Review Article

The Maternal Near Miss Incidence Ratio with WHO Approach in Iran: A Systematic Review and Meta-Analysis

Sedigheh Abdollahpour[1], Hamid Heidarian Miri[2], Talat Khadivzadeh[3]

[1]Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran, [2]Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran, [3]Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

Background: Maternal near miss (MNM) is one of the important criteria for checking the quality of care in maternal health. This systematic review and meta-analysis study was conducted in 2017 to evaluate the incidence ratio of MNM using the World Health Organization approach in Iran. **Materials and Methods:** This study was designed based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist for systematic reviews, and Web of Science and PubMed databases were searched systematically, which, respectively, yielded 171 and 137 papers published before June 9, 2017. To include papers written in Persian by Iranian scholars, Google Scholar database was searched and 542 papers were retrieved. Finally, 12 papers which had covered the topic more appropriately were included in the study. Random-effects meta-analysis was used to pool the incidence ratio. Heterogeneity was explored using formal tests and subgroup analyses, then the study quality was also explored. **Results:** The pooling of overall potentially life-threatening conditions ratio was I2 (97.60%, $p < 0.001$, ratio = 2.50/1000 live births [LBs] [95% CI: 2.00-3.00]), which is divided into two indicators: severe complication ratio (2.40/1000 LBs) and critical intervention ratio (2.54/1000 LBs). The pooling of overall life-threatening conditions ratio was I2 (95.10%, $p < 0.001$, ratio = 0.86/1000 LBs [95% CI: 0.64-1.07]). **Conclusions:** The incidence ratio of MNM needs more attention in Iran. Therefore, it is necessary to identify the factors related to MNM and then implement suitable strategies to reduce the risk factors of the maternal morbidity and improve the quality of maternal care in facilities.

Keywords: *Life-threatening conditions, maternal near miss, severe maternal morbidity, WHO approach, Iran*

Introduction

Maternal near miss (MNM) is defined as a mother who nearly dies but survives life-threatening morbidities that happen during pregnancy, delivery, or within 6 weeks postpartum.[1,2] In addition to the maternal mortality, "near miss" or severe maternal morbidity ratio (SMMR) is an important indicator of the progress in the quality of obstetric care.[1] The two main targets for this goal are "to reduce the maternal mortality ratio (MMR) by three quarters between 1990 and 2015" and "to achieve universal access to reproductive health by 2015."[3] A sustainable development goal for 2030 is to reduce the global MMR to 70 per 100,000 births so that no country exceeds two times that ratio (140 per 100,000).[4] Systematic and regular evaluation of the quality of maternal care could have a critical role in providing the necessary standards of involved facilities[5] because the maternal mortality strongly depends on the quality of care.[5] Therefore, in countries where maternal mortality has decreased, evaluation of severe maternal morbidity is considered as the most significant indicator of maternal health.[6]

The World Health Organization (WHO) then developed a set of indicators for the assessment of the quality of care within a health care setting.[1] These indicators provide some information about the performance of hospitals so that the health system can increase mothers' access to referral hospitals which can offer the mothers high-quality care.[2] In 2009, the WHO proposed a set of criteria to recognize mothers with life-threatening conditions in the childbirth stage, which are termed as MNM cases.[2] As the nationwide implementation of the Integrated Maternal Health Care in Iran[7] may have significant

Address for correspondence:
Dr. Talat Khadivzadeh, Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
E-mail: Khadivzadeht@mums.ac.ir

Access this article online

Website: www.ijnmrjournal.net

DOI: 10.4103/ijnmr.IJNMR_165_18

Quick Response Code:

How to cite this article: Abdollahpour S, Miri HH, Khadivzadeh T. The maternal near miss incidence ratio with WHO approach in Iran: A systematic review and meta-analysis. Iranian J Nursing Midwifery Res 2019;24:159-66.

Received: October, 2018. **Accepted:** January, 2019.

impacts on this issue, it is necessary to identify MNM cases. To achieve this goal, a two-step process was followed.[1] The first step was identifying women who had potentially life-threatening conditions, and the second step was detecting life-threatening conditions/organ dysfunctions.[1]

The great number of MNM cases makes it possible for such studies to identify factors associated with the development of the psychological and physical disease incidence with great precision and power[8] and, hence, to provide recommendations for the prevention of the diseases.[9] When information about fatal and non-fatal cases is compared, factors associated with the progression from a severe disease to death can be identified and management guidelines can be proposed to help improve the outcomes[10] including the patient safety.[11]

