

**A REVIEW ARTICLE ON MATERNAL MORTALITY IN DEVELOPING COUNTRIES:
A FOCUS ON PAKISTAN; CHALLENGES, EFFORTS AND ACTIONS**

**Sabina Baloch¹, Rahman Gul^{1,2*}, Ghulam Farooq¹, Safia Mengal¹, Muhammad Arif Mengal³, Rubina Mir⁴,
Sultan Ahmed Lehari⁵, Abdi Baloch⁶, Kashmala Khan⁷, Hafsa Gharsheen⁸ and Dawood Khan¹**

¹Institute of Public Health Balochistan, Pakistan.

²Faculty of Biological, Pharmaceutical And Health Sciences.

³Bolan Medical Complex Hospital Quetta.

⁴Maternal and Child Health services Provincial Health Directorate Quetta, Balochistan.

⁵Provincial Aids Control Program.

⁶SKBZ Hospital Quetta.

⁷Fatima Jinnah Medical College Lahore, Pakistan.

⁸Federal Medical College Islamabad.

Received date: 22 August 2023

Revised date: 12 September 2023

Accepted date: 02 October 2023

***Corresponding Author: Rahman Gul**

Institute of Public Health Balochistan, Pakistan.

ABSTRACT

Maternal Mortality: underestimated, poorly documented, and neglected tragedy. Every year approximately half a million females die globally due to pregnancy and labor. In other words one woman dies every 2 minutes. Developing countries bear the brunt of 99% of these fatalities. The severity of the problem is equivalent to a Jumbo Jet crashing every four hours. Maternal death and illness is alarmingly high in the third world nations and the common order of contributing factors in these cases are: lack of antenatal care, injudicious decision for domiciliary confinement, unawareness about the harshness after problems arise, extended interruption in search of medical care, unsuitable method of transport, patient unprepared for the journey, and, finally, admittance in hospital when the patient is dying. The statistics show that major reasons of maternal deaths in developing countries are post-delivery and antepartum bleeding, eclampsia and obstructed labor with septicemia. Sociocultural barriers and economic factors play a significant role affecting the high rates of maternal illness and deaths. Expectant females suffer at the first level care due to absence of well qualified and skilled healthcare employees in the communities. Furthermore, despite its well defined role, a patient referral system is not able to deliver effective services to pregnant women. Due to the limited capacity of the medical system, the overall obstetric services are insufficient in providing adequate treatment for pregnant women at primary, secondary, and tertiary care level. Pakistan has a population of over 210 million, is considered the fifth greatest populated country in the world, a growth rate of 1.86 % and stands 53rd in the list of nations contributing to increased maternal death ratio (186 per 100,000 live births). This article is a research literature review of Maternal Deaths in developing countries with a focus on Pakistan. Searches were conducted in PubMed, Medline, PLOS, Google scholar, Science Direct.

KEYWORDS: Maternal Mortality, Developing countries, Maternal Mortality Ratio, Pakistan, Causes, Culture, Challenges, Actions, Efforts, Priority Interventions.

Abbreviations: Maternal Mortality Ratio (MMR), LHW Lady Health Worker (LHW), Millennium Development Goal (MDG), Traditional Birth Attendant (TBA), World Health Organization (WHO), Low and Middle Income Countries (LMIC), High Income Countries (HIC), Strategic Development Goals (SDGs) Maternal and Child Health (MCH), Emergency Obstetric Care (EMOC), Sub

Saharan Africa (SSA), Khyber Pakhtunkhwa (KPK), Maternal Perinatal Death Surveillance Response (MPDSR), United States of America (U.S.A), Rural Health Center (RHC), National Health Service (NHS), Infant Mortality Rate (IMR), Skilled Birth Attendant (SBA), United Nations Population Fund (UNFPA), United Nations International Children's

Emergency Fund (UNICEF) United Nations Development Program (UNPD), International Classification of Disease, Maternal Mortality (ICD-MM), Sexually Transmitted Infections (STIs), Human Immunodeficiency Virus (HIV) South Asian (SA), Primary Health Care (PHC), Health Management Information System (HMIS)

