

A review of research on maternal health  
Pakistan

**List of Tables and Figures**



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<i>S. No.</i>	<i>Contents</i>	<i>Page no.</i>
<b>Table 1.1</b>	<i>Selected Indicators for Women's Health, Pakistan, India Bangladesh and Sri Lanka, State of The World's Children, 2000</i>	11
<b>Table 1.2</b>	<i>Country Estimates Of Number Of Maternal Deaths, Lifetime Risk And Perinatal Deaths (1990)</i>	12
<b>Table 1.3</b>	<i>Maternal Mortality Ratios, Pakistan</i>	13
<b>Table 1.4.</b>	<i>Direct causes of Maternal Mortality, Pakistan</i>	14
<b>Table 1.5</b>	<i>Direct causes of Maternal Mortality, Pakistan</i>	15
<b>Table 1.6</b>	<i>Estimated maternal mortality ratios (MMR) per 100.000 Livebirths by study areas Pakistan, 1989-1992</i>	16
<b>Table 2.1</b>	<i>Causes of Maternal Mortality</i>	25
<b>Table 2.2</b>	<i>Direct causes of Hemorrhage leading to maternal mortality, Sindh And Balochistan</i>	26
<b>Table 2.3</b>	<i>Frequency and causes of rupture of uterus from tertiary Hospitals of Sindh and Balochistan</i>	27
<b>Table 2.4</b>	<i>Percentage of Maternal deaths due to Induced Abortion, Tertiary Hospitals, Pakistan</i>	28
<i>S. No.</i>	<i>Contents</i>	<i>Page no.</i>
<b>Figure 3.1</b>	<i>Maternal Morbidities</i>	31

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# A review of research on maternal health Pakistan

## **Executive Summary**



Each year world wide, close to 600,000 women die due to complications of pregnancy and childbirth. More than 99 percent of these deaths occur in developing countries and two thirds of these deaths occur in India, Pakistan and Bangladesh. Ironically, most of these deaths are preventable. For every woman who dies, many more suffer from serious conditions that can affect them for the rest of their lives.

The lifetime risk of a mother dying due to pregnancy and childbirth in the developing countries is about 1 in 50, as compared to about 1 in 5,000 in the developed countries (1). At least 35% of women in developing countries receive no antenatal care during pregnancy, almost 50% give birth without a skilled attendant and 70 % receive no postpartum care in the six weeks following delivery. Many physical, social, and cultural causes contribute to this tragic mortality (2). The 1994 International Conference on Population and Development (ICPD) held at Cairo in 1994 brought the concept of Reproductive health to the forefront of international attention. The World Health Organization and the United Nations have defined reproductive health and reproductive health care as follows:

*‘Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes – reproductive health care is defined as the constellation of methods, techniques and services that contribute to reproductive health and well –being through preventing and solving reproductive health problems’* (United Nations, 1995, p30).

A report of US National Academy of Sciences considered reproductive health as encompassing what is needed to bring about the ICPD vision that: *every sex act should be free of coercion and infection, every pregnancy should be intended and every birth should be healthy.*

### **Status of Women in Pakistan**

The typical profile of a Pakistani woman is “ an illiterate individual, getting married at an early age, raising 5-6 malnourished children (25 percent being born low birth weight), has restricted mobility and decision powers, and is often physically, mentally and socially abused and dies in the process of child birth.”

The situation is worse for women living in rural areas where incidents of public humiliation and violence, including killing in the name of honor are commonly reported (3)

Over four million women become pregnant in Pakistan each year. Of these an estimated 3.2 million deliver at home. Only 18 percent of births are attended by trained personnel. It is estimated that 18000 to 25,000 women die each year in Pakistan due to pregnancy and birth related causes (4,5). The contraceptive prevalence rate for modern methods is 16.9 percent and for any method is 23.9 percent. Pakistan reports a TFR of 5.36 (6). Tetanus Toxoid coverage for pregnant women is 58 % (7). Although induced abortion is illegal in Pakistan (8), clandestine abortions occur and add subsequently to high maternal mortality. A study from squatter settlements of Karachi has estimated an abortion rate of 25.5 per 1000 women (9). The literacy rate in women of Pakistan is very low. Enrollment ratios of females as a percentage of males in primary and secondary schools are reported to be 70 and 50 respectively (10).

The life expectancy as reported by State of the World’s children 2001 for Pakistan is 65 years. Life expectancy of females as a percentage of males is 103, which means women are living

approximately two more years as compared to men. Cultural restrictions hinder the mobility of women to access reproductive health care and other services. According to a survey of women in reproductive age group in rural Punjab, only 28 percent of women can go unescorted to the local health center and fewer than 12 percent can travel alone to the nearest village. Over two-thirds of the women need permission to leave home (11).

The public and private sectors have taken several initiatives to respond to the maternal and child health needs in the country. All these efforts address to certain extent, the physical well being of women for example provision of MCH and family planning services through Basic Health Units, bringing community based female workers at their doorsteps etc. The issues related to mobility of women, decision-making and appropriate referrals, which directly or indirectly influence maternal mortality and morbidity remain unaddressed.

This document contains a review of published and unpublished research conducted on maternal health for past ten years in Pakistan. The articles selected are mainly from the national and international peer reviewed journals. Dissertations and theses on maternal health issues were also reviewed. Non Governmental Organizations working for maternal health were approached to explore their research-related activities on maternal health.

