

Maternal and Perinatal Death Surveillance and Response in Balochistan, Pakistan - Causes & Contributory Factors of Maternal Deaths

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Abstract: Pakistan is the sixth most populous country in the world & is ranked 53rd in the list of countries contributing towards high maternal mortality ratios. According to a recent maternal mortality survey, the current maternal mortality ratio of Pakistan is 186 per 100,000 live births with high disparities among provinces; Balochistan being the highest contributor with MMR of 298 per 100,000 live births. This study specifically focuses on the causes & contributory factors of high maternal deaths in Balochistan based on the evidence generated by the Maternal and Perinatal Death Surveillance & Response system. MPDSR provides the decision maker with reliable and timely data to take required action and to reduce the preventable maternal deaths. Maternal mortality data was collected from the three pilot tertiary health care facilities and data was analyzed using Statistical Package for Social Sciences version (20.0). Out of 40 notified maternal deaths in the period January 2020 till July 2020 around 39 deaths were reviewed & analyzed. This study found out that of these 39 maternal deaths around 32% were attributed to hemorrhage, and around 15% & 12% resulted from eclampsia and sepsis respectively. Other major causes of maternal deaths included obstructed labour (10%), embolism (10%) and anesthesia complications (2%) respectively. Non-medical causes of these maternal deaths included shortage of human resource (7.7%), lack of medical equipment (7.7%) and failure to recognize the danger signs earlier (5.1%). The major underlying factors of these maternal deaths included low antenatal visits, underutilization of family planning services, poor referral system and delays at all levels in the three delay model. The study concluded that almost all of these maternal deaths can be avoided by undertaking appropriate measures & timely actions.

Keywords: Maternal Death, Causes, MPDSR, Surveillance, Response, Tertiary Care, Balochistan, Pakistan

1. Introduction

One of the pertinent measures to monitor maternal health

care and the progress towards sustainable development goals is maternal mortality. Though worldwide, the MMR has dropped significantly –around 44% since 1990 to 2015, the

rate of progress is different in different parts of the world and countries. Maternal death rate is low in High - Income Countries i.e 3-12 per 100,000 and there is a continuous decline in the trend over the past few decades. Whereas, the situation is much different in low middle income countries where the risk of dying of a woman is one in six due to pregnancy and childbirth [1]. A report published by the World Health Organization reveals that the widest disparity in health statistics between developing and developed countries occur in the area of maternal health resulting in higher contribution of maternal mortality figures by developing countries. Almost 99% of the maternal deaths occur in low- and middle- income countries (LMIC) and sub-Saharan Africa is a major contributor of these deaths [2, 11]. The situation is no more different in Pakistan where the current mortality rate is 186 per 100,000 live births according to a report published by National Institute of Population studies in August 2020 [3].

Pakistan is ranked 53rd on the highest maternal mortality list and is among the top ten countries which account for 60% of global maternal deaths [4, 10]. The sustainable development goal 3.1 stresses the need to reduce the global maternal mortality ratio to 70 per 100,000 live births and no country to exceed twice that ratio (140 per 100,000). In this milieu, it is mandatory to track accurate and timely data on maternal mortality. It will not only help in implementing evidence based health interventions but it will assist in monitoring and evaluation of health programs at national and sub national level [5].

However, in many South Asian countries, including Pakistan, civil registration management system and health management information systems are inefficient. Alternatively, Maternal and perinatal death surveillance system can be used as a reliable source to identify, quantify and prevent maternal and perinatal mortality [5, 6]. MPDSR is a continuous cycle which not only involves identification, notification and review of maternal & perinatal deaths but it also generates evidence based recommendations to improve the quality of care and reduce preventable deaths. The audit process provides the opportunity to review the causes of deaths and examine the circumstances surrounding each death in a systematic and critical manner and in a no-blame setting. However, in order to completely benefit from the MPDSR system it is important that the audit cycle is completed, especially the “R” response part of it, which is implemented to trigger the improvement overtime [7].

Globally only a few countries have robust MPDSR system despite the fact that many countries have adopted the national guidelines of MPDSR. In the starting phase, MPDSR can be implemented at facility level and/or at community level or both depending upon the setting and the situation. Facility based MPDSR comprises six-steps which include case identification, data collection of each case, analysis and review of the maternal deaths by MPDSR committee, generating recommendations based on the findings of analysis, taking the necessary actions and finally monitoring & evaluation [8, 9].