INTRODUCTION

Pregnancy, labor and delivery remain high risk periods in a woman's life. Serious complications can occur unexpectedly and unpredictably at home, even with the best antenatal care. Antepartum hemorrhage, postpartum hemorrhage, retained placenta, eclampsia, precipitated or prolonged labor, abortion, hemorrhage and emergencies arising from ectopic pregnancy can come unheralded. Women in developing nations have additional problems. The effect of any pregnancy complication is worsened by underlying pathology and inadequate medical treatment facilities in rural areas. Also, a late decision to seek medical assistance, coupled with limited transportation options, and long distances to available hospitals can cause a crucial delay in hospital admission. Risk of Maternal mortality and morbidity increases due to such factors as: the delay in quality of healthcare provided to an expectant woman, standing of a female in her household and community as well as inadequate facilities for severity of disease. In the setting of the 3 Delays Model, literature on the cultural and social issues leading to maternal deaths is lacking.^[1] The World Health Organization (WHO), states that classifying maternal losses necessitates three important components; (1) All mortalities of women of Reproductive Age, (2) Their gestational linked status, and, (3) the reason of mortality. However the three components are difficult to measure accurately without certification of the source of expiry and comprehensive vital recordkeeping methods.^[2] An effective assessment of maternal mortality is vital for health care programing/ decision-making, finances towards handling the matter, effective policy making, and advocating for pregnant women.^[3] Low and Middle Income Countries (LMIC) represent ninety nine percent of maternal fatalities, with Sub Saharan Africa reporting the highest number of these fatalities.^[4] In comparison with High-Income Countries (HIC) maternal deaths are 14 times higher in LMICs.^[5] Maternal and Child Health has gained attention in recent years, although analysis of mother and child programs has shown us that the majority of these programs contribute minimally in decreasing maternal deaths.^[6] The one service that has been shown to substantially reduce the Maternal Mortality Ratio (MMR) is family planning.^[7] Clinical

trials have been unsuccessful at collecting data on the efficacy of motherhood facilities in unindustrialized nations.^[8] Large variations are observed in women's competencies in relation to birthing a baby, especially the way a mother goes through labor and delivers her baby. The interval instantly succeeding childbirth that continues for four to six weeks is called the post-partum period, or puerperal phase.^[9] This phase holds significance in terms of postpartum depression and long lasting morbidities due to associated difficulties during gestation and delivery. Furthermore, it has been shown that in LMICs that the decisions families and communities make for a mother and her baby during the period of confinement and delivery can directly affect mothers' chances of survival. Decreasing maternal deaths, as mandated by the Sustainable Development Goal 3 continues to be a major trial for LMICs, as well as Pakistan.^[10]

SDGS PROJECTIONS FOR 2030

SDGs target a whole count of predictable aggregate of maternal fatalities of no further than 2.5 million, between the years 2016 through 2030 and are founded on existing rates of change whereby less than 1.4 million is expected.^[11]

Pakistan Perspective

In Pakistan one maternal death occurs every 20 minutes. Only one in twenty mothers with difficulties of childbirth or pregnancy makes it to an Emergency Obstetric Care (EMOC) facility. Most of the deaths occur during or a few hours after delivery.^[12] Maternal death approximations that are based on population from Pakistan are insufficient to express the scale of the issue. From 1989 through 1992 studies were done in designated groups in Baluchistan, Karachi and KPK. Merging the statistics from the various locations, the overall, estimated MMR was 433/ 100,000 live births; the projected MMR reached from 281 in Karachi Sindh Province to as much as 673 in city of Khuzdar, which confronts the highest incidence of, preventable, baby, child and mothers deaths.^[13] In Baluchistan, MMR is 298/100,000; according to a study conducted in Baluchistan through substantiation by Maternal Perinatal Death Surveillance and Response (MPDSR) revealed that from the 39 maternal deaths that occurred, nearly 32% ascribed towards blood loss, besides 15% and 12% was due to eclampsia and sepsis, respectively. Other significant complications were obstructed labor, embolism and anesthesia complications 10%, 10% and 2% respectively. Contributory factors for mothers and perinatal demises are illustrated in Table 1.^[4]

Table 1: Factors contributing to perinatal and mothers demises.^[4]

Related Causes	Total=8	n %
Human Resource Deficiency	3	7.7
Shortage of apparatus, medicines and blood	3	7.7
Not recognizing signs of danger	2	5.1

In Pakistan, certain cultural and social factors cause deferment to seek care can increase the risk of maternal deaths^[1] Pakistan Maternal Mortality Survey that took place in 2019 highlighted substantial demographic variations between rural as well as urban areas. As compared to urban areas MMR is 26% more in rural areas owing to a major difference in provision of medical care.^[14] From May through October 1998, a cluster-randomized controlled trial took place in seven sub-districts of a rural district in Pakistan. Out of the seven sub-districts three were allocated randomly to the intervention group, where: Traditional Birth Attendants (TBAs) were trained and distributed one-use delivery kits; Lady Health Workers (LHWS) linked TBAs to recognized facilities and noted developments and results; and obstetrical groups conducted outreach clinics for prenatal care. The women participants in the other 4 control sub-districts received standard care. The objective of the randomized trial was to evaluate the efficacy of the interventions in the controlled groups in reducing Maternal/ Perinatal deaths. The study showed that, capacity building of Traditional Birth Attendants and incorporating them into an enhanced medical structure was possible as well as worked in decreasing perinatal fatality.^[8] However no substantiation exists that old-fashioned training programs for child birth in Pakistan had any effect on deaths of mothers; while several programs informed better skills, understanding and performance of their traditional delivery assistants for certain period after training.^[15]