### **Maternal mortality and morbidity**

The estimate of maternal deaths is one of the important measures of human and social development of a country. It reflects the status given to women and the efficiency of the health care system to address the needs of women. No authentic national figure of MMR is available for Pakistan, except for an indirect estimate of 533 for the period around 1991 (estimated from the sisterhood method). Until recently, officially reported MMR for Pakistan was 340 per 100,000 live births, reported by UNICEF and WHO in 1998 and based upon estimation from a mathematical model. Localized community-based studies have estimated the MMR ranging from 281 per 100,000 live births in the urban slums of Karachi to 673 in rural Khuzdar district of Balochistan. Several small studies have reported similarly high levels of MMR. Hospital-based studies in different provinces of Pakistan estimate the MMR to range from 670 to 4,472 per 100,000 live births. Alarming, there has been no significant reduction in the hospital-based MMRs over the past several years.

Research on maternal morbidity is fragmented. Most of the information is hospital-based, arising from case reports. Community-based studies on prevalence of maternal illnesses rely on self-reporting of symptoms, resulting in an over-estimation of their prevalence. Moreover, illnesses that cannot be perceived are left unexplored. There is dearth of data on the determinants of maternal health and on maternal nutrition. Though sepsis has been mentioned in a number of studies as a cause of morbidity and mortality among women presenting to hospitals with complications of pregnancy, no study has observed intrauterine infections and their effects on pregnancy outcomes. Similarly, no information could be found for other infections for example malaria, tuberculosis, bacterial vaginosis etc.

The major causes of maternal mortality have been identified as hemorrhage, hypertensive disease of pregnancy, sepsis, obstructed labor and abortion. It has been noted that most of the studies have not followed authentic definitions or rules for assigning the cause of death and hence a disparity in the rates of different causes of deaths was observed. The high rate of mortality due to mostly preventable causes described above was contrived by the fact that most women even though living in the big cities approached the hospitals or first level care late. Health care facilities were not equipped to provide these women with EmOC due to lack of equipment and medicines. Not much literature

has been observed on the causes of maternal mortality per se. Post partum hemorrhage was reported largely due to uterine atony and retained placenta. The uterine rupture were mainly due to injudicious use of Oxytocin by the birth attendants and obstructed or prolonged labor. In such cases the accompanying peri-natal mortality was also very high. Sepsis was mainly reported in the patients admitted to the hospitals, and especially when some kind of surgical procedure was performed on them for example, C.section, hysterectomy, laparotomy etc. Limited literature was found on abortion and complications of abortion.

Some of the studies have mentioned vesicovaginal fistulas and procedures applied for their repair. Only one study has discussed the occurrence of fistulas as a result of surgical procedures performed on women. There is no information on the social impact of this morbidity on the lives of women.

Women in Pakistan are malnourished and anemic. Surprisingly not much information was identified on nutrition during or after pregnancy. One study mentioned maternal factors affecting birth weight. In this study over 70 percent of the mothers did not take the recommended protein much diet. Another study mentioned that pregnant women are deficient in plasma vitamin A and carotene levels, similarly calcium intake per person per day was also found to be low (1.9 mmol/L) and only 20 percent of the mothers had serum calcium within normal range. Pakistani health professionals perceive that vitamin D deficiency in a nulliparous pregnant woman is associated with mechanical obstruction. Only one study tested this hypothesis and came with the conclusion that though vitamin D deficiency is common in Karachi, however it is not associated with mechanical dystocia.

Research on social determinants of maternal health is practically non-existent. For example how pregnancy changes the social norms for a woman, what supports she gets from the family or husband during pregnancy, gender discrimination and violence during pregnancy and sexual abuse during pregnancy are areas that have not been studied. Furthermore, support of women in the formal and informal sector during pregnancy has also remains unexplored.

This review also considered the research skills applied by the authors and how this has affected the results. Generally most of the studies were observational studies, case reports and surveys. Selection of sample size, methodology used to collect information data analysis and interpretation of the results are wanting in most of the literature reviewed. The lack of research skills of some of the authors was also evident by the write-up of the manuscripts. Some common epidemiological terminology such as incidence, and prevalence were used indiscriminately though they have specific meanings. In a few studies lack of understanding of the research design (selection of controls, treatment to non-intervention group) has made the results and recommendations questionable. The recommendations were generally found to be too ambitious. Such recommendations create confusion in the minds of the readers, health planners and policy makers. Hence there is a need for training the health professionals in research methodology. Training for writing grants should also be provided to the Government institutions so that the quality of research can be improved.

### **Gaps in research on maternal mortality and morbidity**

Some of the gaps identified by the review is described below:

- There is a need for the standardization of assignment of causation of death for the purpose of comparisons
- Need for community-based surveys (on the pattern of MIMS) on maternal deaths every 10 years or so to assess the prevailing situation
- Testing of process indicators for assessment of reduction in maternal mortality
- Testing of new indicators, for example case fatality rates for assessment of maternal deaths (in tertiary care hospitals) as opposed to MMR

- Need for intervention studies for example the impact of better referral linkages, provision of EmOC, upgrading of facilities and their impact on maternal mortality and morbidity in catchment populations
- Testing of useful cost effective interventions and treatment protocols for management of poor patients at community and facility levels. At the community level for example use of partograms by midwives and TBAs for early referrals. For hospitals, use of craniotomies for dead fetuses and symphysiotomies in case of obstructed labor, use of manual vacuum aspiration in incomplete abortions, and modifications in treatment protocols etc.
- Intervention studies for example training of skills of craniotomy, symphysiotomy to midwives and seeing the impact of this training in saving the lives of mothers
- Need for identifying factors delaying management once the patient has reached the facility (Third Delay)
- Information on morbidities occurring as a result of management provided in the maternity homes/hospitals etc.
- Information on social impact on women surviving complications for example prolapse of uterus, cervical tears, gaping of episiotomies, damage to ureters/bladder, or development of VVF
- More research is needed on maternal morbidities. Available information is incomplete and insufficient.
- Unsafe abortion is one of the major causes of maternal deaths or illness. More research is needed in this area for example national representative estimate of induced abortions, cost implications of unsafe abortion and its management, post abortion care and family planning , and gender differences about induced abortion.
- Role of men in supporting induced abortion

### Needs for further research

*Intervention research* is the most neglected area in safe motherhood research. We require testing of strategies keeping in view the country's meager resources and requirements.

