpartum services). Mothers' death causes were identified according to the autopsy report (in case of autopsy), comments of members of the University Committee, and final decision of the National Committee about mothers' death. Morally, all extracted information were collected and coded anonymously. Statistics of live birth at these 5 years were obtained from the Civil Registration Office of the province. The data were analyzed using SPSS through t-test.

## Results:

Based on 67 cases of maternal deaths and 168,262 live births from 2007 to 2011 in Hormozgan Province, the mean maternal mortality rate was calculated 39.81 per hundred thousand live births with the highest in 2010 and the lowest in 2009 (Figure 1). From a total of 67 cases of reported maternal death, 76.11% and 23.89% were occurred during pregnancy and childbirth, respectively, and most of them (68.65%) were living in rural areas. The mean age of the dead mothers was 30.25 years and most of them were between 18-35 years (76.11%).



**Figure 1. Maternal Death Rates in Hormozgan Province and Iran (2007-2011)**

The most common cause of maternal mortality in this study were bleeding in 17 cases (25.37%), embolism in 10 cases (14.92%) (none had autopsy and the cause was reported by the University Committee and finally approved by the National Committee), eclampsia and preeclampsia in 7 cases (10.44%), heart disease in 5 cases (7.46%), unknown in 5 cases (7.46%) (none of them had an autopsy), infection in 2 cases (2.98%), other causes (including pulmonary edema, influenza, brain abscess, etc.) in 21 cases (31.34%).

Most of the mothers have died in the hospital (83.58%) and 82.35% of them have been delivered by a specialist and midwife; 54.90% of pregnant women had normal delivery; and 76.11%

**Table 2. Frequency of the Type of Delivery and Deliverer in Mothers Dead from Complications of Pregnancy and Childbirth in Hormozgan Province between 2007 and 2011**

	Indicator Title	Number	Percentage
Deliverer	Obstetrician and educated midwife	42	82.35
	Untrained person	9	17.65
Delivery type	Normal	28	54.90
	Cesarean section	23	45.10

## Conclusion:

In this study, the highest incidence of maternal death due to pregnancy complications in Hormozgan Province from 2007-2011 was occurred in rural areas, and this finding is consistent with that of Gholami Taromsari in Kohgiluyeh Boyer-Ahmad during 1997-2007 (2)

of mothers had age-appropriate care during pregnancy, and the remaining had incomplete or no care (23.89%).

Regarding enjoying of family planning services, 14 mothers (20.89%) had 5 or more pregnancies, and in 23 mothers (34.32%), two recent pregnancies were occurred in less than three years.

Of the pregnant women referred to hospital for specialized care, the treatment was delayed in 25% of the mothers and they eventually died. In 41.79% of cases, there were delays in decision-making by family for referring the mothers, or they were not timely referred to hospital. In this study, 32 mothers (47.76%) had an underlying disease from the beginning of pregnancy.

**Table 1. Demographic Indicators of Dead Mothers in Hormozgan Province from 2007 until 2011**

Row	Indicator Title	Number	Percentage
1	Dead mothers residing in cities	21	31.35
2	Dead mothers residing in villages	46	68.65
3	Dead mothers aged 18-35 years	51	76.11
4	Dead mothers more than 35 years	15	22.4
5	Dead mothers less than 18 years	1	1.49

and that of Arshichin in 1995 (5); a significant difference existed in these studies between rural and urban areas in terms of percentage of maternal deaths. This difference could be due to differences in socioeconomic and health status of rural and urban areas, and this indicates the need to enhance access of rural community to services such as prenatal care and delivery by trained midwives as

well as appropriate referral system near residence to deal with complications during pregnancy and childbirth.

The results showed that bleeding was the most common cause of maternal mortality in this province (25.37%). In the Taromsari's study, bleeding was also the most common cause of maternal mortality (41%) in Kohgiluyeh Boyer-Ahmad Province during 1997 to 2007 (2). There were 162 maternal deaths throughout Iran in 1997 and bleeding was its most common cause (1). Both mentioned studies confirm the results of this study. In a study conducted in Nigeria in 2012 by Olamijulo et al., the most prevalent cause of death in pregnant women were infection and underlying disease, and bleeding was in the next level; this is different with the present study (7). This difference could be due to sample size, geographic region, and available medical facilities. In the study by Abdollahpour et al. in 2011 in Ilam Province, bleeding was again the cause of death in pregnant women (3).