A study of MNM morbidity in the United Kingdom suggested that 1% of the births are complicated by near-miss morbidity.[12] Even in some developed countries such as the United Kingdom, this indicates the heavy burden that the maternal morbidity can bring about. In the United Kingdom, for example, it is estimated that 8000 women experience the near-miss morbidity each year compared with only nearly 80 who die during pregnancy or postpartum.[13] In recent years, this rate has been reported between 41.10[14] and 12.80 per 1000 live births (LBs) in Brazilian studies.[15] However, this figure is higher in Asian countries, including India, and stands at 15.10/1000 LBs.[16] The gaps found in studies in Iran show that (a) very few studies, only three in fact, have directly addressed MNM. (b) Studies conducted in different regions of the country report diverse magnitudes of MNM prevalence. For example, in a study conducted in 2013 in the south of Iran, the number of mothers who experienced MNM was reported to be 25.20 per 1000 LBs,[17] while in another study conducted in Alborz Province in 2012, this figure was 4.97 per 1000 LBs.[18] Therefore, the results of these studies cannot be generalized to the whole country. (c) Different studies have used various instruments and criteria to diagnose the near-death mothers, which are often not consistent with one another.[17,18] As recent research reports conflicting results, to obtain an overall estimate of MNM based on a single criterion, this study used the WHO approach to estimate the incidence ratio of MNM in Iran.

Materials and Methods

This systematic review and meta-analysis study was designed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.[19] Web of Science and PubMed databases were systematically searched, and 171 and 137 papers published before June 9, 2017, were found in each, respectively. To include papers written in Persian by Iranian scholars, the Google Scholar database was searched, and 542 papers were retrieved.

We investigated the reference lists of all relevant publications for information about other potential studies. We limited the search to articles published in the English language. The search strategy focused on three keywords or phrases: maternal near miss, prevalence or incidence, and Iran. The relevant literature was searched using the terms and free text keywords that referred to severe maternal morbidity, the outcome of interest (experience of severe maternal morbidity and maternal near miss), study population (women who had severe maternal morbidity), and study methodology (cross-sectional or case-control or Cohort). The terms of search included "maternal morbidity" OR "pregnancy complications" OR "puerperal disorders" OR "obstetric complications" OR "postpartum hemorrhage" OR "obstetric hemorrhage" OR "eclampsia" OR "severe preeclampsia" OR "pregnancy hypertension" OR "uterine rupture" OR "severe complications of abortion." The terms "intensive care unit" OR "cardiovascular dysfunction" OR "respiratory dysfunction" OR "renal dysfunction" OR "coagulation dysfunction" OR "hepatic dysfunction" OR "neurological dysfunction" OR "uterine dysfunction" OR "sepsis or severe systemic infection" OR "interventional radiology" OR "laparotomy" OR "use of blood products" were also used in combination with the terms such as "labor," "pregnancy," "obstetric," "birth," "childbirth," "post-partum," and "post-natal" to specify the study population.

Two reviewers independently detected potentially eligible articles by performing an initial screening of the titles and abstracts. Articles were considered for inclusion if

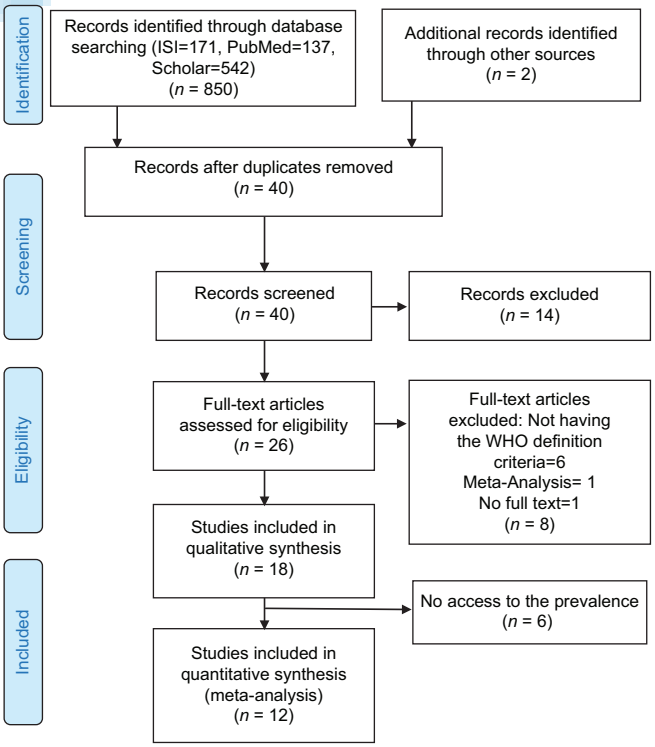

Figure 1: PRISMA diagram for the selection process of the articles

they reported data from an original study and reported on the prevalence of MNM criteria in Iran. We used wide inclusion criteria to provide a detailed systematic review of the topic. There were no limitations on the study type (e.g., cross-sectional study, cohort study). Studies that reported the prevalence of MNM segments were included. Articles were maintained at the discretion of the reviewers. An agreement between reviewers was quantified. Conflicts between reviewers were settled by consensus. The full texts of the selected abstracts were, subsequently, screened. Studies that had taken into account even one of the criteria of MNM based on the WHO approach were included in the study, and those which were not compliant with the WHO standards were excluded. For example, studies that had reported the prevalence of preeclampsia, but had not determined its severity, were excluded. The same was done for studies that had reported only the time frame within which the data had been collected but had not determined the sample size. In general, the researchers attempted to check all features of the papers and included only studies that followed WHO approach.