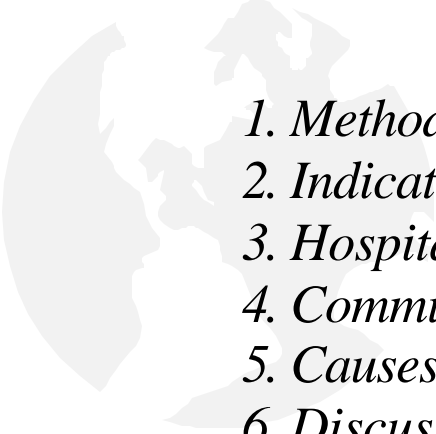
- Creation of revolving drug funds, better ways of record keeping, interventions to reduce cost or duration of stay in hospitals, testing of new indicators for maternal survival, maternal deaths audits, etc. can be very useful
- IEC interventions can result in community mobilization for blood donations, timely maternal care, availing of EOC, seeking care when needed.
- Trying out transport schemes, better communication systems establishing maternity waiting homes, local insurance schemes or formation of local safe-motherhood committees can result in improved maternal health
- There is a need for qualitative research, which can give insight into reasons for non-utilization of government health facilities and establishment of a functioning health system

*Research on social and cultural determinants of maternal health* is also lacking. It is important to know about the attitudes of people towards maternal health. Only one published paper on this subject was identified. Some of the gaps identified are

- Identification of health seeking behavior of an individual or family during and after pregnancy, and their pattern of resort.
- Interventions to bring change in the behavior of people. This should not be tangent to the social and cultural norms, for example factors responsible for first and second delay.
- Involvement of men in maternal care

# A review of research on maternal health Pakistan

## Section-1: Maternal Mortality

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1. *Methods to assess maternal mortality*
  2. *Indicators of maternal mortality*
  3. *Hospital-based data on maternal mortality*
  4. *Community-based data on maternal mortality*
  5. *Causes of maternal mortality*
  6. *Discussion*

A maternal death is defined by the International Classification of Disease, 9<sup>th</sup> Revision (ICD-9), as ‘the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes’. The Tenth Revision of ICD adds a category called “pregnancy related death”, which is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Maternal deaths are classified into two groups (12)

- Direct obstetric deaths – those resulting from obstetric complications of the pregnant state (pregnancy, labour, and the puerperium), from interventions, omissions, or incorrect treatment, or from a chain of events resulting from any of the above.
- Indirect obstetric deaths – those resulting from previous existing disease or disease that developed during pregnancy and that was not due to direct obstetric causes but has aggravated by the physiological effects of pregnancy.

The estimate of maternal mortality is an important indicator of human and social development of a country. It reflects the status given to women by society, and the efficiency of the health care system to address the needs of the women.

It is extremely difficult to assess levels of maternal mortality at the national level. Doing so requires information included on a death certificate about the age, the pregnancy status and the cause of death of the women who died in their reproductive years. Developing countries including Pakistan lack viable and efficient vital registration systems and most deaths go unrecorded. Even in countries having functioning and relatively complete vital registration systems, the cause of death may not be adequately defined and hence the estimation of maternal mortality may be difficult.

## **1. Methods to assess maternal mortality (13)**

### ***Vital registration system***

Accurately measuring maternal mortality requires an adequate vital registration system having sufficiently complete coverage and good quality of data. The accuracy of the data from the vital registration systems depends upon proper certification of the cause of death. Unfortunately in Pakistan, the vital registration system is far from complete and accurate. Therefore, it is not possible to estimate the levels and trends in maternal mortality using the vital registration data.

### ***Household Surveys***

Household surveys have been used to estimate maternal mortality levels in countries where the vital registration system does not exist or is poorly implemented. However, surveys are extremely expensive, as they need a very large sample size to provide statistically reliable estimates, particularly when the objective is to define trends in maternal mortality or compare maternal mortality across regions. Conducting a nationally representative survey to estimate maternal mortality is rarely possible. In Pakistan, regional surveys have been conducted to determine the levels and causes of maternal mortality in selected districts (Maternal and Infant Mortality Surveys, The Aga Khan University, 1991-1993).

### ***Sisterhood method***

The sisterhood method for estimating maternal mortality was carried out during the late 1980s. The method requires a much smaller sample size than household surveys but gives estimates of maternal mortality for periods of 10-12 years prior to the survey. The information is obtained by interviewing female respondents about the survival of their adult sisters. Respondents are asked four simple questions about how many of their sisters reached adulthood, how many died, and whether those who died were pregnant (or within 42 days of termination of a pregnancy) at the time of death. A variant of the method is called the 'direct' sisterhood method and estimates maternal mortality for periods approximately seven years prior to the survey. Neither method can provide a current estimate of maternal mortality and, therefore, cannot be used to monitor changes in maternal mortality or to assess the impact of interventions in the short term. The indirect methods also tend to under-estimate maternal deaths due to abortions or early pregnancy (which will not be reported by the respondent as pregnancy-related deaths). In Pakistan, the National Institute of Population Studies have recently used the indirect estimation method of maternal mortality (Pakistan Reproductive Health and Family Planning Survey, 2001).

### ***Reproductive Age Mortality Studies (RAMOS)***

This type of studies investigate the deaths of women of reproductive ages in a given area over a specified time period to identify which of the deaths can be classified as maternal deaths. The study involves identifying and investigating the causes of all deaths of women of reproductive age group in the study population. While such studies provide valuable information on the causes and risk factors of maternal mortality, they do not always provide data on levels of maternal mortality.