Obviously, access to blood products, obstetrics emergency measures, and early referral to specialized centers can affect the lives of pregnant women.

Most dead mothers were 18-35 years of age; this is consistent with the study of Golian Tehrani et al. performed in Kordestan Province in 1998-2002 (10). According to the study of Afshar and Jalilvand, the rate of maternal mortality in Iran in 18-35 years old dead mothers in 2001 was 75.5% (1). Mohammad Nia et al. reported mothers' death age range as 15-45 years in 2002-2009 in Sistan and Baluchestan (13); this is different with the present study, indicating that pregnancy occurs in younger age groups in this province due to ethnic and cultural characteristics as well as failure to comply with family planning. However, it seems that maternal death in any age group is a function of the number of pregnancies in the same age group, and high prevalence of maternal death in women aged 18-35 years indicates the high number of pregnancies in this age group.

It should be noted that the death of one mother less than 18 years old in this province is the result of reduced number of marriages at an early age, which can be a ray of hope for the future.

In this study, 20.89% of dead pregnant women had 5 or more pregnancies and in 34.32% of them, two recent pregnancies occurred in less than 3 years. In the study of Afshar and Jalilvand on maternal mortality from 2001 to 2005 in Iran, 5 or more pregnancies was seen in 25.4% and two recent pregnancies less than 3 years in 18.2% of mothers (1). According to the study of Khan et al. in Pakistan in 2006, the highest mortality occurred in women aged 29-39 years with more than 4 deliveries (11). In a study by Dior UP et al. in 2013, the odds ratio of death in women with 5 to 9 children was increased compared with mothers with 2 to 4 children; this is compatible with our study (9).

Accordingly, unintended pregnancies can be reduced by increasing access to midwifery services, decreasing overall fertility and pregnancy in high-risk ages, and increasing access to contraception, all resulting in reduction of maternal mortality.

The results showed that maternal death was associated with delayed hospital treatment in 25% of cases, and delays in the decision by family to timely refer in 41.79% of cases; both having an important role in the death of pregnant women. In the study of Abdollahpour et al. in Ilam, 57.2% of the mothers died due to delay in family decision-making to timely refer mothers to hospital and 50% due to delay in treatment (3). Regarding the decision variable, culture building and raising awareness of pregnant women and their entourage about identification of warning signs during pregnancy and during labor is of great importance, same as sensitizing hospital admissions and Emergency 115, intensifying supervision, improving the quality of monitoring health units and hospitals, and utilizing competent resources in the management (12,14).

In the present study, a significant relationship existed between the underlying maternal disease since the beginning of pregnancy and maternal death, and 47.76% of dead mothers had an underlying disease from the beginning of pregnancy which is in line with the study of Abdollahpour et al. in Ilam (3).

According to the results obtained from this research, it seems that raising awareness of society about the warning signs of pregnancy and

postpartum, increasing mothers' access to specialized services, increasing employees' knowledge and skills regarding diagnosis, treatment, and timely referral of high-risk pregnant women, as well as strengthening family planning by encouraging mothers to complete the desired number of pregnancies between the ages of 25-35 years, and using definite methods of contraception can decrease the number of pregnancy complications, and of course, can save the lives of pregnant women and maintain their health.

### Acknowledgement:

Hereby, the authors would like to give their gratitude to all collaborators working in the Health Centers of the province and cities who helped us in this study.