Historical Viewpoint

Increase in Maternal Mortality

The main reasons of maternal deaths in unindustrialized nations currently, are similar to those that existed in developed nations some fifty years ago, such as: sepsis, toxemia and hemorrhage.^[16] Developed Nations like United States of America (U.S.A.) and the United Kingdom (U.K.) have managed to dramatically reduce the risk of maternal deaths associated with pregnancies. Nonetheless, losses due to heart sickness have stayed unaffected or else rather on the rise.^[5] Although decreasing in several third world nations, Spain, the Netherlands and France is witnessing an increase in deaths during maternity.^[17]

Decrease in Maternal Mortality

The intense reduction in maternal fatality proportions since World War II has remained completely reliant on correct statistics for both the quantity and grounds of deaths^[18] Major decline in Sweden's maternal deaths happened in the late 19th century after the introduction of sterile surgical methods and registered midwives who were qualified to manage dystocic labor.^[16] Malaysia has seen a substantial drop in maternal deaths due to the establishment of midwife clinics and Rural Health Centers (RHCs): 28/100,000 in 2010 down from 540 /100,000 in 1957. Malaysia started introducing health care programs such as Maternal and Child Health (MCH) program in the 1950s. In the 1970s, they introduced a

high risk approach in MCH care, and in the 1980s they introduced the Safe Motherhood Program.^[19] Countries such as Bangladesh, Thailand and Sri Lanka, took, twenty one, eighteen and twenty five years respectively, to reduce maternal mortality.^[12] Governments that have declared MDG 5 as precedence by providing direction through financial/human resources have seen a decrease in maternal deaths^[20] Over the last twenty years a, 34% decline have been observed in maternity deaths worldwide.^[17]

DEFINITIONS

Time-of-death definition is: "The death of a female while pregnant or within 42 days of end of pregnancy, regardless of the cause of death is called Pregnancy related death".^[21]

"The number of maternal deaths during a given time period/100,000 live births during the same time period is called MMR (maternal mortality ratio)".^[21]

"Number of maternal deaths in a given time period/ 100,000 women of reproductive age, or woman-years of risk exposure, in the same time period is called Maternal Mortality Rate".^[21]

MEASURING MATERNAL MORTALITY

In the past there were inaccuracies in assessments of maternal deaths even in the developed nations. In unindustrialized nations, impreciseness was considerable. For instance, in the year 1978, the Egyptian government nationwide survey reported a rate of 82/100,000 maternal deaths but, for a second time in 1980-82, a much better community study was done in an affluent area of Egypt which found a maternal death rate of 190/100 000 live births twofold that of the previous.^[7]

The British Ministry of Health in the late 1940s (which were the early years of the NHS), introduced an investigation protocol that was more scientifically rigorous, known as "clinical audits". Clinical audits have improved the accuracy of data reporting maternal deaths^[18] A main feature in measuring the real extent of maternal mortality is also possible by attaining proof about the relation between maternal deaths and the harmonization of the different institutional levels^[22] Besides regional studies, studies of nation-specific variables indicates that Infant Mortality Rate (IMR), Skilled Birth Attendant (SBA) at childbirth and Health Spending Per capita are significant variables to predict maternity deaths at the national level^[23] Levels of maternal death and disease speak to the hazard that is attributed to childbirth and pregnancy. Furthermore, the input of medical systems with regard to, access and quality.^[24] Towards support in monitoring of improvement in terms of 'MDG 5', the United Nations Maternal Deaths Appraisal Inter-Agency Team involving the, WHO, UNFPA, UNICEF, UNPD and the World Bank has repeatedly created evaluations for maternal

deaths, concentrating on nation specific assessments retrospectively to the 90's.^[11]

A program by WHO known as “Making Pregnancy Safer” produced a booklet “Beyond the Numbers” (BTN) on how to execute maternal death analyses. It is a hands-on guide comprising of approaches and methods to help identify why deaths occur.^[25] There remains an unmatched necessity for accurate reporting of deaths during the period of maternity in third world nations.^[21]

Causes of Maternal Mortality

Cardiovascular disease contributes vitally to deaths of mothers in both developed and developing countries^[5] Sub-Saharan Africa (SSA) is a region that has a high rate for deaths during maternity period. A meta-analysis of studies printed between, 2015 to 2020 reported the basis of maternal fatality in fifty seven (SSA) countries (see Table 2). The meta-analysis used as its criterion for review studies that used the international classification of disease (10th revision) for maternal deaths (ICD-MM). The aim was to categorize the main reasons of deaths. Thirty eight (38) studies were identified that reported 11427 maternal deaths and four (4) incidental deaths.^[26]

Table 2: Placement of fatalities by ICD-MM group of reasons in SSA studies: years 2015 to 2020.^[26]

ICD-Maternal Mortality group	Reason of Demise	Deaths in numbers	Percentage of Deaths (95% Confidence Interval)
A	Abortive Consequence of pregnancies	825	7.2% (5.3%-9.1%)
B	High blood pressure Illness In Gestation	2521	22.1% (19.9%-24.2%)
C	Obstetric bleeding	3295	28.8% (26.5%-31.2%)
D	Infections due to pregnancy	1318	11.5% (9.8%-13.2%)
E	Additional obstetric Problems	576	5.0% (3.1%-7.0%)
F	Unsuspected difficulties of management	452	4.0% (1.6%-6.3%)
G	Complications not related to gestation	2151	18.8% (16.4%-21.2%)
H	Not known /Undetermined reasons	289	2.5% (0.2%-4.9%)
I	Unexpected reasons	4	0% (0.0%-0.0%)
Total		11431	100%