### ***Maternal Death Review (MDR)***

The maternal death review is a qualitative, in-depth investigation of the causes and circumstances surrounding a small number of maternal deaths. Usually deaths occurring in a health facility are investigated using a combination of quantitative and qualitative data collection methods to formulate hypotheses about weak points in the maternal health care system and how they might be overcome. Obviously, such studies cannot provide estimates of maternal mortality.

## **2. Measures of maternal mortality**

### ***Maternal mortality ratio (MMR):***

The MMR is the most commonly used measure of maternal mortality and is described as the number of maternal deaths per 100,000 live births. This ratio approximately measures the obstetric risk of death that a woman faces each time she becomes pregnant. The MMR indirectly reflects the quality and accessibility of obstetric care available to women.

A national estimate of the MMR is not available for Pakistan. The figure usually quoted by the Government is 340 per 100,000 live births, which was reported by UNICEF in 1998 (State of the World's Children, 1998), which was an estimate generated from regression models using DHS data from over 40 developing countries. Using the same technique, Hill et al. (2000) have estimated an MMR of 201 for Pakistan, which is considered to be a bizarre underestimate by many Pakistani experts. It may be noted here that UNICEF's State of the World's Children – a major source of statistical information for Pakistani government officials – has stopped reporting Pakistan's MMR since 1999. It is also worth noting here that the estimates of maternal mortality vary greatly by region and source of data, as revealed by various hospital-based and community-based studies.

***Maternal mortality rate (MM Rate):***

It is defined as the annual number of maternal deaths in a given period per 100,000 women of reproductive ages (usually, 15-49 years). This measure represents the true risk of maternal mortality in a population of women. It is interesting to note that the MM Rate will decrease with a reduction in the birth rate, even when there are no improvements in the quality and accessibility of obstetric care in the country.

***Lifetime risk of maternal mortality:***

As mentioned earlier, a woman is at the risk of maternal death each time she becomes pregnant; the risk of dying of obstetric complications, therefore, accumulates. The lifetime risk of maternal mortality reflects the probability that a woman will die a maternal death<sup>1</sup>. The risk is often presented as the proportion of women who are likely to die a maternal death. This measure is by far the most dramatic when it comes to compare the developing and the developed world: In Pakistan, for example, the lifetime risk of maternal death is estimated as about 2.5%, or 1 in 40 (indicating that one out of forty women will die a maternal death), while the comparable risk in the USA and EU is about 1 in 4,000.

### **3. Hospital-based data on maternal mortality**

There are several hospital-based studies on the levels, causes and risk factors of maternal mortality that were conducted and published in Pakistan. Some are listed below.

1. An inquiry carried out in thirty large hospitals, by the Society of Obstetricians and Gynecologists of Pakistan in 1989-90, estimated MMR of 670 per 100,000 live births (14). Investigators of this study sent a questionnaire to all government and large private hospitals. Information was requested about the number of deliveries, booking status of patients, number of maternal deaths, and the age, parity and cause of death for each maternal death. Thirty hospitals responded, twenty from the Government and public sector and ten from private sector. The most common causes of deaths were hemorrhage (21.1%, both antepartum and postpartum) eclampsia (18.6%) and puerperal sepsis (13.3%), while 11% deaths were due to abortions and 8.7% due to ruptured uterus.
2. In a study from Jinnah Postgraduate Medical Center (JPMC) where information on maternal death was collected over a period of ten years from 1981-1990, the estimated MMR was 700 per 100,000 live births. Almost 82% of maternal deaths were attributed to direct causes. Live births reported were 53,987 and number of maternal deaths as 384. Hemorrhage accounted for 20%, pregnancy-induced hypertension for 19.8% and abortions for 10% of maternal deaths. Another study from the same hospital looked into the causes of death among 150 women who were dead on arrival at the Hospital during the period 1981-1992 (18). A majority of these women lived within the city in areas 5-10 km from JPMC. The reasons for delay in reaching the hospital were ascertained from the family members accompanying the deceased woman. The probable cause of death was determined on the basis of history alone, and no autopsies were done. None of the women were booked for antenatal care at JPMC and all belonged to low socio-economic class. Ninety-two (61.3%) had been delivered 2-4 hour before reaching the hospital, while 48 (32%) died before giving birth. Hemorrhage (42%) was the leading cause of death, while eclampsia accounted for 19.3%, ruptured uterus for 9.3% and

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<sup>1</sup> The lifetime risk of maternal mortality is estimated using:  $1 - ((1 - P_m)^{TFR})$ , where  $P_m$  is the probability of maternal death, reflected as maternal mortality ratio (MMR/100,000).

