**ANALYSIS OF MATERNAL MORTALITY IN TERTIARY CARE HOSPITALS; TO DETERMINE CAUSES AND PREVENTABLE FACTORS**

**IN DISTRICT ABBOTTABAD**

**SUBMITTED BY**

**ZAIB-UN-NISA KHATTAK**

**&**

**AROOSA TAHIR**

**ABSTRACT**

Pregnancy, although being considered a physiological state, carries risk of serious maternal morbidity and at times death. This is due to various complications that may occur during pregnancy, labor or thereafter. Maternal death has serious implications on the family, the society and the nation. Maternal Mortality Ratio (MMR) is a very sensitive index that reflects the quality of reproductive care provided to the pregnant women. The objective of this study is to determine causes and identify preventable factors leading to maternal mortality in tertiary care hospitals of Abbott bad. This study was carried out in Gynaecology unit of Ayub Teaching Hospital Abbottabad over a period of two years (2012-2014) and Gynaecology unit of Benazir Women Hospital (Women & Children) Gammi Adda Abbottabad. **Secondary Data** was collected through Retrospective analysis from Gynecology registers for the period from 1st January, 2012 to 31st December, 2014. A self structured Performa was used for data collection. The data collected through hospitals records were analyzed through MS Excel spread sheet and results were presented in the form of tables,charts,graphs and conclusions.

All pregnant women are at risk of obstetrical complications and most of these occur during labor and delivery that lead to maternal death. In our study maternal mortality is serious issue. Safe motherhood as a priority for action cannot be identified without properly assessing maternal mortality

**CHAPTER 1**

# INTRODUCTION

## 1.1Maternal mortality at a glance

Maternal health is a transversal issue that has not only affected the social and economic development of a country, but also on the rights to the highest attainable standard of health of an individual. Pregnancy and childbirth are natural processes in a woman's life. Motherhood should be a time of anticipation and joy for a woman, her family and her community, but they are by no means risk-free. For some women in certain parts of the world especially in developing countries the reality of motherhood is often grim. For these women is motherhood often marred by unforeseen complications or even a loss. Some women loss fetus even before they are born, or shortly after birth; whiles any loss both their live and that of the baby.

"A deep, dark continuous stream of mortality . How long is this sacrifice to go on" William Farr, the first registry in general in England and Wales, asked this question of maternal mortality in England in 1838; 165 years now this question has still not been answered. Whiles risk of dying during pregnancy, childbirth or shortly after birth are now very rare in industrialized countries, in large parts of Africa, Asia and Latin America maternal mortality is still an everyday occurrence.

Progress towards the Millennium Development Goals (MDG) 5a -reducing maternal mortality by 75% between 1990 and 2015 is slow in many parts of the world. The total number of maternal deaths in 2010 is estimated, according to the latest release from WHO and partners, at 287,000 deaths, a decrease of 47% from 1990 levels Similarly, the Institute of Health Metrics and Evaluation (Ihme) estimated the global number of maternal deaths to be 273,465 in 2011

Earlier figures from the same departments had proposed a higher total number in 2008 (358 000) [5] and 342,900 by WHO and partners and Ihme, respectively. 25% reduction in the total number of maternal deaths within two years may reflect better data availability and statistical methods, but also the accelerating progress in maternal health in some parts of the world. Total annual reduction in maternal mortality was estimated at 3.1% and 1.9% between 1990 and 2010 and in 1990 and 2011 respectively in the two publications. The estimates in both publications, the annual rate of reduction in maternal mortality lower than 5.5% annual reduction required to achieve MDG 5.

Both WHO and Ihme publications, reports that the highest maternal mortality ratio (MM ratios) are in sub-Saharan Africa and South Asia. For the year 2010, it was reported regional MM ratios of 500 and 220 per 100,000 live births for sub-Saharan Africa and South Asia, respectively, according to WHO estimates Many countries, especially in sub-Saharan Africa, are not likely to reach MDG5 although major efforts are made. However, some regions of the world such as North Africa and East Asia has made steady progress, reducing some MM-percentages over 60% in the period between 1990 and 2010, in line with MDG.

The WHO estimated in the past that 80% of maternal mortality is due to direct causes and 20% is due to indirect causes. Newer estimates propose that a larger proportion is due to indirect causes

The program of action of the International Conference on Population and Development formulated two overall goals in relation to women's health and safe motherhood; namely: - 1- "To promote women's health and safe motherhood" to achieve a rapid and substantial reduction in maternal morbidity and mortality and reduce the differences observed between developing and developed countries and within countries. On the basis of a commitment to women's health and well-being, to reduce greatly the number of deaths and morbidity from unsafe abortion. "To improve the health and nutrition status of women, especially pregnant and lactating women".

## 1.2 The scale of maternal mortality in Pakistan

Pakistan is the seventh most populous country in the world with an estimated population of 172.8 million with fertility rate of 4.1 births per cent and contraceptive use at 30 percent. Total expenditure on health in Pakistan is 2.6 to 2.7% of GDP (percentage of GDP) in 2006- 2009 .Total expenses is the sum of public and private health expenditures that gives both curative and preventive health care. According to Pakistan Demographic and Health Survey (PDHS) 2006-2007 National Maternal Mortality Ratio 276. Nevertheless, there is considerable variation between provinces - Punjab 227, Khyber Pakhtun Khua 275, Sindh 314, and Baluchistan 785. The difference between Rural and Urban areas is also very pronounced, MMR is almost twice as high in rural areas (319) than in urban (175).

Trends in maternal mortality 1900-2013, an article published by WHO, estimates MMR for Pakistan for the year 2013 as 170 with a degree of uncertainty between 93 to 3,201, while the Global Burden of Disease estimates the MMR for Pakistan on 400.with uncertainty between 233- 560 .the variations in MMR values ​​can be attributed to variations in study design, methodology selected, data collection and location (rural / urban). Actual measurement MMR is problematic because approaches available are complex and require intensive resources.