In Pakistan, MPDSR started in the year 2015, at the community level in Punjab through lady health workers (LHWs). However, in Balochistan, which is the largest province in terms of area and contributes significantly towards maternal mortality ratios of Pakistan, it started in 2017. Balochistan not only contributes significantly towards maternal mortality statistics of Pakistan but also it is ranked highest in Asia and thus contributing towards high maternal mortality rates of the region. According to a recent maternal mortality survey published by National Institute of Population Studies the maternal mortality ratio of Balochistan is 298 per 100,000 live births which is highest as compared to any other province of Pakistan; Punjab having the lowest 157 per 100,000 live births & Azad Jammu Kashmir has 104 per 100,000 live births. Currently, MPDSR is institutionalized in Balochistan at the facility level; two health facilities in Quetta district and one health facility in Kech District were selected as pilot facilities in 2017. This study aims to identify the causes and contributory factors of high maternal mortality ratio based on the evidence generated by maternal & perinatal death surveillance system in Balochistan especially in the selected districts where MPDSR has been implemented.

2. Methodology

A retrospective analysis of maternal deaths was done and around 40 maternal deaths were notified (n=40) out of which 39 maternal deaths were reviewed (n=39) in all three pilot health facilities in Balochistan from January 2020 to July 2020 using total sampling method. A structured and validated questionnaire was used to extract the data from the MPDSR database. The collected data was then analyzed using Statistical Package for Social Sciences (SPSS) software 20.0. Study population constituted all cases of maternal deaths that occurred in health facilities in District Quetta & Kech from January 2020 till July 2020. The inclusion criterion was that all the deaths which were notified by the selected health facilities to the provincial MPDSR system were included in the study. In this retrospective study a robust epidemiological & programmatic review of maternal death data, gathered from the provincial MPDSR system, was done. Moreover, comprehensive desk review of documents, policies, guidelines, and reports, related to maternal mortality in Pakistan produced till date was also carried out. A total sampling of all the MPDSR supported health facilities was done and the data was assessed for quality, consistency, completeness purposes.

MPDSR tool currently being used in Pakistan at the facility level includes MDF1, MDF 2 and MDF 4 forms. These semi-structured, pretested and validated data collection tools are being used to notify maternal death (MDF1), collect data & detailed information on maternal death (MDF2) and finally for monitoring and evaluation purposes (MDF4). The data was validated and checked for consistency through cross checking. This study also assessed the MPDSR implementation efforts at the facility level and the

presentations made by the health providers at the Provincial Task Force meeting were also reviewed to get the deeper understanding of the pattern of maternal death notification, reproductive health history, causes and contributory factors of maternal deaths.

3. Results

Only tertiary care health facilities were included in the study. In June 2020, thirty-nine 39 (97.5%) of 40 cases notified were reviewed. The socio-demographic characteristics of the women whose deaths were both notified and reviewed during the period is shown in Table 1.

Average age at death was 34.17 years, around 12 (31%) lived in urban areas whereas 17 (69%) were living in rural areas.

Table 1. Socio-demographic profile of women died.

Variable	N	%
Age mean 34.17 ± 5 years		
15-24	2	5.1
25-34	12	31
35-44	23	59
45-49	2	5.1
Residence		
Rural	27	69
Urban	12	31

The six major direct causes of maternal deaths in Balochistan province are shown in Figure 1. Hemorrhage accounts for 32.0%, eclampsia account for 15% while sepsis & embolism accounts for 12% & 10% maternal deaths respectively. Others major causes include obstructed labor 10%, abortion 7%, and any other complication of labor accounted for 10% of maternal deaths. Table 2 showed that only 23% women had antenatal care whatever is the source while 15% were not sure whether they had it or not. It was also revealed that around 23% of maternal deaths occurred within the first 6 hours and almost 18% occurred more than 24 hours after admission (Table 2).