The papers that eventually entered into the study were checked for information such as the name of the author(s), the year of publication, the city, the study design, the sample size, and the investigated variables based on the WHO approach.[1] Two reviewers independently extracted such information using a standardized form. The quality of studies was assessed by each reviewer based on the Joanna Briggs Institute Reviewers' Manual on conducting prevalence reviews.[20-22] The quality of a paper for inclusion in the study was assessed based on criteria such as the representativeness of the sample, the appropriate recruitment of the participants, the adequacy of the sample size, the detailed description of the participants and the setting, the sufficiency of the coverage of the identified sample by the data analysis, the objectivity and standard of the criteria used for measurement of the condition, the reliability of the condition measurement, the appropriateness of the statistical analysis, the adequacy of the response rate, and the appropriate coping with the low response rate, in case it existed. The answer to each question (score) was *yes* (2), *no* (0), *unclear* (1), or *not applicable* (1). In this study, the scores for quality assessment of articles were categorized into three categories: optimal quality (18-12), moderate (11-6), and poor quality (less than 6). All the papers met the high-quality benchmark. Table 1 summarizes the characteristics of the selected studies on the prevalence of MNM.

We categorized the studies based on the criteria used by the WHO to diagnose MNM.[1] The first step was to detect mothers with severe pregnancy-related morbidities, that is, potentially life-threatening conditions. Such mothers were identified based on a history of severe morbidities (e.g., severe preeclampsia, eclampsia, severe postpartum hemorrhage [PPH], sepsis, or ruptured uterus) or a history of receiving a critical intervention (e.g., admission to ICU, laparotomy, use of blood products, interventional radiography). The second step was to identify the organ dysfunction in life-threatening conditions (near-miss criteria) including cardiovascular, renal, respiratory,

Table 1: Specifications of studies about prevalence severe maternal morbidity based on the WHO approach in Iran

Author Name	Year	City	Study design	Sample size	Number of individuals with a certain condition*																Score of JBI
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Aali[28]	2004	Kerman	cross-sectional	5261	-	-	-	-	-	167	33	-	-	-	-	-	-	-	-	.-	-	17
Direkvand-Moghadam[29]	2013	Ilam	cross-sectional	610	-	-	-	-	-	58	-	-	-	-	-	-	-	-	-	-	-	15
Ghazivakili[18]	2016	Alborz	cross- sectional	38,663	245	0	85	127	111	267	15	16	15	-	141	24	30	41	9	3	10	18
Ghojazadeh[30]	2013	Tabriz	cohort	739	-	-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-	15
Gurtani[31]	2013	Isfahan	case-series	29,444	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	18
Mohammadi[32]	2016	Tehran	case-control	12965	54	-	8	41	29	26	-	6		1	18	17	7	111	1	4	14	18
Naderi[17]	2015	Kerman	cross- sectional	19908	43	-	10	17	50	137	21	4	3	-	5	7	1	56	.	12	10	18
Zareian[33]	2004	Jahrom	cross-sectional	2300	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	14
Zibaeenezhad[34]	2010	Shiraz	cross- sectional	24196	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	14
Kashani[35]	2012	Gorgan	Cohort	61820	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	18
Zahiri Soroori[36]	2007	Rasht	cross-sectional	12142	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	17
Akbari[37]	2001	Tehran	cross-sectional	4856	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	16

*Critical interventions or intensive care unit use
1 Admission to the intensive care unit
2 Interventional radiology
3 Laparotomy (includes hysterectomy, excludes caesarean section)
4 Use of blood products

*Severe maternal complications
5 Severe postpartum haemorrhage
6 Severe pre-eclampsia
7 Eclampsia
8 Sepsis or severe systemic infection
9 Ruptured uterus
10 Severe complications of abortion

*Life-threatening conditions
11 Cardiovascular dysfunction
12 Respiratory dysfunction
13 Renal dysfunction
14 Coagulation/haematological dysfunction
15 Hepatic dysfunction
16 Neurological dysfunction
17 Uterine dysfunction

coagulation/hematological, hepatic, neurological, and uterine dysfunction.[1]

Indicators of obstetric care using MNM cases include MNM incidence ratio which refers to the number of life-threatening conditions per 1000 LBs and SMMR which refers to the number of mothers with potentially life-threatening conditions per 1000 LBs.[1] Therefore, the steps taken in doing the meta-analysis are as follows: (a) potentially life-threatening conditions which included severe complication and critical intervention were identified, (b) life-threatening conditions were identified, and (c) total cases of potentially life-threatening and life-threatening conditions were extracted. To investigate MNM ratio with WHO approach, the number of cases in a 1000 LBs was calculated.

We conducted a random-effects meta-analysis to obtain the weighted average prevalence with 95% CIs for studies. Heterogeneity was evaluated using the Cochran I2 statistic and its *p* value. Subgroup analysis was performed to diagnose the MNM as defined by the WHO. All statistical analyses were performed using Stata version 14.1.