PDHS showed that maternal deaths account for 20% of all deaths in women of childbearing age. Post Partum Hemorrhage (PPH) was the leading direct cause of maternal deaths responsible for 27.2% of deaths. Infect, Bleeding, both ante partum and postpartum, caused deaths in nearly a third (32.7%) of women.

In a study of mothers who were brought dead to the Jinnah Graduate Medical Centre, Karachi nearly 50% of deaths were due to PPH. Preeclampsia / eclampsia accounted for 10.4% of maternal deaths while abortions were found to be responsible for 5.6 percent of deaths. Abortion death was however considered to be underreported because of the stigma associated with abortions. Among the indirect causes of maternal deaths, liver failure due to hepatitis was the most common. One of the disturbing facts of PDHS report the number of deaths were classified as iatrogenic ie due to improper management and negligence in hospital settings. This included erroneous transfusions and general anesthesia complications.

In addition to medical reasons, socio-economic, psychological and cultural factors affecting maternal health. These include poverty, lack of education, poor nutrition and lack of family planning, domestic violence, gender discrimination, and access to quality care especially during birth. A thorough analysis of deaths of women of reproductive age 2006-07 highlighted anyone other than medical reasons, including some of those mentioned above. These included poverty, neglect by an unsupportive family, domestic violence, sexism, superstition and ignorance. The psychological, social and cultural factors affecting women's lives and well being and creates a barrier in seeking appropriate and timely care.

## 1.3 Causes of maternal mortality.

There are both direct and indirect causes of maternal mortality. Direct causes are haemorrhage, sepsis, eclampsia, obstructed labor and complications of abortion. Direct causes include related complications during pregnancy, childbirth or the postpartum period.

Indirect causes include HIV, anemia, cardiovascular diseases, tuberculosis and malaria. Indirect causes are the complications that arise from pre-existing conditions or from conditions arising in pregnancy which are not related to direct obstetric causes but may be aggravated by the physiological effects of pregnancy. In Africa and Asia, most of the deaths are due to haemorrhage (> 30%). In Latin America and the Caribbean, one in four maternal deaths due to hypertensive disorders (25.7%), and in developed countries like the European countries, North America, Australia, Japan and New Zealand, of maternal deaths is mainly due to other direct causes such such as complications of anesthesia and 5 cesarean. Abortion-related deaths are high in some parts of Eastern Europe and the Caribbean regions that can exceed more than 30%. In India, most maternal deaths are imputed to direct obstetric causes and there is less indirect deaths. Other undefined complications venous complications in pregnancy, obstetric trauma are also the main causes comprises about a quarter of the total number of maternal deaths.

## 1.4 Maternal mortality in Abbottabad

Many studies have been conducted on this issue in NWFP earlier, most of them in the years 1998-2012, but studies done in Abbottabad was till 2009. Data on maternal deaths was available through the programs after 2009. In Abbottabad, Maternal mortality ratio was 12, 7/1000 live births (26/2040). More-over trend analysis has been reported only once in KPK on the causes of maternal mortality, shows data until 2009 only. This paved the way for this study, which aims to have newer data, trend analysis of causes and to exclude the greatest threats to women in our society during childbearing period and true picture of this city.

## 1.5 Statement of the problem

Maternal mortality remains prevalent in Pakistan and other developing countries thus concerns have been raised about many developing countries including Pakistan meeting the millennium Development Goal 5 i.e. improve maternal health, by 2015. Pakistan has implemented Maternal Healthcare programs which enable all pregnant women to have free access to maternity care services before, during and after childbirth from all public hospitals in the country. These programs enable the country to achieve it Millennium Development Goal 5 on maternal health as it will enable pregnant women access maternity healthcare services from skilled healthcare providers without paying fees at the point of service utilization.

However official statistics from the Ministry of Health, Pakistan indicates that the country still records high maternal mortality figures even after the Free Maternal Healthcare programs implemented in the year 2010.

## 1.6 Research Objectives

1. To analyze causes (Both direct and indirect causes) of maternal deaths.
2. To identify preventable factors leading to maternal mortality in tertiary care hospitals.

## 1.7 Purpose of study

The purpose of this study was to identify the pattern of maternal deaths in previous years from 2012 to 2014, their associated risk factors and to suggest the improvement in the approaches to prevent maternal morbidity and mortality in this regard at our tertiary care setup.

## 1.8 Study Area

The Study area of the research is as follows:

1. Ayub Teaching Hospital, (Ayub Medical Complex) Abbottabad:

2. Benazir Women Hospital (Women & Children) Gammi Adda Abbottabad

**1.9 Thesis Layout**

The paper begins with an introduction and then literature review of analysis of maternal mortality. In chapter 1 the maternal mortality in general is discussed. Chapter 2 elaborates dimension of problem globally and at national level. This is followed by Chapter 3; includes description of the research methods that is used to analyze the maternal mortality .In Chapter 4 results are presented based on variables .Finally, paper ends with Chapter 5 containing conclusions and recommendation

**Chapter 2**

**Literature Review**

**Definitions:**

## 2.1 Maternal Mortality

Maternal mortality is defined as a death of a woman while pregnant or within 42 days after termination of pregnancy, irrespective of the duration and site of the pregnancy, for any reason related to or aggravated by pregnancy or its management but not from accidental or incidental causes.

2.2 Direct maternal deaths is defined as deaths due to birth complications of the pregnant state (pregnancy and childbirth), from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above.

2.3 Indirect maternal deaths is defined as deaths resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes but which was aggravated by physiologic effects of pregnancy.

2.4 Late maternal deaths between 42 days and one year after abortion, miscarriage or delivery caused by direct or indirect causes.