The basis for deaths during the time of maternity are several, interconnected, multifaceted, and nearly at all times avertible.^[15] There are five Primary Obstetric grounds of maternal demise, namely: Hemorrhage, Puerperal infection, precarious abortion, protracted/obstructed Labor, and illnesses of Pregnancy related to high blood pressure^[27] Hemorrhage (Antepartum or Post-Partum) is widely accepted as the primary cause of death. Access to well-timed and expert obstetric care determines whether or not a mother dies from blood loss for the period of or following birth of baby^[28] Research studies in Iran identified three main causes of maternal fatality: hemorrhage, high blood pressure and heart disease^[3] A backdated study in India (2000 to 2009) identified gestation induced high blood pressure as the 3rd greatest cause of deaths.^[29]

Implementation of developments in medical proficiency is recognized as a key factor for the decreasing tendencies of deaths during maternity in developed countries and not socioeconomic development^[16] In (HIC) obesity, smoking and increasing age of motherhood, are significant factors that increase the risk of maternal deaths^[5] The role of medical facilities in the causality of maternal demise has been pointed out in several studies. “Stretch- to- hospital”, which is a measure of time to attain (EMOC) and absence of antenatal care, is implicated as a chief factor of maternal fatalities in many similar studies^[30] In Pakistan, early marriages, under nutrition for mothers, baby, and adolescent girls, and high fecundity proportions, together

with unmet needs for birth control remain key determining factors for poor health in mothers^[15]

Culture As A Determinant Of Maternal Mortality

The arduous battle to decrease maternal deaths is steadfastly entrenched in highlighting certain cultural/social practices that generate limitations for mothers seeking maternity care^[1] Cultural beliefs, practices, customs, values and norms deeply influence mothers’ activities during the antenatal period and in specific cases surge the probability of death during delivery. A central impact in a mother’s life is culture which directly influences her judgments during this precarious phase. Mixed method approaches used in qualitative research have identified elements of culture that show a direct correlation to maternal deaths. There are four ways that culture may cause MMR to increase, they are: social status, inaction, utilization of health care services, and direct harmful acts. Interventions planned that are devoid of accounting for such traditional causes are more likely to be less operational in decreasing maternal fatality and morbidity.

RISK FACTORS

Since the 2000’s, Iran has piloted subcategory meta-analysis of studies that has estimated MMR as: 45.03/100 000, during 2000–2004, 36.05 during 2005–2009, and 23.71 after 2010. The highest leading cause of MMR was unskilled birth attendance, age of mother, caesarean section, low maternal education levels, poor prenatal and delivery care, residence in rural or distant areas, and

lower human development index^[3] Risk factors such as high-blood pressure, Body Mass Index (BMI) and diabetes are progressively more vital, , and found to be on the rise in several nations, metropolitan settings and especially in sub-populations in SSA, Asia, and Latin America^[5] Cerebral, renal, and cardiac conditions which occur due to raised blood pressure are high risk as well.^[31] Other contributory factors may include Polycystic ovarian(PCOS) syndrome which is found in women with multiple clinical presentations such as metabolic disorders, menstrual irregularities, weight gain, infertility, cardiovascular diseases, several types of cancers, depression, and anxiety.^[32]

CASE SCENARIOS

Delivery by Unskilled Birth Attendant

A twenty nine year old Para 3 mother had antepartum hemorrhage due to placenta praevia. She was attended by a (TBA) who provided her with native medication. She bled for about nine hours before presentation. Shortly after arrival she died undelivered with severe anemia.^[33]

Lack of autonomy and mobility

One Lady Health Worker (LHW) narrated; “It is not the decision of the pregnant mother alone as to why, when, and from whom to pursue medical care. Customarily, it is the mutual verdict of several actors, including the husband and his brother, father and mother-in-law who make declarations conferring to nature of the risk, expenses, availability and capability of care providers, perceived severity of illness and other conditions”.^[1]

Priority Interventions to Decrease Maternal Mortality are listed below^[27]

Most of the interventions are aimed at managing the five principal obstetric reasons of maternal mortality, they are: blood loss, high blood pressure, postpartum infection, hazardous abortion and extended/obstructed labor.

These interventions are

Antenatal care (ANC)
 Management of:
 Pre-partum bleeding
 Pregnancy Induced Hypertension (PIH)
 Prolonged/Obstructed labor
 Post-delivery blood loss
 Management of puerperal sepsis (P-sepsis)
 Postpartum care (PPC)
 Comprehensive abortion care (CAC)
 Birth Control
 Control of (STIs) and (HIV)
 Emergency & comprehensive emergency obstetric care (EMOC/CEMOC)

1. Pre- conception

-Sexually Transmitted Disease (STD)/ Family Planning,
 Control of HIV and comprehensive abortion care,

2. During labor, child birth and perinatal phase

- Management or prevention of post-delivery hemorrhage, pregnancy induced hypertension and obstructed or protracted labor, sepsis.