Ethical considerations

In this review study, the collected data were only used for scientific purposes, and the intellectual property was respected in the reporting and publication of the results.

Result

Our electronic search retrieved 852 papers on the maternal near-miss ratio with the WHO approach in Iran. After deleting duplicates and reviewing the titles and abstracts, 40 articles remained for full-text screening. Papers were mainly excluded because they were irrelevant to the aim of the study. Of the 40 titles and abstracts and articles screened, 14 were excluded. There were 26 articles which met the selection criteria. Out of these 26 articles, in

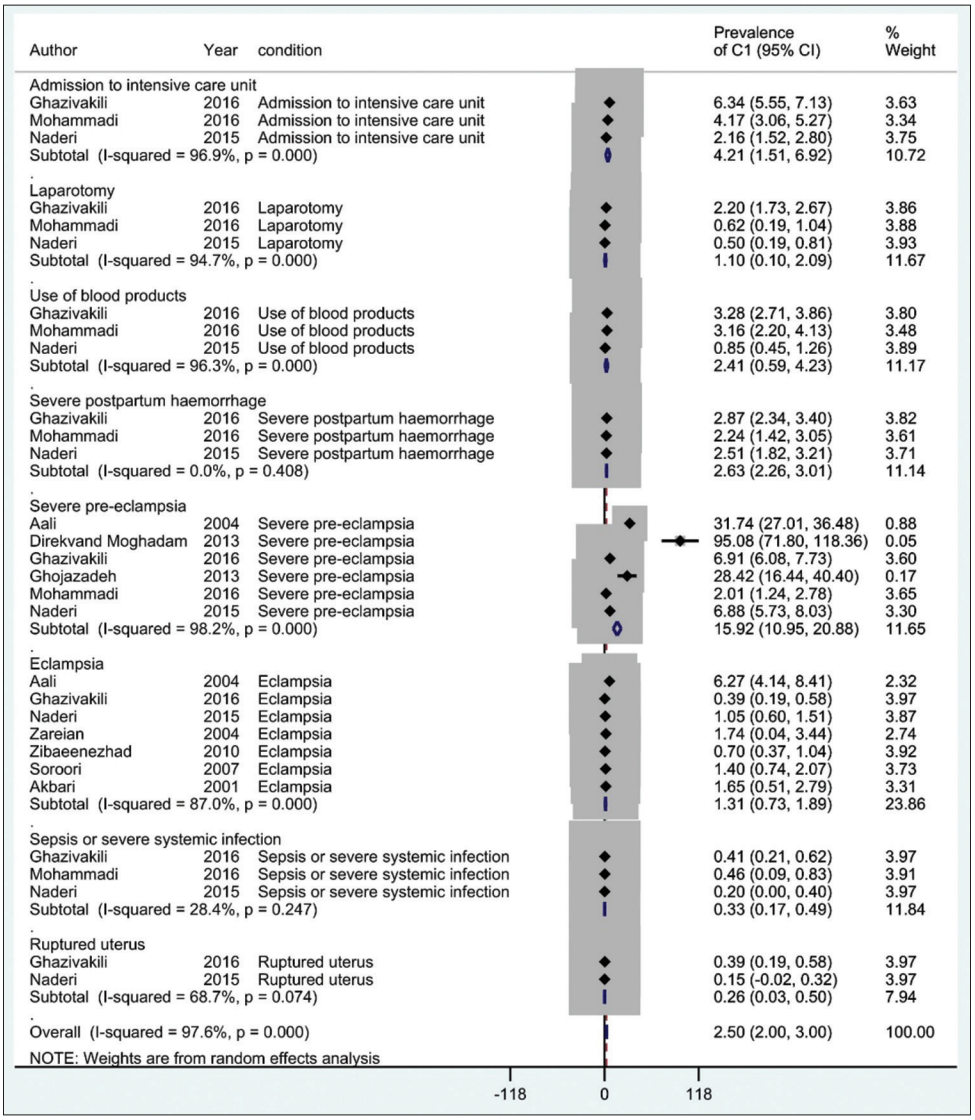

Figure 2: The pooling of overall potentially life-threatening conditions ratio

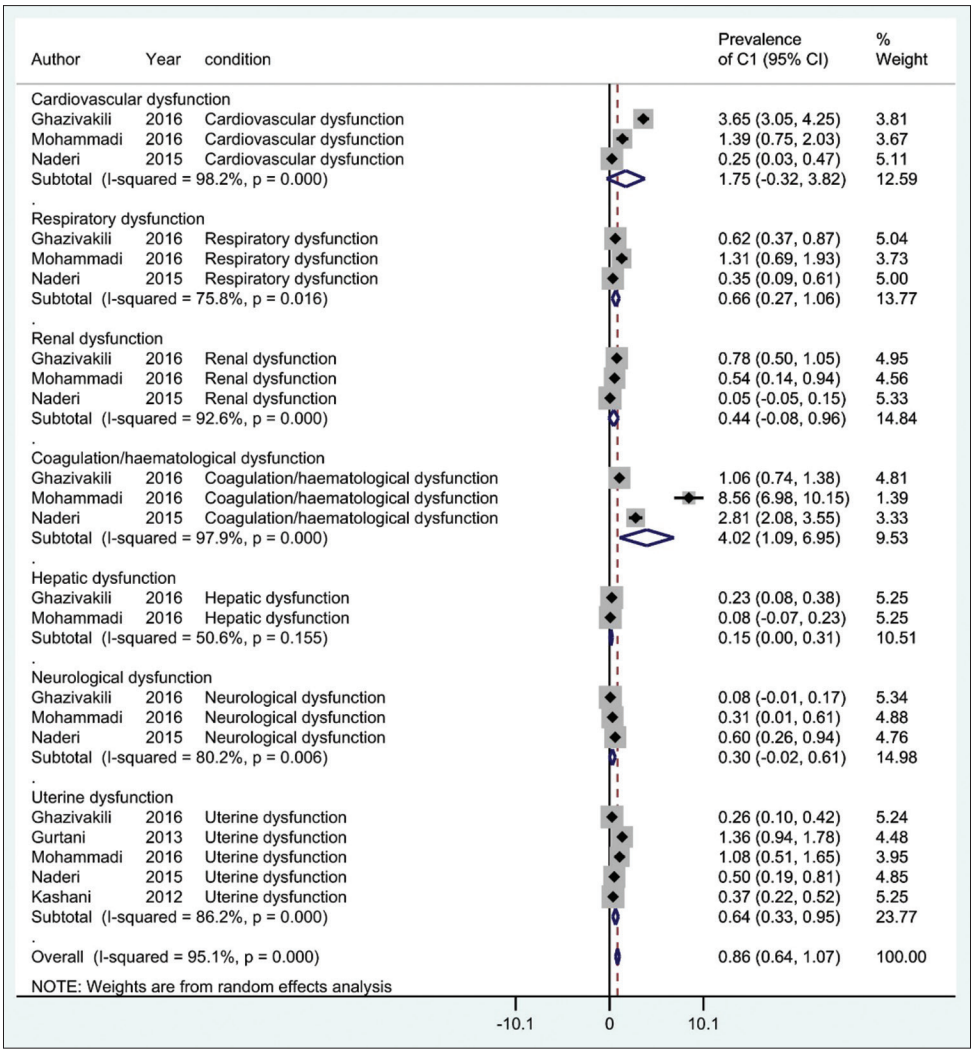

Figure 3: The pooling of overall life-threatening conditions

the next step, 8 were excluded either because they had not followed the WHO definition criteria or they were meta-analyses, or did not include the full text. Therefore, 18 papers remained for qualitative analysis. However, 6 articles did not report the prevalence and had to be deleted and finally, 12 articles remained for meta-analysis. The reviewers unanimously agreed (88.47%) that the final articles were eligible for inclusion in the study. Figure 1 displays the processes of article selection.