- acute inversion of uterus for 6% of these deaths. The reported reasons for the delay in arriving at the hospital were: unavailability of transport and lack of finances (39%); the family's hesitance to go to the hospital and/or need for permission from the husband (34%); and inadequate maternal services (21%), while a reason for delay could not be established among 6% of cases.
3. Analysis of maternal deaths from Chandka Medical College and Hospital and Shiekh Zayed Women Hospital Larkana, reported 62 cases of maternal deaths during 1994-95 out of 2,989 emergency obstetric admissions (15), indicating a high case fatality rate of 2.1%. These admissions resulted into just 1,308 live births, giving rise to an extremely high MMR of 4,740 per 100,000 live births. Major causes of maternal death were hemorrhage (51.8%), eclampsia (32.3%) and sepsis (8.8%). Recommendations to reduce maternal mortality from this study were: basic health education messages for women, improvement in female literacy rates, public awareness to utilize health services, availability of health services, ambulance services, training of traditional birth attendants, training of midwives, a functional referral system, upgrading of secondary hospitals, hospital staff meetings to discuss maternal deaths and establishment of various committees to advise government on ways to reduce maternal mortality.
  4. The Department of Obstetrics and Gynecology Bolan Medical College (Quetta) reported MMR of 630 for the period 1991-1994, which was based upon 128 maternal deaths and 20,317 total deliveries and not live births (16). The investigators critically reviewed the case reports and laboratory investigations before assigning the cause of death. Where the death could be attributed to multiple causes, the most important one was reported as the cause of the death. The leading causes were hemorrhage (53.1%), sepsis (25%) and eclampsia (11.7%). This study recommends a strong community education campaign about the importance of antenatal checkup and better nutrition for pregnant and lactating mothers. Improved obstetric care, during delivery, improving the social environment and encouraging the use of family planning are some of the other recommendations by the author for reducing maternal mortality.
  5. An analysis of maternal deaths conducted at the Liaqat Medical College and Hospital, Hyderabad, (1990-1995) reports a very high MMR of 2,322 per 100,000 live births (17). The major causes of maternal deaths were sepsis (20.5%), eclampsia (19.7%), and uterine rupture and obstructed labor (14%). This article further discusses about the trends seen in the direct and indirect causes of death over the years, and reports that the hospital's MMR has not reduced much during the last decade. This study recommends availability and good access to medical care, blood transfusion services and antibiotics to reduce maternal deaths.
  6. Another study looked into the causes of maternal deaths associated with cesarean section that were carried out in Allied Hospital Faisalabad during 1990-1992 (19). Out of 7,423 deliveries, 2,089 (28%) were performed through cesarean section. The commonest indications for the cesarean section were obstructed labor (46%) and antepartum hemorrhage (26%). The total number of maternal deaths was 64, out of which 35 deaths followed a cesarean section (mortality rate of 1.7%). The study also pointed out the facility-based factors contributing to the c-section deaths, including inadequacy of blood transfusion services, incompetence of junior staff to manage complications and non-availability of a senior anesthetist at the time of patient's arrival.
  7. A study from Sir Gangaram Hospital, Lahore (20), reported MMR of 225 during 1983-1992. however, the methodology used to estimate the MMR over a period of 10 years has overestimated the ratio and is questionable. Additionally some of the variables have wrongly being termed as risk factors related to maternal death.

8. A report of the Maternal and Child health Center of Pakistan Institute of Medical Sciences (PIMS), Islamabad, includes data from seven referral level hospitals of Rawalpindi and Islamabad (21). The estimated MMR was 311, while the leading causes of maternal deaths were hemorrhage (27%), sepsis (21%), and hypertensive disorders (19%). Most maternal deaths were attributed to the delays in decision making to seek medical care and difficulties in getting transport.

#### **4. Community-based data on maternal mortality**

##### ***Maternal and Infant Mortality Survey (MIMS)***

The most recent community-based information on maternal mortality is available from the Maternal and Infant Mortality Survey (MIMS), which was carried out in selected clusters in Karachi, Balochistan (Pishin, Loralai, Lasbela, and Khuzdar), the NWFP (Peshawar, Hazara and Dera Ismail Khan Divisions) and FATA (Kurram and Khyber agencies). The survey was carried out during 1989-1993, by the Department of Community Health Sciences, The Aga Khan University, Karachi. The survey used pre-coded questionnaires administered to over 55,000 households to ascertain household characteristics, complete pregnancy histories and births and deaths in the household during the five years preceding the survey. Verbal autopsy questionnaire were then administered to the households reporting the death of an adult female during the last five years. Descriptive, bivariate and multivariate analyses were carried out to determine association between background variables, biological factors, social indicators and maternal mortality.

1. The overall MMR, combining data from all study sites was 433 per 100, 000 live births (23). The MMR ranged between 281 in Karachi to 673 in Khuzdar, Balochistan. Hemorrhage (52.9%), puerperal sepsis (16.3%), and eclampsia (14.4%) were the leading causes for direct maternal deaths. Logistic regression analyses were conducted to estimate the odds ratio (OR) for the following risk factors: poor construction material of the house (OR = 2.1 [1.3, 3.2]) distance of 40+ miles from the nearest hospital (OR = 1.3 [0.9, 1.8]), five or more previous pregnancies (OR = 1.6 [1.2, 2.4]) and previous history of one or more fetal losses (OR = 5.3 [3.8, 7.4]). The study recommended an approach focusing on women at a high risk of maternal mortality, such as those having five or more pregnancies previously, those having a poor obstetric history and those residing in villages 40 miles or farther from a secondary care hospital. Those without access to water, living in katcha houses and at greater distance from the nearest hospital must be considered at risk as these are the ones who are most likely to die during pregnancy or the post partum period. The authors further emphasized the importance of training, monitoring and supervision of birth attendants for the provision of oxytocics to avoid deaths due to direct obstetric causes.
2. In Karachi, the MIMS was conducted in eight squatter settlements, including 10,135 households (24). The study identified 34 maternal and 87 non-maternal deaths. A nested case-control analysis was used to determine the risk factors of maternal mortality, whereby the 34 maternal deaths were the cases and controls were the surviving women reporting a pregnancy in the preceding five years. To assess the potential public health impact of significant risk factor, the population-attributable (PAR) was estimated. The main medical causes of direct maternal deaths were hemorrhage (47%), eclampsia (20%) and puerperal sepsis (12%). Important risk factors identified were woman's employment (OR=3.8 [1.1, 13]), husband's unemployment (OR=5.9 [1.5, 22.5]), and poor prior pregnancy history (OR= 5.7 [1.0, 27.3]). The population attributable risk for these risk factors was 21.3% for woman's employment,