CHALLENGES OF DEVELOPING NATIONS

In Pakistan, as well as many SA countries, health management information systems (HMIS) plus civil registration management systems are inefficient^[4] Although MCH has gained much needed attention in the healthcare profession, it continues to be under prioritized by politicians, makers of policy and health authorities^[6] Plentiful is identified to alert global action, but the underprivileged nations have the poorest data^[28] In Pakistan, half of the total number of women do not undertake facility based delivery and nearly one quarter of expectant mothers do not use any antenatal care services^[10] In addition to challenges such as the lack of EMOC and skilled human resources especially in countryside areas, there are additional limitations that impede the delivery of birth control material and facilities. The elevated levels of maternal morbidity and deaths in Pakistan are a direct result of the interchange between a variety of features, such as: illiteracy, poverty, low standing of women in society, poor nutrition, reduced access to medical services, and a high proportion of high-risk pregnancies^[15] In addition to this, Pakistan is a male dominated society where monetary choices are significantly made by men^[10] In the South West of Pakistan, the province of Baluchistan has a population of approximately 21.7 million. In comparison to the National average (67.79 years) Baluchistan has the lowermost lifespan (63.4 years) with a progress of just 3.22% from the years 1990 through 2019. There is imminent necessity to address such discrepancies by reasonable investment in the medical system to reach “universal health coverage” in the country^[34] which Pakistan is also pursuing, although in the year 2019 it was rated worldwide in the lowest 10th of nations in standings of effective ‘universal health care’^[35]

NATIONAL AND GLOBAL EFFORTS TO REDUCE MATERNAL MORTALITY

Universal Health Coverage is recognized as the top National Priority in the, 2016–25 National Health Vision of Pakistan^[35] Long-term efforts are needed to strengthen country capabilities aimed at all-inclusive repetitive recording of deaths as well as births^[21] Understanding how traditional beliefs regarding pregnancy and childbearing can inadvertently affect the chances of a mother’s survival during and post pregnancy can help midwives, nurses, and medical professionals in delivering medical services and planning effective packages to help reduce maternal deaths, specifically in underdeveloped countries. Better access to obstetric care during emergency procedures and better training of staffing in peripheral health facilities could reduce the threat of maternal mortality in the (KPK) and rural Baluchistan^[30] Lately further consideration has been given to modifying health systems to the resources besides the needs of underdeveloped nations^[7] Safe

abortion services and Family planning saved many lives, followed by care in pregnancy with misoprostol supply and lastly by institutional based Post-Partum Hemorrhage treatment.^[27]

CALL FOR ACTION

In spite of the innumerable challenges that underdeveloped nations confront in their struggles to decrease the high numbers of maternal fatalities, indication from various low-resource settings recommends that, in an electorally reassuring environ, intense drops in deaths of mothers can be attained by basic, economical intermediations^[27] Even for countries deprived of good operational vital record-keeping systems; data can be gathered by surveillance methods and properly planned research work for cause-specific studies of deaths during maternity.^[11] MPDSR can be utilized as a dependable approach to detect, measure, and avert maternal deaths^[4] Re-orientation of community leaders and care givers to increase mindfulness and timely recognition of the risk factors and life-threatening indicators associated with pre/eclampsia with rapid and acceptable care or referral remains stressed^[33] Pakistan should warrant that, judicious purposes are transformed into high quality, immediate services and programs at the local level^[15] Traditional culture and gender equity need to be taken into account to support the health of mothers^[22] Emphasis on decreasing poverty and empowering mothers is vital for supporting women's right to health care.^[1] The continuum of care remains well known by way of refining Maternal Neonatal/Child Wellbeing through cohesive service delivery. It has two central dimensions, namely: sequential time and space, and the interval aspect comprising of health service distribution from pre-conception until childhood. The latter, space element, contains clinical care, domestic care and community, and care of out-patients /outreach.^[36]

CONCLUSION

Maternal mortality is an underrated, poorly recognized, and neglected tragedy. Every year almost half a million women die due to childbirth globally. Putting this into perspective, it is the equivalent of one woman dying every two minutes from complications during or post pregnancy. Third world nations bear a disproportionate brunt of 99% of these deaths. Primary Health Care (PHC) relies on the use of available health workers, villagers, traditional health practitioners including ancillary health workers. Also the minor strength of much competent employees stands held in reserve for complex responsibilities. Undoubtedly, the change away from the remedial models of the West and in the direction of (PHC) remains a key development. Nevertheless, there are certain noteworthy medical difficulties that PHC will have little effect and maternal mortality is one of them. It is well documented that the one service of the basic MCH package that that has proven to considerably reduce maternal mortality is family planning^[7] More than half of maternal deaths all