## 2.5 Maternal mortality ratio (per 100,000 live births)

According to WHO maternal mortality ratio is the number of maternal deaths during a given time period per 100,000 live births during the same time period. This expresses the risk of death associated with each pregnancy

## 2.6 Maternal mortality rate

Maternal mortality is the number of maternal deaths in a given period per 100,000 women of childbearing age during the same time period. This expresses the frequency of women at risk through fertility [

## 2.7 Global Nature and Dimensions of the Problem:

Maternal mortality is a major problem in developing countries, which were often forgotten and sometimes neglected topic during the 1970s and early 1980s (Abu Zahr, 2000).

In 1987 the safe motherhood initiative to work with developing countries (Africa, Asia and Latin America) are experimenting various techniques, direct and indirect, to provide an estimate of the magnitude of maternal mortality in some countries. According to WHO (1987), is an accurate estimation of maternal death is the first step towards reducing maternal morbidity and mortality. A smaller but significant literature have examined maternal deaths as avoidable cause of death among young women in developing countries. They have focused on the disparity observed in health indicators between developed and developing countries as well as the medical, social and cultural reasons (Hog Berg, 1985; Royston and Armstrong, 1989; Campbell and Graham, 1991).

Hog berg (1985) discussed early death as invisible tragedy linked neglected reproductive health, lack of welfare care and unskilled professional help during childbearing period. Sheen and Williamson (1999) supports the high fertility rates as a major factor in maternal mortality process while Royston and Armstrong (1989) is regarded as a cumulative low status of women is directly related to maternal mortality. All of them recognize the need to identify the extent of maternal mortality by detecting the degree of under-reporting and knowledge of the actual dimension of the problem requires urgent intervention at international, national and local levels.

According to WHO (1995) out of a million women die each year due to pregnancy and child birth, more than half of these women are African (53% in 1995), while the rest are Asian (42%) and to a lesser extent Latin American (4 %), less than 1% of maternal deaths occur in Europe or North America.

At the global level, revised 1990 estimates of maternal mortality issued in 1996 indicate that about 585,000 women die each year from pregnancy-related causes, 99 per cent of them in developing countries. The gap in maternal mortality ratios of developed and developing countries is large: in 1990, it ranged from an average of 480 per 100 000 live births in the less developed countries to about 27 per 100 000 live births in the developed regions (world population monitoring, 1998 ). Maternal mortality is an event that occurs on the population of reproductive and also productive ages. In most developing countries, between one-third of all deaths of women of childbearing age can be attributed to pregnancy related causes (Royston and Armstrong, 1989; Shen and Williamson 1999), pre-mature deaths are responsible for breaking structure countless families because of the role that women play in their families and communities.

Maternal mortality in China fell by 17.1% from 63.9 per 100 000 live births in 1996 to 53.0 in 2000, in a rural area fell to 22.2% from 86.4 per 100 000 live births to 67.2, and in urban area only 1.0% from 29.2 per 100 000 live births to 28.9, the leading causes of maternal mortality in China is bleeding, preeclampsia / eclampsia and amniotic fluid maternal mortality due to bleeding in the national level and rural level has fallen by 33.8%, 34.9% respectively.

And studies in countries (Maine, D. et al, 1987) as diverse as Bangladesh, Egypt, Jamaica, Papua New Guinea and the United States have shown that less than half of the maternal deaths that occur actually reported. Demographic Yearbook, (1998) show that in 1995, estimates of maternal mortality ratio was 870 per 100,000 live births in Africa; 390 per 100,000 live births in Asia and 190 per 100,000 live births in Latin America and the Caribbean. In the USA and Europe it is lower than 10 per 100 000 live births and Canada there are about 3.6 per 100 000 live births.

While one out of every 200 pregnant women die as a result of maternal problems in developing countries, in places like Canada, this risk is a maternal death to 13000 among pregnant women. Senegal is one of the countries which are totally lacking vital registration and cause of death statistics, have sought sister methodology to assess maternal mortality levels. The questions related to the sisters were asked under a demographic and health survey conducted in 1992- 1993, with a sample of 6310 women aged 15-49. The survey declared total 17,282 sisters, among them 3736 were deceased. Most of them had died in early childhood, often long before the survey. Only 167 deaths of women aged 15-49 had happened during the past six years. Among these were no more than 70 or 42% died of maternal deaths. This shows that even in countries with high mortality, maternal death is a relatively rare occurrence, which require large samples to measure incidence.

On the basis of this study, maternal mortality ratio in Senegal estimated at 566 deaths per 100,000 live births between 1986 and 1992. (Nadiaye S., et al 1994). In Brazil during the 1970s and 1980s MMR was estimated to be 270 per 100,000 live births nationwide, with a concentration in the northeast, about 600 per 100,000 live births. Laurenti (1987) placed the number at 200 deaths per 100,000 live births for 1980.

The maternal mortality committee of Parana (1991) found maternal mortality ratio of 100 per 100,000 live births to Parana. Another estimate was conducted by Wong (1996) using the DHS-96 where maternal mortality ratio was 100 and 140 per 100,000 live births in Brazil and northeast, respectively (Valongueiro, 2001). A study conducted in 1997 - 1998 in Pernambuco Brazil based on reproductive mortality age study (RAMOS). Maternal mortality as a public health problem; maternal mortality as an underreported cause of death and maternal mortality problem of low status women were driven from this study. Among 6016 women died (10-49) years were 1152 (20%) investigated, after investigation, was 254 maternal deaths confirmed, was 155 (61%) maternal deaths declared as such on the death certificate, while 99 (39%), were recovered by the method of the study. This difference between the declared and presumable maternal deaths represent an under reporting (39%) and corresponding correction factors (1.63). The structure of maternal deaths in this study showed that (75%) were performed by direct maternal causes (Eclampsia / Hypertension (24%), Hemoraahage (22%), abortion (6%) and infection (8%). The indirect maternal causes amounted to (25%) of maternal deaths, a classic pattern for areas with high maternal mortality risk of dying of maternal mortality, estimated through life -. time risk in Pernambuco during 1997-1998 was about 200, ie. one of each 200 women of childbearing years are predicted to die from maternal cause women who died of maternal case were generally young (62%) of them are under 30 years (14%) are less than 19 years and one case under 14 years. The proportion Women older than 45 years represented only (2.4%) of maternal deaths occurred during the period.