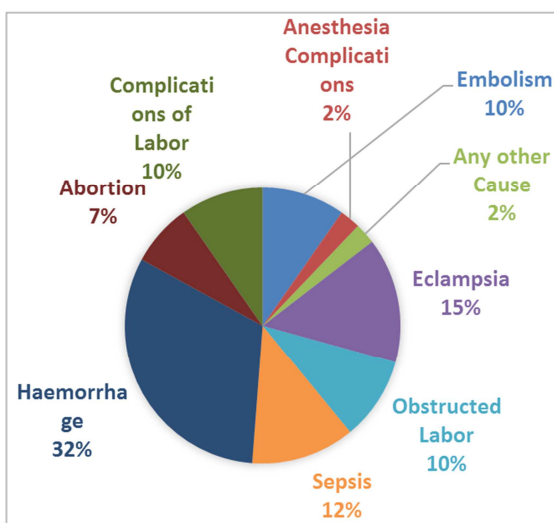


Figure 1. Major causes of Maternal Deaths.

Figure 1, also showed that hemorrhage has the highest proportional mortality rate of (0.82), followed by eclampsia (0.31). In response to the reported surveillance systems, hospital administration carried out capacity building training of health facility staff and step up monitoring and supervisory visits among others. Moreover, site specific improvement actions were taken by each health facility to address the preventable causes of maternal deaths such as availability of essential medicines and presence of pharmacists around the clock etc. Figure 2; revealed that most of the maternal deaths (14%) occurred in the 10th & 14th gravida while around 12% death occurred in 5th & 7th gravida respectively. Increased number of maternal deaths in higher gravida also emphasizes the need for better family planning measures in these facilities.

Table 2. Obstetrics/Gynecology history of women who died (n=39).

Variable	N	%
Received ANC as at last pregnancy		
Yes	9	23
No	24	61.5
Not Sure/Don't know	6	15
Sources of initial care		
Traditional Birth Attendant	21	54
Home	13	33.3
Others	5	12.8
Period of maternal death		
Pregnancy	13	33.3
Labour/deliver	15	39
Postpartum	11	28.2
Time interval between admissions & deaths		
6 h	9	23
6-12h	8	20.5
12-24h	12	30.7
>24h	7	18
Not indicated	3	7.6

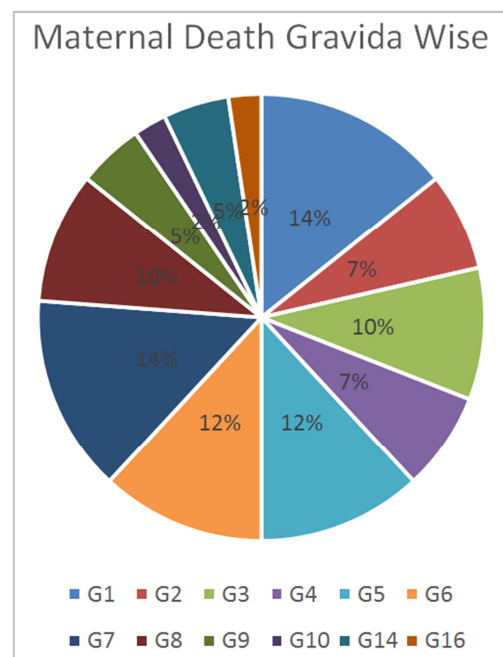


Figure 2. Maternal Deaths based on Gravida.

The leading contributory factors or non-medical causes of Maternal death as shown in Table 3. Major contributory factors of maternal deaths include shortage of human resource (7.7%), lack of equipment/medications (10.3%) and failure to recognize the danger signs (5.1%) Table 3.

Table 3. Contributory factors/Non-medical causes of Maternal and perinatal deaths.

Contributory Factors (n=9)	n	%
Manpower Shortage	3	7.7
Lack of equipment/medication/blood	3	7.7
Failure to recognize danger signs	2	5.1

Moreover, based on the three delays model the delay in seeking care contributed for (32%), delay in reaching care accounted for (24%) and delay in receiving care resulted in (44%) of the maternal deaths.