over the world, during the years 2003 and 2009 was, bleeding disorders, sepsis and high blood pressure, and over a quarter of fatalities were due to secondary reasons. The high number of preventable maternal deaths should give cause to prioritizing health resources and funding towards reducing deaths locally and internationally. Additional work is required to improve access and validity of statistical data associated with maternal deaths^[37] The known causes of deaths during maternity, establish the significance of refining universal access to reproductive healthcare, quality of pregnancy care services, and access to skilled birth attendance^[3] Use of oxytocic medicine following, child birth and active management of the third stage of labor have been shown to reduce post-partum bleeding. However, a program that improves the capability of the medical system to treat mothers with different problems will have a much greater consequence on maternal mortality^[38] Maternal and neonatal outcome is an important indicator for mortality. There should be neonate and maternal intensive care unit to prevent morbidity and mortality among neonates and mothers^[39] Intense improvements can be achieved in health facility births and the utilization of maternity care, by executing active follow-up in the community, strengthening human resource capacity, and de-incentivizing home births^[40] In Pakistan, around 75% of babies are born in homes by TBAs. Nevertheless, no robust indication exists that Traditional Birth Attendant trainings in Pakistan have had an impact on reducing maternal deaths. However, human development, social sector reform, and health system interventions can address many of the causes of ill health and deaths in mothers^[15] Improving data collection methods will support and improve targeted approaches to respond to necessities, address clinical and distal reasons of deaths, and permit better accountability, and quality assurance^[41] Health care ought to be recognized as a fundamental human right. No woman should die due to child birth and pregnancy.

REFERENCES

1. Sonia Omer, Rubeena Zakar, Muhammad Zakria Zakar and Florian Fischer: The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. *Reproductive Health*, 2021; 18: 97. <https://doi.org/10.1186/s12978-021-01151-6>.
2. Ali Mohammad Mir, Mohammad Saleem Shaikh, Siti Nurul Qomariyah, Gul Rashida, Mumraiz Khan, and Irfan Masood .Using Community Informants to Estimate Maternal Mortality in a Rural District in Pakistan: A Feasibility Study Research Article Hindawi Publishing Corporation *Journal of Pregnancy*, 2015. Article ID 267923, 8 pages <http://dx.doi.org/10.1155/2015/267923>
3. Khalili M, Mashrouteh M, Haghdoost A, Torkian S, Chegeni M. Systematic review and meta-analysis of maternal mortality ratio and related factors in the Islamic Republic of Iran. *East Mediterr Health J.*,