In terms of the design, the selected papers were cross-sectional (N = 8), cohorts (N = 2), case control (N = 1), and case-series (N = 1). All studies had been carried out in the big cities of Iran. The overall pooled potentially life-threatening conditions ratio was I2 (97.60%; $p < 0.001$, ratio = 2.50/1000 LBs [95% CI: 2.00-3.00]) [Figure 2]. The overall pooled severe complication ratio was I2 (97.5%, $p < 0.001$, ratio = 2.40/1000 LBs [95% CI: 1.83-2.97]), the overall pooled critical intervention ratio was I2 (97.30%, $p < 0.001$, ratio = 2.54/1000 LBs [95% CI: 1.48-3.60]), and the overall pooled life-threatening conditions ratio was I2 (95.10%, $p < 0.001$, ratio = 0.86/1000 LBs [95% CI: 0.64-1.07]) [Figure 3]. Moreover, the overall pooled life-threatening and potentially life-threatening conditions ratio was I2 (97.10%, $p < 0.001$, ratio = 1.63/1000 LBs [95% CI: 1.39-1.87]) [Figure 4].

Discussion

This systematic review provides summary estimates for the MNM incidence ratio in the Iranian population. The results of this systematic review suggest that the total ratio of life-threatening and potentially life-threatening conditions based on the WHO criteria is 1.63/1000 LBs. We reviewed 12 studies which had reported a wide range of MNM. In general, potentially life-threatening conditions were much more than MNM. Because of in the severe morbidity, if the interventions are not effective, it leads to organ dysfunction and the mother experiences MNM.[1] In this study, the ratio of SMMR was 2.50/1000 LBs and MNM ratio was 0.86/1000 LBs. In a study by Tuncalp and colleagues, the estimate of the near miss was 0.42%