- 14.6% for husband's unemployment, 8.8% among women having their first pregnancy and 20.7% among women having a poor obstetric history (prior fetal losses). The study concluded that short term strategies could focus on steps dealing with inadequate and delayed health care and urgent need for appropriate training of the dais and local health care practitioners to improve recognition of complications of pregnancy and prompt referral to appropriate facilities.
3. In another analysis, the MIMS data from Karachi were subjected to the reproductive age mortality study (RAMOS) method for assessing maternal deaths (25). The overall adult female mortality rate in the eight squatter settlements was 151 per 100,000 women aged 10-49 years, which was higher than the male mortality rate in the same age group (146.9 per 100,000 men). This study found a 2.8 percent excess of female over male deaths. Since 28.1 percent of all deaths were due to obstetric causes, removal of these causes resulted in a considerable reduction in adult female mortality, which is consistent with reports from developed countries where preventable obstetric causes of death have been largely eliminated. The study concludes that Government and private organizations should urgently address the deaths of women in the reproductive ages. Development and implementation of cost-effective health intervention strategies including health education messages should be given a priority.
  4. Another detailed analysis of MIMS data from Balochistan and NWFP investigated the contextual risk factors associated with maternal mortality (26). A nested case-control design was used, whereby the cases were 261 maternal deaths reported during the last five years and 9,135 controls were randomly selected from the women who survived a pregnancy during the same period. Using multilevel analysis, the study estimated the interactions between the biological risk factors of maternal mortality and the district-level indicators of health services. The over all MMR was 392 maternal deaths per 100,000 live births. Within districts, the MMR ranged between 51 and 688. This study tried to estimate the reasons for variation in the maternal mortality in between districts, after accounting for the individual level risk factors. The variation in mortality between districts was dependent several district-level attributes including staffing patterns of government health facilities. The study also revealed that the high-risk women were better off living in a district with well-staffed peripheral health facilities (PHFs), even when access to emergency obstetric care (EmOC) was poor. These women were at the highest risk if they lived in the districts having poorly staffed PHFs and poor access to EmOC, and at the lowest risk if they lived in the districts having well-staffed PHFs and better access to EmOC. However the women living in the districts having well staffed PHFs were at no greater risk if their access to EmOC was poor. These two factors (staffing of PHFs and accessibility of EmOC) could explain some, but not all, of the variability within the districts related to maternal mortality. The study concluded that in the rural districts of Balochistan and NWFP provinces of Pakistan better staffed peripheral health facilities and improved access to EmOC could significantly reduce maternal mortality among high-risk women.

#### ***Other community-based studies***

1. An important part of the data on community-based maternal deaths come from the work of Dr. Altaf Bashir from Faisalabad, Punjab (27-31). The Faisalabad Obstetric flying Squad (FOFS) was created in 1988 in response to high levels of maternal mortality and morbidity in the city. The project provided free ambulance services to poor mothers in case of obstetric emergencies. The ambulance system was linked to Allied Hospital Faisalabad. Trained hospital staff was available round the clock to carry out the life saving procedures. The other objectives of the project included training of

traditional birth attendants, establishing maternal and child health centers, free maternity services at the Allied Hospital. Other components of the project included provided public health education through the use of media and mobile health camps and improved liaison between dais, lady health visitors, hospital staff and patients. A four year review of the work of FOFS revealed that the Squad shifted 394 women in need of EmOC, which represented about 5% of all obstetric admissions in the Hospital. Maternal mortality declined from 86 to 64 per 100,000 live births. However, the validity of the reduction in maternal mortality is doubtful because of the flaws in the study design, e.g., lack of comparable admission data from other hospitals.

2. A report published by Behbud Association looked into the causes of maternal mortality and morbidity in peri-urban and rural areas of Rawalpindi in 1999 (32). A total of 461 households were surveyed; 29 of these households reported a maternal death in the past 10 years. In the peri-urban setup, maternal deaths were highest among multiparous women. Hemorrhage, puerperal sepsis, pregnancy-induced hypertension, obstructed labor and abortions were the leading direct causes of maternal death.

## 5. Causes of maternal mortality

Globally, around 80% of all maternal deaths are the direct result of complications arising during pregnancy, delivery, or the puerperium.

- **Hemorrhage**, especially postpartum hemorrhage, is unpredictable, sudden in onset, and more dangerous when a woman is anemic. Some 25 % of all maternal deaths are due to hemorrhage.
- **Sepsis** is often a consequence of poor hygiene during delivery or of untreated sexually transmitted diseases. Some 15 % of maternal deaths occur as a result of sepsis.
- **Hypertensive disorders of pregnancy**, particularly eclampsia, are the cause of 12 percent of all maternal deaths.
- **Prolonged or Obstructed labor**, accounts for about 8% of all maternal deaths. This is often caused by cephalopelvic disproportion or by an abnormal lie.
- **Complications of unsafe abortion**, are responsible for 13% of all maternal deaths

Approximately 20 % of maternal deaths are the result of pre-existing conditions that are exacerbated by pregnancy or its management. One of the most significant is anemia which , as well as causing death through cardio-vascular arrest, also contribute to direct causes of deaths for example hemorrhage and sepsis.

### 1. Hemorrhage:

Nearly all studies on maternal mortality have identified hemorrhage as the major cause of maternal deaths. Some studies even attempted to identify the causes of hemorrhage as well (Table 1.4). However, since most causes are overlapping there is confusion in assigning the cause of bleeding. Some studies have taken uterine rupture as a separate cause of bleeding not including into APH or PPH. Others have combined APH and PPH into a broad category of hemorrhage. Community based studies have settled for broad categories which is understandable as identifying a clinical cause through verbal autopsy instrument is very difficult. One study from Sandeman Civil Hospital, Quetta by Tasneem Ashraf addressed the issue of postpartum hemorrhage per se (33). This study was conducted from January 1993-

December 1996. The case records of the patients were reviewed retrospectively. There were 13,850 deliveries conducted, and out of these 338 women had PPH. Eighty-nine percent of these patients had primary PPH while 11% had secondary PPH. The commonest cause of PPH was retained placenta in 126 cases followed by uterine atony in 116 cases. Eleven patients succumbed to PPH, 2 died in hospital and 9 were either brought dead or in moribund condition. Morbidities following PPH were high-grade fever in 10 cases and acute renal failure in six cases. Most of women who developed PPH were delivered at home (54%) followed by private clinics or maternity homes (26%) and Civil Hospital Quetta (20%).