- 2023; 29(5): 380–401. <https://doi.org/10.26719/emhj.23.063>
4. Anaam Arif, Asfandyar Sherani, Qudsia Uzma, Babar Alam, Ellen Thom, Attiya Abro, Naila Ehsan, Ismail Mirwani, Aisha Siddiq, Uzma Sohail, Najma Ghaffar, Shazia Saeed, Rehana Kamal, Fozia Muhammad Bukhsh, Safia Bibi, Fozia Baloch. Maternal and Perinatal Death Surveillance and Response in Balochistan, Pakistan - Causes & Contributory Factors of Maternal Deaths. *Journal of Gynecology and Obstetrics*, 2022; 1-5. doi: 10.11648/j.gjo.20221001.11
 5. AO Mocumbi, K Sliwa, P Soma-Pillay: Medical disease as a cause of maternal mortality: the pre-eminence of cardiovascular pathology. *CARDIOVASCULAR JOURNAL OF AFRICA* • Volume 27, No 2, March/April 2016 *Cardiovasc J Afr*, 2016; 27: 84–88. www.cvja.co.za DOI: 10.5830/CVJA-2016-018.
 6. Dr. Sandhya Gupta, Dr. Arvind Gupta*: Study of Direct and Indirect Causes of Maternal Mortality: A Study from Tertiary Care Centre of Bhopal. *Scholars International Journal of Obstetrics and Gynecology*. *Sch Int J Obstet Gynec*, May 2019; 2(5): 112-114.
 7. ALLAN ROSENFELD and DEBORAH MAINE: MATERNAL MORTALITY-A NEGLECTED TRAGEDY Where is the M in MCH? *Lancet series*.
 8. Abdul Hakeem Jokhio and Kar Keung Cheng,:An Intervention Involving Traditional Birth Attendants and Perinatal and Maternal Mortality in Pakistan *N Engl J Med* 352;2005:2091-9
 9. Falsafa Jamal, Rahman Gul*, Safia Mengal, Kashmala Khan, Nighat Saleh , Aida Durrani and Muhammad Zaman Khethran : Postpartum Depression In Women (Review Article) *World Journal Of Advance Healthcare Research* www.wjahr.com, 2023; 7(6).
 10. Rubeena Zakar, Muhammad Zakria Zakar, Nauman Aqil, Ashraf Chaudhry & Muazzam Nasrullah Determinants of maternal health care services utilization in Pakistan: evidence from Pakistan demographic and health survey, 2012–13, *Journal of Obstetrics and Gynaecology*, 2017; 37(3): 330-337. DOI: 10.1080/01443615.2016.1250728.
 11. Leontine Alkema, Doris Chou, Daniel Hogan, Sanqian Zhang, Ann-Beth Moller, Alison Gemmill, Doris Ma Fat, Ties Boerma, Marleen Temmerman, Colin Mathers, Lale Say,: Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group *Lancet*, 2016; 387: 462–74 Published Online November 12, 2015 [http://dx.doi.org/10.1016/S0140-6736\(15\)00838-7](http://dx.doi.org/10.1016/S0140-6736(15)00838-7)
 12. Jabeen S, Zaman BS, Ahmed A, Bhatti S. Maternal mortality. *Professional Med J Dec*, 2010; 17(4): 679-685.
 13. Sathar, Zeba, Maqsood Sadiq, and Seemin Ashfaq. 2015. "Reducing maternal and child mortality in Balochistan: The untapped potential of family planning," Policy brief. Islamabad: Population Council, The Evidence Project, 2015.
 14. Sean Kaisser Shaeen, Zoaib Habib Tharwani, Wajeha Bilal, Zarmina Islam, Maternal mortality in Pakistan: Challenges, efforts, and recommendations. *Commentary. Annals of Medicine and Surgery*, 2022; 81: 104380 [journal homepage: www.elsevier.com/locate/amsu](http://journal.homepage:www.elsevier.com/locate/amsu)
 15. Yasir P. Khan, Shereen Z. Bhutta, Shama Munim, Zulfiqar A. Bhutta, Maternal Health and Survival in Pakistan: Issues and Options *J Obstet Gynaecol Can*, 2009; 31(10): 920–929.
 16. FARIYAL F. FIKREE', FARID MIDHET', SALIM SADRUDDIN' AND HEINZ W. BERENDES: Maternal mortality in different Pakistani sites: ratios, clinical causes and determinants. *Acta Obstet Gynecol Scand*, 1997; 76: 637-645.
 17. C. King: Strategies to reduce maternal mortality in developed countries *Jeffrey Curr Opin Obstet Gynecol*, 2013; 25: 117–123. DOI:10.1097/GCO.0b013e32835e1505 1040-872X 2013.
 18. Irvine Loudon: Maternal mortality in the past and its relevance to developing countries today. *Am J Clin Nutr*, 2000; 72(suppl): 241S–6S. Printed in USA. © 2000 American Society for Clinical Nutrition
 19. Hematram Yadav: A review of maternal mortality in Malaysia. *IeJSME*, 2012; 6 (Suppl 1): S142-S151.
 20. Nawal M. Nour.: An Introduction to Maternal Mortality. VOL. 1 NO. 2 REVIEWS IN OBSTETRICS & GYNECOLOGY. WOMEN'S HEALTH IN THE DEVELOPING WORLD, 2008.
 21. WJ Graham, S Ahmed, C Stanton, CL Abou-Zahr and OMR Campbell Review: Measuring maternal mortality: An overview of opportunities and options for developing countries *BMC Medicine*, 2008; 6: 12. doi:10.1186/1741-7015-6-12 This article is available from <http://www.biomedcentral.com/1741-7015/6/12>.
 22. Diana Gil-González, Mercedes Carrasco-Portiñoa & Maria Teresa Ruiz Preventive Medicine and Public Health, Knowledge gaps in scientific literature on maternal mortality: a systematic review. *Bulletin of the World Health Organization*, November 2006; 84(11).
 23. Ana P Betrán, Daniel Wojdyla, Samuel F Posner and A Metin Gülmezoglu. National estimates for maternal mortality: an analysis based on the WHO systematic review of maternal mortality and morbidity. *BMC Public Health*, 2005; 5: 131. <http://www.biomedcentral.com/1471-2458/5/131>.
 24. A Metin Gülmezoglu, Lale Say, Ana P Betrán, Jose Villar and Gilda Piaggio WHO systematic review of maternal mortality and morbidity: methodological issues and challenges. *BMC Medical Research Methodology*. 2004; 4: 16. doi:10.1186/1471-2288-4-16 <http://www.biomedcentral.com/1471-2288/4/16>