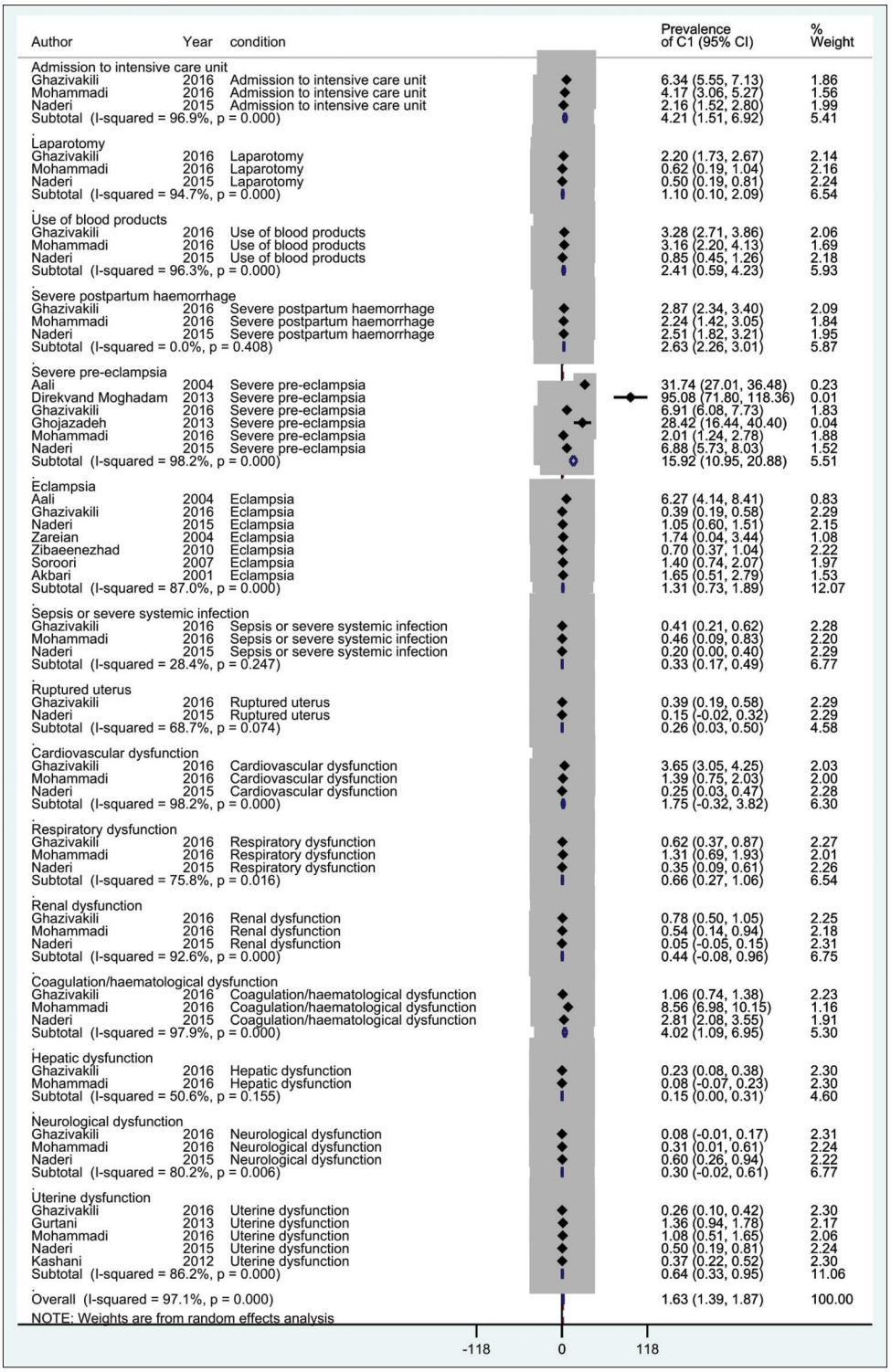

Figure 4: The pooling of overall life-threatening and potentially life-threatening conditions ratio

(95% CI: 0.40%-0.44%), which is almost in line with our study, and perhaps the slight difference in the prevalence is because that study had an international scope, but this study focused on Iran, which as an Asian country may have more maternal complications.[23] The upper near-miss rate ranged from 4.93% in Latin America to 5.07% in Asia and to 14.98% in Africa.[2] As Say and colleagues maintain, in studies that use potentially life-threatening conditions, prevalence varies between 0.80% and 8.23%, while in studies which use life-threatening criteria, the range can be from 0.38% to 1.09%.[24] The statistical differences between these studies and this study can be due to the statistical diversity in different parts of the world, or perhaps because of the fact that these studies reported

their results per 100 mothers, but this study reports the results per 1000 mothers.

Also, in this study, the individual criteria together with the WHO definition of MNM and SMMR were studied. For example, hysterectomy ratio was 0.64/1000 LBs. In Tuncalp and colleagues' study, the emergency hysterectomy criteria and the near miss rate was 0.039% (95% CI: 0.037%-0.42%),[23] which is much lower than that in this study. But in a study by van den Akke, hysterectomy complicated 1 per 1000 deliveries (range = 0.20-10.10).[25] Prevalence differed between poorer and richer settings, that is, 2.80 and 0.70 per 1000 deliveries, respectively,[25] which is consistent with this study in Iran as a middle-income country.