In another study conducted by the Department of Obstetrics and Gynecology, The Aga Khan University, the effects of first and second trimester vaginal bleeding on pregnancy outcome were assessed (34). The study subjects were 268 non-diabetic patients. Out of these 173 patients were non-bleeders whereas 71 women with first and 24 were second trimester bleeders. Fetal loss (abortion) occurred in 34 % of first trimester and 25% in second trimester bleeders. Low birth weight and pre term delivery were significantly associated with second trimester hemorrhage, the results suggest that first and second trimester vaginal bleeding correlates with adverse infant outcomes. This was a retrospective case control study. The study had a small sample size, and wide confidence intervals around ORs. The number of subjects in cases and controls kept changing, which authors have acknowledged, by relating it to the design and incomplete information. The crude ORs were discussed; potential confounders for the association shown were not addressed.

The Department of Obstetrics and Gynecology, Jinnah Post Graduate Medical Center conducted a study on management of postpartum bleeding (35), whereby uterine packing was carried out in 67 cases of acute postpartum hemorrhage over a six years period from January 1989 to December 1994. During this period 41,516 deliveries were conducted and there were 362 cases of postpartum hemorrhage. Fifty packing were done after vaginal delivery in which main indication for was uterine inertia. While 17 packing were done at the time of cesarean section where main indication was bleeding from the placental site of a previous cesarean section. Thirty patients (44.7%) were delivered at JPMC while another 30 were delivered at home and then rushed to the hospital with postpartum hemorrhage after 6-8 hours of delivery. Most of the patients were young (20-25 yrs of age). Fifty-seven were non-booked patients. The complications, which occurred subsequent to packing, were failure of packing in 9 percent of cases, septicemia in 7 percent and maternal mortality in 2.9 % of cases. In this study authors have mentioned that out of a total of 362 cases of PPH which were admitted during 6 years, intra-uterine packing was performed on 67 cases which is 18.5 % of total cases. This study was aimed to find out the efficacy and safety of this method of controlling acute hemorrhage. The authors do not give information on other procedures performed (for example internal iliac artery ligation and hysterectomy) on other patients of PPH and their success or failure rate. Hence it is not possible to draw any inferences about the efficacy of a method without comparison. With a little more insight into the study design and additional information this study would have been more informative and powerful.

## **2. Sepsis:**

Sepsis is reported to be among the top three causes of maternal mortality in the studies mentioned above. The study from Liaquat Medical College Hyderabad, has listed sepsis as the leading cause of maternal deaths, which is in contrast to several other studies (36). The reasons for the high prevalence of sepsis are not mentioned in the study. Various other studies, which discuss maternal deaths due to rupture of uterus, also mentioned sepsis or wound infection as the other important factors contributing to maternal morbidity and mortality (14-17). Limited

literature on ectopic pregnancy is available which address the issue of sepsis indirectly, in the form of reasons for ectopic pregnancy and pelvic inflammatory disease (43,44).

### **3. Hypertension in Pregnancy:**

Eclampsia is listed as the second or third most important cause of maternal deaths in various hospital-based studies. Only one study from Aga Khan Hospital was identified from the literature on hypertensive disorders of pregnancy in the context of maternal morbidity. This study determined the relationship of hemolysis, elevated liver enzymes and low platelets (HELLP) syndrome with maternal and perinatal morbidity and mortality (37). From January 1, 1989 to December 31<sup>st</sup> 1994, the case records of the patients with severe hypertension were reviewed. Out of the 120 cases of severe hypertension, 36 cases of HELLP syndrome were identified. These were then compared with cases without HELLP syndrome. The overall incidence of HELLP was 0.4%. In the ante-partum factors un-booked status (66% vs 30%, p-value <0.05), diastolic BP >120mmHg (61% vs 16%, p-value, 0.05), DIC (13% vs 2%, p-value 0.03), seizures (40% vs 16%, p-value 0.01) and ARF (11% vs 1%, p-value = 0.07) were significantly raised. In the intrapartum factors there were no significant differences between the two groups between the mode and complications of delivery. Neonatal outcomes did not differ significantly between the two groups. The authors suggest intensive monitoring of the patients with HELLP syndrome to avoid complications during and after delivery.

KJ Noorani and M Noorani from the Department of Obstetrics and Gynecology, Civil Hospital Karachi, studied the prevalence of acute renal failure in patients developing abruptio-placentae as a consequence of pregnancy-induced hypertension (PIH) (38). This study was conducted from 1985-1990. There were 8,766 patients admitted in the labor room, of which 1,147 had APH. Out of these 630 cases had abruptio-placentae, and, of these, 45% had PIH. Twelve patients developed renal failure characterized by less than 40ml of urine per 24 hours. These patients were treated with hemodialysis; ten patients fully recovered while the remaining two patients needed kidney transplant.

A study of prevalence and risk factors associated with eclampsia was conducted by the Department of Obstetrics and Gynecology, Allied Hospital Faisalabad and Punjab Medical College Faisalabad during January 1989 to December 1995 (39). Out of 16,952 total births, only 249 patients had eclampsia. Sixty-six percent of these patients were from rural areas. There were no deaths among these patients. The study concluded that community education program created awareness about the importance of antenatal check up which led to early detection and treatment of pre-eclampsia thereby preventing development of eclampsia.