### References:

1. Afshar A, Jalilvand A. Report country systems's maternal mortality care. Tandis Press; 2006. [Persian]
2. Taramsari Gholami M. The causes of maternal maternity in Kohkiluyeh & Boyerahmad province in 10 years period. *Danesh & Tandorosti Journal*. 2008;3:44. [Persian]
3. Abdollahpoor P, Babaei M, Ghasemi YM. Causes of maternal mortality in pregnant women in urban and rural areas of ilam. *Reaserch of Health Systems Journal*. 2011;7:1278-1286. [Persian]
4. Khodaei J. Factors affected on maternal mortality in khorasan province from 1997 to 1999 years. *Secret of Better to Live*. 2000;9:21-23. [Persian]
5. Arshinchi M. Demographic study of maternal mortality in Iran today. (dissertation) Tehran: Tehran Branch, Azad University Central: 2005;152-154. [Persian]
6. Rai SK, Anand K, Misra P, Kant S, Upadhyay RP. Public health approach to address maternal mortality. *Indian J Public Health*. 2012;56:196-203.
7. Olamijulo JA, Olorunfemi G, Olaleye O, Ogedengbe OK, Giwa-Osagie OF. Trends in maternal mortality at the Lagos University Teaching Hospital, Lagos. *Nigeria Q J Hosp Med*. 2012;22:72-79.
8. Chapman E, Reveiz L, Chambliss A, Sangalang S, Bonfill X. Cochrane systematic reviews are useful to map research gaps for decreasing maternal mortality. *J Clin Epidemiol*. 2013;66:105-112.
9. Dior UP, Hochner H, Friedlander Y, Calderon-Margalit R, Jaffe D, Burger A, Avgil M, et al. Association between number of children and mortality of mothers: results of a 37-year follow-up study. *Ann Epidemiol*. 2013;23:13-18.
10. GolyanTehrani SH, Holakoei K, Zarei M. Survey study of effective factors on maternal mortality in Kurdistan province from 1998 to 2002. *Hayat Journal*. 2004;10:47-54. [Persian]
11. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. *Lancet*. 2006;367:1066-1074.
12. Sedghieyani M, Golmohammadlu S, Ayatollahi H, Ibrahim I, Salary Sh. Rate and causes of maternal mortality induced by direct complications of pregnancy and delivery in West Azerbaijan province in 1997-1999. *Uraemia University of Medical Sciences Journal*. 2002;13:275-282. [Persian]
13. Mohammadinia N, Samiezadeh Toosi T, Rezaei MA, Rostaei F. Investigating the Frequency and Effective Factors on Maternal Mortality in Sistan and Baluchistan Province, Iran, 2002-2009. *Zahedan University of Medical Sciences Journal*. 2013;16:28-34. [Persian]
14. Eslamloo F, Nanbakhsh F, Heshmati F, Amirabi A. Study epidemiological of maternal deaths in West Azarbaijan Province (2001-2005). *Urmia University of Medical Sciences Journal*. 2006;17:23-31. [Persian]

## بررسی فراوانی و عوامل موثر بر مرگ و میر مادران باردار در استان هرمزگان، سالهای ۹۰-۸۶

سهیلا مرادی<sup>۱</sup>، نسیمه روزبه<sup>۲</sup>، آرزو مبارک‌آبادی<sup>۱</sup>، مهدی تدریس حسنی<sup>۳</sup>، محمود حسین‌پور<sup>۴</sup>، مینو رجایی<sup>۵</sup>، عبدالحسین مدنی<sup>۶</sup>  
<sup>۱</sup> کارشناس، مامایی، <sup>۲</sup> کارشناس، بهداشت عمومی، <sup>۳</sup> پزشک عمومی، <sup>۴</sup> دانشیار، گروه زنان، <sup>۵</sup> دانشیار، گروه اپیدمیولوژی، مرکز تحقیقات عوامل اجتماعی در ارتقاء سلامت، دانشگاه علوم پزشکی هرمزگان، بندرعباس، ایران. <sup>۶</sup> دانشجوی دکترا، بهداشت باروری، دانشگاه علوم پزشکی شهیدبهشتی، تهران، ایران.

مجله پزشکی هرمزگان سال نوزدهم شماره اول ۹۴ صفحات ۵۸-۵۳

### چکیده

**مقدمه:** شاخص مرگ و میر مادر باردار در اثر عوارض بارداری و زایمان، یکی از مهم‌ترین و شاخص‌های توسعه در جامعه به حساب می‌آید و کاهش آن از تعهدات مهم کشورهای است. علت انتخاب این شاخص به عنوان نمایه توسعه، تأثیر عوامل مختلف اجتماعی و اقتصادی در کاهش یا افزایش آن است. مرگ و میر مادران در استان هرمزگان نیز به عنوان یکی از استان‌های محروم نسبت به شاخص کشوری و اهداف سازمان جهانی بهداشت از وضعیت مطلوبی برخوردار نمی‌باشد. لذا این مطالعه با هدف تعیین فراوانی و عوامل مؤثر بر مرگ مادران باردار استان هرمزگان مربوط به سال‌های ۹۰-۸۶ انجام شد.