In this study, the prevalence of severe preeclampsia per 1000 LBs was 15.92, which is the highest magnitude of SMMR in Iran. In a study by Cheraghi and colleagues that aimed to estimate the prevalence of preeclampsia and eclampsia in Iran, the prevalence of preeclampsia per 1000 LBs was 0.50 (95% CI: 0.04-0.06) between 2005 and 2010 and 0.70 (95% CI: 0.04-0.09) between 2010 and 2013.[26] They reported a much lower estimate of the preeclampsia and eclampsia perhaps because they focused on preeclampsia during pregnancy and studied all cases of preeclampsia including mild, moderate, or severe preeclampsia. However, in our study based on the WHO criteria, the severity of the cases was among the criteria for inclusion. In the study by Cheraghi and colleagues, the overall prevalence of eclampsia among Iranian women was 1 case per 1000 LBs,[26] which is consistent with our finding (1.31) because all cases of eclampsia need to be hospitalized and the standard for their identification is the same in all studies.

In this study, the severe PPH ratio was 2.63/1000 LBs. In a study by Calvert and colleagues, the prevalence of severe PPH in Africa had the highest incidence of severe PPH at 5.10% (95% CI: 0.3-15.3), followed by an incidence of 4.30% in Northern America, with the lowest incidence in Asia at 1.90%. Around 3% of women giving birth in Latin America, Oceania, and Europe were estimated to suffer from severe PPH, and the global prevalence of severe PPH is 2.80%.[27] This significant difference in the prevalence can be due to a different prediction of bleeding or how to distinguish severe bleeding from mild. However, this number is very close to that reported in Asian regions.

In addition to the paucity of studies on MNM in Iran, one of the limitations of this study was that not all studies had used the WHO approach and their data had not been analyzed based on this approach.

Conclusion

Our study is the first comprehensive report which systematically evaluates the literature on the MNM incidence ratio with WHO approach in Iran. The results can clarify the status of the near miss in Iran, and required interventions can be made to improve the quality of obstetric care in the country. The findings of the study can also provide useful information to policy makers and planners to take actions to decrease the morbidity and mortality associated with the MNM. This study, however, did not focus on possible risk factors, something further studies can take into account. Awareness of these factors makes the better monitoring and follow-up of the MNM possible and facilitates the evaluation of the progress in maternal care quality.

Acknowledgements

The authors would like to extend their deepest thanks to all librarians who helped them to access information resources in Mashhad University of Medical Sciences.

Financial support and sponsorship

Mashhad University of Medical Sciences

Conflict of Interest

Nothing to declare.

References

1. WHO. Evaluating the Quality of Care for Severe Pregnancy Complications: The WHO Near-Miss Approach for Maternal Health. World Health Organization; 2011.
2. Say L, Souza JP, Pattinson RC. Maternal near miss–towards a standard tool for monitoring quality of maternal health care. Best Pract Res Clin Obstet Gynaecol 2009;23:287-96.
3. World Health Organization. Targets and strategies for ending preventable maternal mortality (EPMM); 2015. Available from: https://www.healthynewbornnetwork.org/hnn-content/uploads/WHO_EPMM.pdf. [Last accessed on 2019 Mar 07].
4. UN. The Sustainable Development Goals 2015 – 2030. United Nations; 2018. Available from: https://una-gp.org/the-sustainable-development-goals-2015-2030/. [Last accessed on 2019 Mar 07].
5. Talungchit P, Liabsuetrakul T, Lindmark G. Development and assessment of indicators for quality of care in severe preeclampsia/eclampsia and postpartum hemorrhage. J Healthc Qual 2013;35:22-34.
6. Tuncalp O, Hindin MJ, Adu-Bonsaffoh K, Adanu RM. Assessment of maternal near-miss and quality of care in a hospital-based study in Accra, Ghana. Int J Gynecol Obstet 2013;123:58-63.
7. Akrami F, Mohammadi G, Motlagh ME, Ramezankhani A, Valafar S. Mothers' knowledge, attitude, and practice: The performance of the nationwide integrated maternal health care project. Health Med 2012;6:3316.
8. Abdollahpour S, Mousavi SA, Motaghi Z, Keramat A, Khosravi A. Prevalence and risk factors for developing traumatic childbirth in Iran. J Public Health 2017;25:275-80.
9. Knight M, Kurinczuk JJ, Spark P, Brocklehurst P. Cesarean delivery and peripartum hysterectomy. Obstet Gynecol 2008;111:97-105.
10. Geller SE, Rosenberg D, Cox SM, Brown ML, Simonson L, Driscoll CA, *et al*. The continuum of maternal morbidity and mortality: Factors associated with severity. Am J Obstet Gynecol 2004;191:939-44.