According parity (20%) of the deaths occurred during first pregnancy while (8%) occurred among women with more than 8 pregnancies (60%) of them had between 2 and 4 pregnancies (Valongueiro, 2001).

According to Tanaka et al (1991), there is a significant underestimation of maternal mortality even in developed countries, ranging from 15 to 50%. In developing countries (except Cuba, China and some Latin American countries), has the important registry a low coverage. Thus, measurement of specific cause adults and child mortality tends to be a complex and intensive structuring of the numerator and denominator to construct an indicator. This weakness of the official system of information represents the first mechanism for underreporting maternal death. The second mechanism involved with underreporting in the quality of information recorded in the death certificate.

Maternal mortality for Algeria in Bab El Oued Teaching Hospital Alger 1977-1984 was estimated to be 105 (per 100 000 live births). Maternal mortality was positively related to maternal age and parity, the most common causes of maternal deaths were ruptured uterus (31%), hemorrhage (25%), sepsis (13%), abortion and complications of surgery (9%) and other complications (12 %). Also found that high-risk group for maternal deaths were age 45+ with MMR 429 per 100,000 and age 15-49 with MMR 205 per 100,000 The other findings was that MMR was higher in winter and spring at 138 and 126 per 100 000 live births, respectively compared with 114 and 108 per 100,000 live births in summer and autumn. Twenty of the 29 deaths from hypertensive disorders occurred during the winter. Sepsis was more common during the summer months. Of the 37 Sepsis deaths 22 occurred during the summer. (Algeria, Direction National Des Statistics 1981) Most of the information about the causes of maternal deaths come from hospitals, but study conducted in Jabalpur, Bangladesh where the 58 deaths, only three occurred in hospitals. These three were due to Toxemia, which thus amounted to 100% of hospital deaths there as it accounted for only 20% of all maternal deaths.

In 1986 study was conducted in southern India to investigate maternal mortality by combination of information from hospitals and health facility records, field surveys, and case control studies. There were 798 maternal deaths per 1,000 live births. About half of the deaths occurred in the house or on the way to hospital. Maternal deaths accounted for 36% of mortality for women under reproductive age (15- 49). The analysis shows that many of these deaths are preventable and significant differentials existed with regard to the demographic, social and behavioral factors. (Jagdish.C.B, 1993).

In Zaire, MMR for women with no education were 720 against 130 for women with education. In Jordan, 78% of women with university education using prenatal services, compared with only 24% of illiterate women. Female literacy and the average age at first marriage are the two indicators of social status for women (Abdulaziz, 1995).

Maternal mortality ratio (MMR) in Afghanistan is high (400 per 100 000 live births) compared with countries in the region, and some of the developing countries. Afghan women die due to pregnancy-related complications because they cannot get access to maternal services directly to them in their own area.

## 2.8 Dimensions of the Problem in Pakistan:

Bushra Khan, Farhat Deeba, Samina and Naseem Khattak conducted a study on maternal mortality at the Ayub Medical Complex from January 2002 to January 2012. The maternal mortality ratio was calculated as 772 per 100 000 live births. Direct maternal deaths accounted for 143 (87.7%) and indirect deaths were responsible for 20 (12.3%) deaths. Bleeding was the leading cause of maternal death and were responsible for 43.55% of maternal deaths, whereas poisoning was observed in 26.99% of maternal deaths. In 6.13% of patients rupture uterus was the cause of maternal death.

According to the study conducted by Sarawak Ara, Samaria Tahir, Adela Rehman from April 2006 to March 2010 in Faisalabad, the estimated range of maternal mortality from 190 to 1,700 deaths per 100,000 live births. Total maternal deaths during those four years were 168 in 24,667 births with MMR of 6.81 / 1000. The most common causes of maternal deaths were obstetric hemorrhage in 58 (34.5%), hypertensive disorders in 31 (18.45%), puerperal sepsis in 23 (13%) and unsafe abortion in 20 (11.9%). Other direct causes were found in 12 (7.1%) patients. A forty-eight (88.09%) patients belonged uneducated class, 110 (65.48%) from the rural area, while 95 (56.5%) had not received prenatal care.

From January 2006 until December 2010, Anisa Fawad, Humaira Naz, Ansa Islam, Seemi Zaffar, and Aziz-un-Nisa Abbasi, completed study at Ayub Medical College, Abbottabad, Pakistan. During these five years there were 200 maternal deaths of 11,997 obstetric admissions. There were 7,380 total births and 200 maternal deaths during the study period and maternal mortality were 1057/100000. The main cause of maternal death was poisoning and its complications (28.2%).

Another study by Ayub Medical conducted by Humaira Naz, Iram Sarwar, Anisa Fawad, Aziz Un Nisa from 18 April 2006 on 17 July 2006. In this study, a total of 50 cases of primary PPH were recorded during the study period. The frequency of PPH was calculated at 7.1%. The main cause of PPH was uterine agony found in 29 (58%) cases, followed by cervical, vaginal and perineal tears in 12 (24%) cases. Initially, all patients received pharmacological followed by surgery. Subtotal (haemostatic) hysterectomy was performed in 10 (20%) cases. Maternal morbidity was detected in 31 (62%) of cases; the major diseases was DIC in 3 (6%) cases, acute renal failure in 3 (6%) patients and shock in 2 (9.9%) cases and anemia occurred in 20 (90.1%) cases.