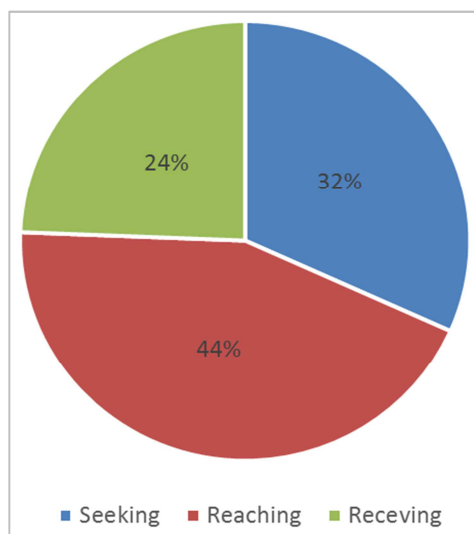


Figure 3. The Three delay.

4. Discussion

Institutionalizing MPDSR in Balochistan has presented a significant pattern and contributory factors to preventable maternal deaths in Pakistan. The leading causes of maternal deaths (hemorrhage followed by eclampsia and sepsis which has been revealed in this study had not only been the trend in Pakistan but also in many other developing countries [10-12]. Additionally, evidence from MPDSR case review meetings suggests that most maternal deaths have occurred because of poor referral system, delays in referral, low rate of antenatal care and low prevalence of family planning practices in Balochistan. Moreover, a huge number of un-booked cases was also a contributory factor for the high rate of maternal deaths as pregnant women who were not reserved for antenatal visits could not benefit from the provisions that a healthcare facility offers.

Though it was observed that the majority of the causes of maternal deaths were attributable to preventive measures, numerous contributory factors resulted from low socio-economic status, socio-cultural barriers, poverty, ignorance,

poor attitude towards maternal health, transportation issues and poor referral system.

The possible solutions to address these challenges include policy interventions to overcome the socio-cultural & socio-economic barriers, community based interventions targeted towards rural areas (rural population 72.46%), stakeholder engagement and introducing multifaceted-interventions which combine different aspects of clinical, educational and behavioral interventions. The surprisingly high number of institutional Maternal Mortality Ratio (iMMR) among all tertiary care facilities stresses the need that the health care system around maternal health should be strengthened and prioritized in Pakistan [13-15]. In the same way, the order of risk at a reference value of 0.5 showed that the risk of dying from hemorrhage is higher (32%) followed by eclampsia (15%). Among the indirect causes of maternal deaths, complications of anesthesia and other indirect causes contributed significantly towards higher risk (0.04%) of maternal deaths. This trend stresses the need for health care providers to pay deep attention to the women who are coming to health facilities with these diagnoses. In this milieu, the role of hospital management and policy makers cannot be overemphasized so as to make sure that health facilities are well equipped and have adequate number of human resource who are properly trained to manage these cases.

To a large extent, the health status and pregnancy outcome of a woman is determined by the antenatal care and delivery services that she receives. A significant portion of mothers did not have antenatal care (ANC) which emphasizes that efforts should be directed towards utilization of ANC services especially in rural areas. Moreover, underutilization of Family Planning services, as is evident by the high number of deaths in 5th & 10th gravida, is another area of concern. Improving family planning services can reduce the number of unwanted pregnancies and unmet needs for contraceptives which can significantly reduce maternal deaths. The obstetric and gynecological history further revealed that although problems start around the second and third trimester of pregnancy, yet the number of deaths are higher in the period around delivery and few hours or days after delivery. This situation further stresses the need for active management of labor and immediate post-partum period for all care providers. Moreover, essential Obstetric care services should be available all the time whether there would be complications or not. Lastly, there is need for improved compliance to referral system and referral procedure to prevent further maternal deaths.

5. Conclusion

This study concludes that safe motherhood strategies combined with focused antenatal care can significantly reduce the preventable maternal deaths. Moreover, an appropriate referral system, improved access, availability and utilization of family planning services and active management of labour can play a pivotal role in eliminating maternal morbidity and mortality. Maternal & Perinatal Death Surveillance & Response system provides evidence

based recommendations on how the quality of maternal care can be improved and where the loopholes exist in the system. Nevertheless, there is a need for strong commitment towards the “R” response part of the MPDSR to see the reduction in maternal mortality rate in Pakistan.

The implementation and institutionalization of MPDSR is in progress in Balochistan, Pakistan which further ascertains the fact that MPDSR is feasible and should be institutionalized in all provinces of Pakistan.

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