11. Knight M. The UK obstetric surveillance system. Obstet Gynaecol Reprod Med 2008;18:199-200.
12. Widyaningsih V, Khotijah, Balgis. Expanding the scope beyond mortality: Burden and missed opportunities in maternal morbidity in Indonesia. Glob Health Action 2017;10:1339534.
13. Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk J. Saving lives, improving mothers' care lessons learned to inform future maternity care from the UK and Ireland confidential enquiries into maternal deaths and morbidity 2009-2012. Available from: https://www.npeu.ox.ac.uk/downloads/files/mbrrace-uk/reports/Saving%20Lives%20Improving%20Mothers%20Care%20report%202014%20Full.pdf. [Last accessed on 2019 Mar 07].
14. Rosendo T, Roncalli AG. Prevalence and factors associated with Maternal Near Misses: A survey of the population in a capital city of the Brazilian Northeast. Cien Saude Colet 2015;20:1295-304.
15. Oliveira LC, da Costa AA. Maternal near miss in the intensive care unit: Clinical and epidemiological aspects. Rev Bras Ter Intensiva 2015;27:220-7.
16. Abha S, Chandrashekhar S, Sonal D. Maternal near miss: A valuable contribution in maternal care. J Obstet Gynaecol India 2016;66:217-22.
17. Naderi T, Foroodnia S, Omidi S, Samadani F, Nakhaee N. Incidence and correlates of maternal near miss in southeast Iran. Int J Reprod Med 2015;2015:914713.
18. Ghazivakili Z, Lotfi R, Kabir K, Nia RN, Naeeni MR. Maternal near miss approach to evaluate quality of care in Alborz province, Iran. Midwifery 2016;41:118-24.
19. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. Ann Int Med 2009;151:264-269.
20. Munn Z, Moola S, Lisy K, Riitano D. The Systematic Review of Prevalence and Incidence Data The Joanna Briggs Institute Reviewer's Manual 2014. Australia: The Joanna Briggs Institute; 2014.
21. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data. Int J Evid Based Healthc 2015;13:147-53.
22. Munn Z, Moola S, Riitano D, Lisy K. The development of a critical appraisal tool for use in systematic reviews addressing questions of prevalence. Int J Health Policy Manag 2014;3:123-8.
23. Tuncalp O, Hindin MJ, Souza JP, Chou D, Say L. The prevalence of maternal near miss: A systematic review. BJOG 2012;119:653-61.
24. Say L, Pattinson RC, Gülmezoglu AM. WHO systematic review of maternal morbidity and mortality: The prevalence of severe acute maternal morbidity (near miss). Reprod Health 2004;1:3.
25. van den Akker T, Brobbel C, Dekkers OM, Bloemenkamp KW. Prevalence, indications, risk indicators, and outcomes of emergency peripartum hysterectomy worldwide. Obstet Gynecol 2016;128:1281-94.
26. Cheraghi Z, Esfahani BO, Mohammadian Z, Nooreldinc RS. Prevalence of preeclampsia and eclampsia in Iran. Arch Iran Med 2016;19:64-71.
27. Calvert C, Thomas SL, Ronsmans C, Wagner KS, Adler AJ, Filippi V. Identifying regional variation in the prevalence of postpartum haemorrhage: A systematic review and meta-analysis. PloS One 2012;7:e41114.
28. Aali BS, Ghafoorian J, Mohamed-Alizadeh S. Severe preeclampsia and eclampsia in Kerman, Iran: Complications and outcomes. Med Sci Monit 2004;10:CR163-7.
29. Direkvand-Moghadam A, Khosravi A, Sayehmiri K. Predictive factors for preeclampsia in pregnant women: A receiver operation character approach. Arch Med Sci 2013;9:684-9.
30. Ghojazadeh M, Azami-Aghdash S, Mohammadi M, Vosoogh S, Mohammadi S, Naghavi-Behzad M. Prognostic risk factors for early diagnosing of preeclampsia in nulliparas. Niger Med J 2013;54:34-84.
31. Gurtani FM, Fadaei B, Akbari M. Emergency peripartum hysterectomy in Isfahan; maternal mortality and morbidity rates among the women who underwent peripartum hysterectomy. Adv Biomed Res 2013;2:20.
32. Mohammadi S, Essen B, Fallahian M, Taheripanah R, Gargari SS, Kallestal C. Maternal near-miss at university hospitals with cesarean overuse: An incident case-control study. Acta Obstet Gynecol Scand 2016;95:777-86.
33. Zareian Z. Hypertensive disorders of pregnancy. Int J Gynecol Obstet 2004;87:194-8.
34. Zibaeenezhad MJ, Ghodsi M, Arab P, Gholzom N. The prevalence of hypertensive disorders of pregnancy in Shiraz, Southern Iran. Iran Cardiovasc Res J 2010;4:169-72.
35. Kashani E, Azarhoush R. Peripartum hysterectomy for primary postpartum hemorrhage: 10 years evaluation. Euro J of Exper Biol 2012;2:32-6.
36. Zahiri Z, Gharami H, Faraji R. Seasonal variation of the onset of preeclampsia and eclampsia. J Res Med Sci 2007;12:198-202.
37. Amir Ali Akbari S, Doulatian M, Valaei N. Prevalence of preeclampsia, eclampsia and their related factors in women referring to medical university hospitals in Tehran. Pejouhandeh 2001;9:225-30.