On retrospective analysis of maternal mortality in a tertiary Care Hospital of Peshawar, Pakistan, a study conducted by Farhat R Malik Arsalan AZMAT Swati, Sohail Akhter, Abdul Hadi, Shoaib Iqbal Safi, Shams ul Islam Wazir, Rameez Afridi and Mohammad Anas from January 1 2009 to 31 December 2011.In this study a total of 277 maternal deaths were recorded from the Lady Reading hospital in three years. Bleeding is still the leading cause of 27.07% (CI = 0.66, SD = 5.65) followed by poisoning 15.88% (CI = 0.60, SD = 5.13), ruptured uterus 10.83% (CI = 0, 51, SD = 4.35) and sepsis 10, 10% (CI = 0.47, SD = 4.04). Maximum maternal deaths by 33.57% reported in 26- 35 years, followed by 26.71% in the 15- 25 years, 23.10% in the 36- 45 years and 3.24% in the 45- 55 years and 6.13 % deaths reported from unknown age group as well. Post Partum bleeding was significant with P-value (0.002).

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# Chapter 3

**Research Methodology**

This study was carried out in Gynaecology unit of Ayub Teaching Hospital Abbottabad over a period of two years (2012-2014) and Gynaecology unit of Benazir Women Hospital (Women & Children) Gammi Adda Abbottabad. This is a retrospective analysis. The catchment area of these hospitals is 2.5–3 million population of Hazara Division. The nature of admissions is mostly emergency and referred from other hospitals in critical condition. The inclusion criteria are pregnancy complications leading to death. Record of patients’ age, parity, education, socio-economic status, antenatal care, level of care and distance from hospital was analysed. Patients with medical and Gynaecological causes and those beyond 42 days post partum was excluded from study. The data was collected from maternal mortality records.

Record of first 50 women’s was obtained from gynaecology unit of Ayub Teaching hospital Abbottabad and record of other 50 women’s were obtained from gynaecology unit of women and children hospital Abbottabad.

Maternal mortality rate for the study period was calculating by using the formula

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## 3.1 Target Population:

The target population of the research was 4025 pregnant women.

## 3.2 Sample Size and Sampling Techniques:

Records of 100 pregnant women’s who died because of pregnancy related problems were selected on the basis of secondary data. And random sampling was used for this study.

## 3.3 Data Collection

**Secondary Data** was collected through Retrospective analysis from Gynecology registers for the period from 1st January, 2012 to 31st December, 2014. A self structured Performa was used for data collection.

## 3.4 VARIABLES:

1. Age.
2. High parity,
3. Lower socio-economic status,
4. Illiteracy,
5. Socio-cultural factors(Delays)
6. Poor access to health facility

## 3.5 Data Analysis

The data collected through hospitals records were analyzed through MS Excel spread sheet and results were presented in the form of tables, charts and conclusions.

# CHAPTER 4

# RESULTS AND DISCUSSION

## 4.1 RESULTS

A total of 4025 deliveries took place during the study period and there were 100 maternal deaths with maternal mortality rate of 24.8/1000 live births. Ages ranged from 18 to 41. Most of the maternal deaths occurred in age group of 21-30years (Table-1).

## 4.2 Age

Age is commonly assessing using five-year intervals for group (15-19, 20-24, etc.).

Some studies use larger intervals like 15-24, 25-35, and above 35 to avoid too few cases in each group. Age is known to be a natural risk factor, but age is also a socio-cultural substitute, as age influences the status of a female in the society.

Older mothers have a higher risk of eclampsia and placenta previa. Jacobson et al calculate an increased odds ratio for rigorous eclampsia of 1.29 (95% CI 1.16 – 1.44) and for placenta previa of 4.10 (95% CI 3.55 – 4.73) in women aged 40-44 compared to women aged 20-29 after adjusting for several risk factors including parity and pre-existing maternal disease [31].

In our study it was observed that maternal mortality is high in age group of 21-30

**Table-1: Distribution of Maternal Deaths in relation to age**

|  |  |  |
| --- | --- | --- |
| **Age group** | **No.** | **%** |
| < 20 years | 31 | 31 |
| 21-30 years | 46 | 46 |
| 31-40 years | 18 | 18 |
| >40 years | 5 | 5 |

Pie-chart: 1 Percentage distribution of Maternal Deaths in relation to age

## 4.3 Education

Educational standing of women’s also effects maternal mortality rate. Maternal education has mostly been assessed; few studies investigated the association between paternal education and maternal mortality .The way by which education might control maternal mortality is by means of increased utilization of health care but also better health status. Better education might also reflect family and childhood background, which might reduce the probability of harmful traditional practices such as food restriction being present in familial norms and beliefs. Higher education might also associate with higher social and economic status, factors that are often described as reducing maternal mortality. Education has consistently been documented as an important determinant of other health outcomes as well, for example infant mortality

In our study educational status of women’s were analyzed in relation to maternal mortality and it was found that almost 50% of women’s were uneducated (Table-2)

**Table-2: Educational status relationship with maternal mortality**

|  |  |  |
| --- | --- | --- |
| **Educational Status** | **No.** | **%** |
| **Educated** | 52 | 52 |
| **Un-Educated** | 48 | 48 |

Bar chart 1: Educational status relationship with maternal mortality

## 4.4Socio-Economic Factors:

Socio economic position has been measured conventionally using income or consumption spending, or the occupations of women or their husbands. More recently, an asset-based approach to measure socioeconomic position has been used in many studies such as the DHS. The way through which economic condition might influence maternal mortality is through influencing access to maternal care and better overall health. Economic accessibility is not only influenced by the economic situation of the mother or her family, but also by the extent to which costs are actually incurred in the use of health care. Costs for health care might include direct and indirect fees at health facilities, transport costs—mostly in emergency situations—as well as opportunity costs. In most studies, economic factors showed a connection with maternal mortality. Lack of money is commonly cited as a main barrier to accessing care in qualitative studies, and main reason for maternal death.