25. Gwyneth Lewis: Maternal mortality in the developing world: why do mothers really die? REVIEW ARTICLE: *Obstetric Medicine*, 2008; 1: 2–6. DOI: 10.1258/om.2008.080019.
26. Musarandega R, Nyakura M, Machezano R, Pattison R, Munjanja SP. Causes of maternal mortality in Sub-Saharan Africa: A systematic review of studies published from 2015 to 2020. *J Glob Health*, 2021; 11: 04048.
27. Ndola Prata†, Paige Passano, Amita Sreenivas & Caitlin Elisabeth Gerdt: Maternal mortality in developing countries: challenges in scaling-up priority interventions – Review 10.2217/WHE.10.8 2010 Future Medicine Ltd *Women's Health*, 2010; 6(2): 311–327 ISSN 1745-5057.
28. Carine Ronsmans, Wendy J Graham, on behalf of The Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where, and why *Lancet*, 2006; 368: 1189–200. Published Online September 28, 2006 DOI:10.1016/S0140-6736(06)69380-X www.thelancet.com Vol 368 September 30, 2006.
29. Nighat Saleh , Rahman Gul, Safia Mengal , Kashmala Khan , Falsafa Jamal, Mir Abdul Qadir, Abdul Ghani Sasoli , Muhammad Zaman Khethran and Aida durrani : PREGNANCY INDUCED HYPERTENSION (PIH): A REVIEW: *WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH*: www.wjahr.com, 2023; 7: 6.
30. FARID MIDHET, STAN BECKER and HEINZ W. BERENDES: CONTEXTUAL DETERMINANTS OF MATERNAL MORTALITY IN RURAL PAKISTAN. Pergamon, U.S.A. *Soc. Sci. Med.* Vol. 46, No. 12, pp. 1587±1598, 1998 # Elsevier Science Ltd, 1998.
31. Muhammad Zaman Khethran, Rahman Gul, Safia Mengal and Kashmala Khan: A Review Article On Essential Hypertension: *World Journal Of Advance Healthcare Research* www.wjahr.com, 7: 5.
32. Irum Ismail , Rahman Gul, Safia Mengal , Ghulam Farooq , Kashmala Khan , Abdul Qadir and Wajid Khan: A REVIEW OF POLYCYSTIC OVARIAN SYNDROME: IMPLICATIONS FOR NONCOMMUNICABLE DISEASES: *EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH* www.ejpmr.com, 2023; 10: 8.
33. J.U.E Onakewhor, E.P. Gharoro, Department of Obstetrics and Gynecology, University of Benin Teaching Hospital, Benin City, Nigeria: CHANGING TRENDS IN MATERNAL MORTALITY IN A DEVELOPING COUNTRY: *Nigerian Journal of Clinical Practice*, June 2008; 11(2): 111-120.
34. Muhammad Farooq, Muhammad Usman muhammad.; École Nationale Supérieure de Chimie de Rennes, Centre National de la Recherche Scientifique , UMR 6226, Rennes, France (MU) Pakistan needs an equitable investment in the health system and collaborative efforts. www.thelancet.com/lancetgh, 11 February 2023.
35. Ali H Mokdad,: The state of health in Pakistan and its provinces and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Glob Health*, 2023; 11: e229–43.
36. Kikuchi K, Ansah EK, Okawa S, Enameh Y, Yasuoka J, Nanishi K, et al. Effective Linkages of Continuum of Care for Improving Neonatal, Perinatal, and Maternal Mortality: A Systematic Review and Meta-Analysis. *PLoS ONE*, 2015; 10(9): e0139288. doi:10.1371/journal.pone.0139288.
37. Lale Say, Doris Chou, Alison Gemmill, Özge Tunçalp, Ann-Beth Moller, Jane Daniels, A Metin Gülmezoglu, Marleen Temmerman, Leontine Alkema: Global causes of maternal death: a WHO systematic analysis *Lancet Glob Health*, 2014; 2: e323–33. Published Online May 6, 2014 [http://dx.doi.org/10.1016/S2214-109X\(14\)70227-](http://dx.doi.org/10.1016/S2214-109X(14)70227-)
38. Deborah Maine, Department of International Health, Boston University School of Public Health, Boston, MA 02118, USA dpm1@bu.edu *Lancet*, 2007; 370: 1380–82. Detours and shortcuts on the road to maternal mortality reduction.
39. AQUSA BALOCH, ROMANA QAIMKHANI, MUHAMMAD SIDDIQUE RAJPUT, SAIRA TALPUR, HUMERA YASEEN, MEHREEN MEMON, ABRAR AHMED QAIMKHANI Fetal and Maternal Outcome in Women with Placenta Accreta. DOI: <https://doi.org/10.53350/pjmhs20221612473>. *P J M H S* Vol. 16, No. 12, December, 2022; 473.
40. Satti H, Motsamai S, Chetane P, Marumo L, Barry DJ, et al. Comprehensive Approach to Improving Maternal Health and Achieving MDG 5: Report from the Mountains of Lesotho. *PLoS ONE*, 2012; 7(8): e42700. doi:10.1371/journal.pone.0042700.
41. Flavia Bustreo, Lale Say, Marge Koblinsky, Thomas W Pullum, Marleen Temmerman, Ariel Pablos-Méndez WHO, 1211 Geneva, Switzerland (FB, LS, MT); United States Agency for International Development, Washington, DC, USA (MK, AP-M); and ICF International, Fairfax, VA, USA (TWP) temmermanm@who.int Ending preventable maternal deaths: the time is now Published Online August 19, 2013. [http://dx.doi.org/10.1016/S2214-109X\(13\)70059-7](http://dx.doi.org/10.1016/S2214-109X(13)70059-7) © 2013 World Health Organization; licensee Elsevier.