**روش کار:** در این پژوهش مقطعی، داده‌ها بر اساس مطالعه پرونده مراقبت دوران بارداری، پرونده بیمارستانی و همچنین پرسشنامه‌های تکمیل شده استاندارد کشوری نظام مراقبت مرگ و میر مادران استخراج گردید. علت فوت مادر نیز بر اساس تأیید نهایی شامل گزارش اتوپسی (در مادران اتوپسی شده)، نظرات اعضاء کمیته دانشگاهی و تصمیم نهایی کمیته کشوری بررسی مرگ مادر تعیین شده است. از نظر اخلاقی کلیه اطلاعات استخراج شده محرمانه و بدون ذکر نام و مشخصات افرا، جمع‌آوری و کدگذاری شد. داده‌ها با استفاده از نرم‌افزار SPSS و آزمون آماری *t-test* تجزیه و تحلیل شد.

**نتایج:** میزان مرگ و میر مادران در طی پنج سال مطالعه، ۳۹/۸۱ مورد در هر صد هزار تولد زنده محاسبه گردید. بیشترین درصد متعلق به گروه سنی ۲۵-۱۸ سال (۷۶/۱۱٪) و هم چنین بیشترین آنان ساکن مناطق روستایی (۸۵/۹۳٪) بودند. بیشترین علت فوت مادران باردار، خونریزی (۲۵/۳۷٪) و کمترین آن عفونت (۲/۹۸٪) بود. ۲۰/۸۹٪ مادران فوت شده سابقه پنج بارداری و بیشتر داشتند و در ۳۴/۳۲٪ آنان فاصله دو بارداری اخیرشان کمتر از سه سال بود. ۴۷/۷۶٪ مادران فوت شده از ابتدای بارداری مبتلا به بیماری زمینه‌ای بودند. ۷۶/۱۱٪ مادران در حین و پس از زایمان و ۲۳/۸۹٪ در مقطع بارداری فوت نمودند. همچنین ۷۶/۱۱٪ مادران فوت شده متناسب با سن بارداری مراقبت شده و بقیه به صورت ناقص و یا اصلاً مراقبت نشده‌اند (۲۳/۸۹٪).

**نتیجه‌گیری:** نتایج به دست آمده از تحقیق نشان می‌دهد که میزان مرگ مادران استان هرمزگان با متوسط کشوری فاصله زیادی دارد. به نظر می‌رسد افزایش آگاهی جامعه در خصوص علائم خطر بارداری و پس از زایمان، افزایش پوشش مراقبت‌های پیش از بارداری، حین بارداری و پس از زایمان و ارتقاء کیفیت مشاوره تنظیم خانواده می‌تواند در کاهش مرگ و میر مادران باردار مؤثر باشد.

**کلیدواژه‌ها:** مرگ و میر مادران باردار - خونریزی - هرمزگان

نویسنده مسئول:  
سهیلا مرادی  
مرکز بهداشت استان دانشگاه علوم پزشکی هرمزگان  
بندرعباس - ایران  
تلفن: ۹۸۹۱۷۱۶۲۲۱۸  
پست الکترونیکی:  
S\_moradi@yahoo.com

نوع مقاله: پژوهشی

دریافت مقاله: ۹۲/۲/۲۸ اصلاح نهایی: ۹۲/۶/۱۵ پذیرش مقاله: ۹۲/۷/۱۳

ارجاع: مرادی سهیلا، روزبه نسیمه، مبارک‌آبادی آرزو، تدریس حسنی مهدی، حسین پور محمود، رجایی مینو، مدنی عبدالحسین. بررسی فراوانی و عوامل مؤثر بر مرگ و میر مادران باردار در استان هرمزگان، سالهای ۹۰-۸۶. مجله پزشکی هرمزگان ۹۴:۵۸-۵۳.