In a case-control study in Addis Ababa, Ethiopia, Kwast and Liff reported that mortality was higher in women where the annual family income was below 24 United States Dollar (USD)compared to over 150 USD (adjusted OR4.6, 95% CI 0.7 – 27.9) (Table 2). Also, women who were maid compared to women who were housewives had a higher risk of dying (adjusted OR 3.2, 95% CI 1.0 – 9.8) [25]. In Mat lab, Bangladesh, a defensive effect of higher wealth was reported (crude OR 0.5, 95% CI 0.4 – 0.6) when comparing the least poor mothers to the poorest mothers). No effect was observed after change for other socio economic factors . In Burkina Faso, pregnancy-related mortality was lower in the two least poor quintiles, but the confidence intervals were overlapping

In our study Socio-economic status revealed that poverty of lower middle (58%) and poor class (34) women’s are major causative factor in escalating maternal mortality (Table-3).

**Table-3: Socio-status in Relation to Maternal Mortality**

|  |  |  |
| --- | --- | --- |
| **Socio-economic status** | **No.** | **%** |
| Higher class | 0 | 0 |
| Upper middle class | 8 | 8 |
| Lower middle class | 58 | 58 |
| Poor class | 34 | 34 |

## Bar chart 2: Socio-economic status in relation to maternal mortality

## 4.5 Causes of Maternal Mortality

Maternal mortality results from both direct and indirect causes. Direct causes are hemorrhage, sepsis, eclampsia, obstructed labor, and complications of abortions. Direct causes include related to complications during pregnancy, labor or the post partum period.

In our study major direct causes of maternal mortality are Hemorrhage and Hypertensive disorders of pregnancy .32% of maternal deaths occur because of Hypertensive disorders of pregnancy and 25% of maternal deaths occur because of Postpartum Hemorrhage. (Table 4)

**Table-4: Direct Causes of Maternal Mortality**

|  |  |  |
| --- | --- | --- |
| **Causes** | **No.** | **%** |
| Hypertensive disorders of pregnancy | 32 | 32 |
| Postpartum Hemorrhage | 25 | 25 |
| Sepsis | 15 | 15 |
| Obstructed /prolonged labor | 5 | 5 |
| Ante Partum Hemorrhage | 7 | 7 |
| Others | 0 | 0 |

Pie chart 2: Direct Causes of Maternal Mortality

**Indirect Causes of Maternal Mortality**

Indirect causes are those complications that occur from pre-existing conditions or from conditions arising in pregnancy which are not related to direct obstetric causes but may be aggravated by the physiological effects of pregnancy.

In our study indirect causes that result in maternal mortality are Anemia (5%), Heart disease (4%), Anesthetic complications (5%), Un-identified factors are (1%).

**Table-5: Indirect Causes of Maternal Mortality**

|  |  |  |
| --- | --- | --- |
| **Causes** | **No.** | **%** |
| Anemia | 5 | 5 |
| Heart disease | 4 | 4 |
| Anesthetic complications | 5 | 5 |
| Hepatic encephalopathy | 0 | 0 |
| Un-identified | 1 | 1 |
| Others | 0 | 0 |

**Figure 3: Indirect Causes of Maternal Mortality**

## 4.6 Parity

The risk of death is greater in first births and in higher order birth (above five or more pregnancies).Different categories are used for higher birth orders; sometimes gravidity is used rather than parity. Parity defines the number of earlier deliveries (stillbirths and live births) whereas gravidity counts all pregnancies whether resulting in an abortion, stillbirth or a live birth.

The biological way for how parity could affect maternal mortality might be due to the risk of obstetric complications during the first pregnancy, in particular, a higher rate of eclampsia, malaria infection, and obstructed labor. For mothers having had five or more previous births, a higher rate of postpartum hemorrhage has been reported [32, 33].

In our study highest maternal mortality was found in Grand Multi gravidas group (given birth three or more time) i.e. 38% (Table-6)

**Table-6: Distribution of Maternal Deaths according to parity**

|  |  |  |
| --- | --- | --- |
| **Parity** | **No.** | **%** |
| Primigravidas | 28 | 28 |
| Multigravidas | 12 | 12 |
| Grand Multigravidas | 38 | 38 |
| Great Grand Multigravidas | 19 | 19 |
| Others | 3 | 3 |

Column 1: Distribution of Maternal Deaths according to parity

**4.7 Causes of delay**

There are different causes that results in delay and that results in maternal mortality like lack of transport, ignorance about health care facility, familial taboos poverty and other factors.

The major causes of delay in our study that results in maternal deaths are Familial taboos (40%) given in Table-7

**Table-7: Cause of delay in relation to maternal mortality**

|  |  |  |
| --- | --- | --- |
| **Cause** | **No.** | **%** |
| Lack of transport | 24 | 24 |
| Poverty and inability to afford cost | 14 | 14 |
| Familial taboos | 40 | 40 |
| Ignorance about health care facility | 20 | 20 |
| Others | 2 | 2 |

Column 2:Cause of delay in relation to maternal mortality

## 4.8 Geographical accessibility

Geographical accessibility might influence maternal mortality by predicting how fast and easily maternal health services can be reached for primary delivery care or in the case of obstetric complications. However, the determinant “place of living” might also be a proxy of socioeconomic status, as the urban population is often wealthier and better educated.

In Sweden in the 19th century, women living in an urban or sawmill district were at a one-and a half-times greater risk of dying from direct obstetric causes compared with women living in agricultural district (RR 1.6, 95% CI 1.3-2.0) suggesting that at that time, living in an urban area boded disadvantages for maternal health[28].

In Pakistan, women living more than 40 miles from a hospital compared to those living less than 40 miles than from a hospital had a one-and-a-half times higher risk of maternal mortality(adjusted OR 1.3, 95% CI 0.9 – 1.8) [29]. Aggarwal et al reported a sevenfold higher maternal mortality (OR 6.8, 95%CI 3.8 – 12.4) comparing women who lived more than 5 km to less than5 km from the nearest health facility in a vicariate analysis (no multivariate analysis available)using a case-control design to study mortality in slums Delhi, India [30].

In our study distance of (6-10km) and (11-15km) results in 26% of maternal deaths.

**Table-8: Distance from hospital as cause of delay in relation to maternal mortality**

|  |  |  |
| --- | --- | --- |
| **Kilometers** | **No.** | **%** |
| 1-5 | 14 | 14 |
| 6-10 | 26 | 26 |
| 11-15 | 26 | 26 |
| 16-20 | 20 | 20 |
| 21-25 | 13 | 13 |
| Others | 1 | 1 |

**4.9 Level of care**

Pregnant women’s have different level of care available at their nearest health care facility. In Pakistan mostly women’s get heath care facilities from mid wives or traditional birth attendants.

In our study mostly women’s have TBA’s (29%) and midwives (44%) as level of care which is present nearest to them. (Table-9).

**Table-9: Level of care available at nearest health facility to patients**

|  |  |  |
| --- | --- | --- |
| **Level of Care** | **No.** | **%** |
| Traditional Birth Attendants | 29 | 29 |
| Midwife | 44 | 44 |
| Lady Health visitor | 18 | 18 |
| Doctors | 9 | 9 |
| Others | 0 | 0 |

Cone 1: Level of care available at nearest health facility to patients

**4.10 Place of Delivery:**

Place of delivery means place at which pregnant women delivered a child. These places includes hospitals, homes, primary health care centers, private clinics or on the way to hospitals. In developing countries like Pakistan mostly deliveries take place at homes but because of pregnancy related complications at that time, death of women’s occur

In our study 72% of deliveries take place at homes.

**Table-10: Place of delivery in relation to maternal mortality**

|  |  |  |
| --- | --- | --- |
| **Place** | **No.** | **%** |
| Hospital | 17 | 17 |
| Home | 72 | 72 |
| Primary Health Care | 5 | 5 |
| Private clinics | 3 | 3 |
| On the way | 3 | 3 |
| Others | 0 | 0 |

Column 3: Place of delivery in relation to maternal mortality

**4.11 Place of Death**

Place of death means place at which death of women occur, during or after delivery or within 42 days of delivery.

In our study 91% of deaths of women’s occur at hospital.

**Table-11: Place of Death**

|  |  |  |
| --- | --- | --- |
| **Place of Death** | **No.** | **%** |
| Hospital | 91 | 91 |
| Home | 7 | 7 |
| Primary Health Care | 0 | 0 |
| Private clinics | 0 | 0 |
| On the way | 2 | 2 |
| Others | 0 | 0 |

Column 4: Place of Death

**4.12** **Time Duration between delivery and death**

Time duration between delivery and death is measured in hours that in how much time after delivery, death of women occur.

In our study it was observed that mostly deaths occur within 12-24 hours of delivery (table 12)

**Table-12: Time Duration between delivery and death**

|  |  |  |
| --- | --- | --- |
| **Time** | **No.** | **%** |
| 0-12 | 31 | 31 |
| 13-24 | 43 | 43 |
| >24 | 16 | 16 |
| Missing | 10 | 10 |

Pie chart 4: Time Duration between delivery and death

Hundred maternal deaths were recorded during study period. Maternal mortality ratio was24.8 /1000 live births (100/4025). The direct causes of maternal mortality were Hypertensive disorders of pregnancy (32%), Postpartum Hemorrhage (25%), sepsis (15%).Some indirect causes includes Anemia (5%), Heart diseases (4%), and Anesthetic complications (5%). Education, antenatal booking and socio-economic status were poor. The distance from hospital was between 1 and 50 KM. The level of care available at nearest health facility was estimated, 44% were attended by midwife, 29% by traditional birth attendant, 9% by doctors and to 18% by health care visitors.

## 4.8 DISCUSSION

The death of a woman in childbirth is a very sad event, an unnecessary and wasteful event that carries with it a huge burden of sorrow and pain. Pregnancy is not a disease and pregnancy related morbidity and mortality are avoidable. Half a million women die each year due to pregnancy related problems and 95% of them belong from developing world. The lifetime risk of a woman dying of pregnancy related causes in developing countries is 1:40 as compared to 1:3600 in developed world.

The causes of maternal mortality are several, inter-related, complex and almost always preventable. Complications of pregnancy and delivery are the leading causes of death and disability among women of childbearing age. In Pakistan each year over 5 million women become pregnant, out of these 0.7 million (15% of all pregnant women) are likely to experience some obstetrical and medical complications.

There is no organized method of data collection in Pakistan and it is very difficult to assess levels of maternal mortality. For correct assessment of maternal mortality it requires knowledge of death of pregnant women and cause of death. The most common causes of maternal mortality are hemorrhage 21%, Hypertensive diseases 18.6%, sepses 13, 3%, abortion 11% and others 36% (1989-90 SOGP survey).

The maternal mortality rates are high ranging from 286/100,000 in Karachi’s urban settlement to 756 in rural Balochistan1. The official figures of country’s maternal mortality (MM) are 340/100,000 lives births but the fact is much higher than these figures. Over 89% deliveries take place at home (94% rural and 77% urban) and around 80% of deliveries are conducted by traditional birth attendants who are incapable to manage complications.

In our study the maternal mortality ratio in two tertiary care hospitals of Abbott bad (WCH and Ayub teaching hospital) is 24.8/1000 live births, which is higher than a previous local study conducted between 1994-97 in Women and Children Hospital (WCH) Abbottabad where Maternal mortality ratio was 9.46/1000 live births. The reason of this difference is that WCH receives mostly normal cases while Ayub Teaching Hospital receives serious cases with complications and also complicated cases of other hospitals as well. Regardless of this difference of maternal mortality ratio in both studies the example of maternal mortality causes did not change over the years. Still the major causes are hemorrhage, hypertensive disorders and sepsis. The reason behind this is the persistent tradition of deliveries in domiciliary settings in unsafe and unhygienic conditions by untrained or poorly trained birth attendants.

The major cause was Hypertensive disorders of pregnancy (32%) in our study and deaths due to hypertensive disorders of pregnancy are mostly preventable. Successful treatment requires abrupt, effective and resuscitative measures.

Hemorrhage is still a major cause of maternal mortality globally. The frequencies of Hemorrhage and hypertensive disorders are high in our country. Between 10-15% of maternal deaths are due to Hemorrhage while 10% deaths are associated with eclampsia. In our study Hemorrhage was responsible for (25%) maternal deaths.

Sepsis came out to be the 3rd most common cause of maternal mortality. Unsafe deliveries in unhygienic conditions lead to puerperal sepsis. Septic induced abortions make a major proportion of maternal deaths. Optimal aseptic method can clearly reduce this percentage. In our study sepsis was responsible for (15%) maternal deaths.

In our study some indirect causes are also accountable for maternal mortality. Few of them are Anemia (5%), Heart disease (4%), Anesthetic complications (5%).

In recent years though here has been major move towards establishing primary care centers. However regardless of these efforts the heath care system remains dysfunctional with little direction and poor quality of services. There are 9846 primary health care services in Pakistan including 531 rural health centers, 5171 basic health units, 856 maternal and child health centers and 4635 dispensaries. Also there is active move towards increasing the role of private sector in providing health facilities.

Current figures specify that there is one doctor per 1529 persons (Economic study 2000-2001) However the distribution of these health care facilities is not uniform particularly in rural areas and majority of them are concentrated in urban areas.

Several factors keep these pregnant women away from these existing resources, such as their familial taboos, lack of education, poverty, and distance from health care facility, transport or attitude of health personnel towards delivery of health services.

The last Pakistan demographic survey indicated that 70% of births took place at home without nany antenatal care. The percentage of births with no antenatal care increased with birth order of the mother and was higher for those ≥ 35 years of age. None of the patients in our study availed any antenatal care. The causes of lack of antenatal care are multi factorial including lowest gender ratios, illiteracy, teenage marriages, frequent pregnancies and poor access to health facilities.

One of the chief essential problems causative to high rate of maternal mortality is generally poor educational and socio economic standing of women in Pakistan. Our literacy rate among females is one of the lowest in the world that is 28%, which keeps them unaware about their reproductive rights and health facilities. The lower life expectancy of females at birth than males (51 yr compared to 52 for males) is the result of lower status of female in our social setup plus superadded factor like malnutrition, anemia, infection, septicemia, toxemia and hemorrhage. Another contributing factor is delay in seeking help due to cultural factors like non-availability of males or hesitancy to go to hospital without attendants or their permission.

It is difficult for women to overcome these socio cultural constraints. Currently estimated safe motherhood indicators reveal that antenatal care during pregnancy is available to 27% only, deliveries at health facilities 13% and skilled attendants at delivery in 18% cases. With this poor convenience and availability of health services the burden of closely spaced pregnancies poses a major threat to the life of women.

Our study also revealed increased frequency of maternal mortality with increasing age, high parity, lower socio-economic status, illiteracy, socio-cultural factors and poor access to health facility. It is evident that there is great need for equity in gender relations and reproductive rights. This only comes with improving literacy in females. There is a need for community education targeting men in culturally conservative areas to improve men’s consciousness about females’ rights over health facilities, their reproductive rights and promoting increase use of contraceptives in both sexes.

Pakistan is the seventh most populous country of the world with population of 140 million by the year 2000 and population growth rate of 2.6%. It spends less than 1% of GNP on health and education. Keeping these two major factors in mind the need for increased contraceptive measures arises so that women’s misery could be solved and we should not lose more mothers during pregnancy and childbirth. By strengthening four pillars of safe motherhood including family planning, antenatal care, clean safe delivery and essential obstetrical care the increase in maternal mortality can come to a halt.

Improving the number of booked patient’s especially grand multi gravidas, availability of safe blood and positive approach towards life saving surgery can reduce maternal deaths to great extent. Selection of high-risk cases for hospital confinement, early referral and careful use of drugs to control fits can greatly improve our statistics.

# Chapter 5

# Conclusion and recommendations

## 5. 1 Conclusion

Poor socio-economic conditions, un-educated status, rural residency and lack of availing benefits of already existing antenatal and health facilities are important contributors to maternal mortality. It was also noted that deficiencies such as problems with blood transfusions, availability of trained medical staff and shortages of necessities in the existing health services at primary, tehsil and district level are responsible for referral of patients in moribund condition which may further worsen the situation. It is required that refresher courses and workshops must be arranged at all level, so that we can improve quality of already existing health care system and avert maternal mortality. The timely management of direct causes of maternal death through presence of qualified personnel and adequate medicines and medical supplies and adequate healthcare facilities could salvage the situation. In areas with human resource constraints to respond to obstetric emergencies, a shift of tasks to lower cadre of staff could even further save unnecessary loss of women’s lives. Existing health services should be improved and emergency obstetrical care should be available to all women’s.

## 5.2 Recommendations

* For raising awareness about reproductive health, literacy rate should b improved and use of available health resources could be optimized.
* Traditional birth attendants should be trained not to cause complications, rather recognize complications and not to manage complications on their own and they should be motivated to make referrals.
* Gender discrimination should be discouraged, so that females can make important decisions regarding reproduction
* Repeated and closely spaced pregnancies should be discouraged and contraceptive prevalence needs to be increased in culturally conservative areas.
* Nutritional status of reproductive age group should be improved to discourage rise in maternal mortality.
* Socio-economic status of community needs to be improved to avoid hindrance of high cost of care and poverty
* Non-governmental organizations should expand their services in rural areas to upgrade reproductive health status