Another study, conducted by the Department of Obstetrics and Gynecology of Services Hospital Lahore during September 1995 to August 1996, reported an incidence of eclampsia at 0.75% of all deliveries. None of the patients had any antenatal check up in that pregnancy. Mean age of the patients was 23 years and the mean parity was 1.2 ( $\pm$  1.08). The mean gestational age at the time of developing eclampsia was 33.8 weeks. Thirteen (68.4%) patients had antepartum fits while the rest had postpartum fits. Cesarean section was the mode of delivery in 26.3% of the patients. There was one death, which resulted from acute pulmonary edema (41).

A study was conducted in Islamabad (42) to study the role of aspirin in the management of pregnancy-induced hypertension in Pakistani population. A randomized control trial on patients with previous history of PET and essential hypertension was carried out to assess the role of Aspirin on patients. The treatment group comprised of 100 women from 14<sup>th</sup> week

gestation onwards or when first seen in antenatal clinic with mild hypertension i.e. BP 140/90 mm Hg recorded on two consecutive occasions, and treated with 75 mg Aspirin bid (1/4<sup>th</sup> tab.) The comparison group comprised of 100 patients on routine anti-hypertensive medicines. The treatment group showed encouraging results as compared to the control group where PET (hypertension + edema + albuminuria) developed in spite of anti-hypertensive treatment with beta blockers and Ca Channel blockers. Aspirin was found to be a very cheap and effective drug for prevention of P.I.H. if given early as a prophylactic agent. It decreases the severity of disease and also neonatal morbidity due to IUGR and preterm deliveries considerably in early detected cases. If given to patients with moderate to severe PET, it has no effect.

#### **4. *Prolonged or Obstructed Labor:***

In addition to the studies mentioned above, very important literature on causes of obstructed labor and rupture of uterus is available from various hospital-based studies. All of these studies have pointed out a high maternal and perinatal mortality associated with obstructed labor and rupture of uterus (42-52). Associated morbidities are also mentioned in these studies. Table 1.5 summarizes the major causes of the rupture of uterus from some of these studies.

## **6. Discussion**

Hospital-based data on maternal mortality is not considered to be representative of general population and cannot be used to estimate national level indicators of maternal mortality. The hospital-based figures either over or under estimate maternal mortality in the general population, depending upon the type of the hospital. Tertiary care public hospitals receive high-risk pregnancies and last-minute referrals of serious obstetric emergencies, leading to extremely high MMRs. On the other hand, private hospitals catering to the higher socio-economic strata of the population have much lower MMRs. Smaller private hospitals and maternity homes may refer their serious obstetric cases to a tertiary care public hospital at the last minute. Hospital staff is usually not trained in statistical methods and sampling design, and many hospital-based studies suffer from design and sampling problems. Completeness of information is an important issue in retrospective studies, which leads to missing information on certain important variables. When only hospital records are used for conducting maternal mortality studies, the above problems increase. In spite of these weaknesses, hospital studies are a good source of the distribution of medical causes of maternal deaths and, in some cases, of the underlying risk factors. Maternal mortality data from public hospitals represents the situation among high-risk women in the population.

The hospital-based studies reviewed in this report used different standards and/or definitions to assign the cause of death. Some of the definitions were problematic, and so were the source of data used to assign a cause of death. Variation in the definition also made the results less reliable. In the absence of certain set standards some studies will report primary cause of death as hemorrhage and others as uterine rupture. For example, the study conducted by Chandka Medical College classified the deaths from uterine rupture under hemorrhage. The study reports that about 52 percent of maternal deaths were due to hemorrhage, which is much higher compared to the other studies. It was not clear whether these deaths were primarily due to hemorrhage or due to rupture of the uterus. In some other studies, deaths due to uterine rupture were classified under obstructed labor.

The MIMS survey gives us an insight about the risk factors related to maternal mortality. Although the results are representative within the districts and regions where the MIMS was conducted, they do not represent the national situation. Moreover, data on maternal

deaths refer to a period of five years before the survey, and problems associated with the recall of events surrounding maternal deaths cannot be ruled out. It is also possible that some maternal deaths might have been misclassified as non-maternal or vice versa and that some maternal deaths were not reported. Finally, the survey used verbal autopsy questionnaire to identify maternal deaths and assign a cause of death. Since the questionnaire was not validated, the degree of its accuracy cannot be established. The articles and reports published using the MIMS data have acknowledged these limitations.

Most published studies and reports from the MIMS present the MMRs and their 95 percent confidence intervals for different sites. These indicate that although there are differences in the point estimates between sites, many of their confidence intervals overlap. This is not surprising since the MIMS was conducted only in the rural areas (with the exception of Karachi, where the survey was conducted in urban squatter settlements). However, it is interesting to note that the authors were able to demonstrate the significant impact of distance from health facility and the socioeconomic development of the districts on maternal mortality.

In all the studies reviewed for this report the most commonly used indicator of maternal mortality is MMR. Since maternal deaths per se are a rare phenomenon, cumulative deaths over a period of time are estimated. It is hard to use the MMR as an indicator to monitor trends in maternal mortality over a period of time, unless national level data from a reliable vital registration system exists. Unfortunately in Pakistan, the vital registration system doesn't work. There are several alternatives to using MMR, an important one is using the case fatality rates among obstetric complications in public hospitals. It is possible to designate a few large public hospitals catering to the general population for monitoring maternal deaths. These hospitals can issue annual estimates of case fatality rates (and also the prevalence of 'near-miss' obstetric admissions in the hospital in that year<sup>2</sup>).

The pattern of causes of maternal deaths in Pakistan has remained largely unchanged over time, with slight regional variations. We now have sufficient regional and national data regarding the burden of the problem, causes of death and factors associated with high maternal mortality. What is lacking is the evidence-based research testing cost effective strategies to address these issues. Nearly all the studies recommended the need health education messages, raising the status of women and upgrading health facilities to provide a full spectrum of emergency obstetric care. These recommendations can within our constrained resources be implemented was left unanswered. These studies made no direct evidence that interventions improved treatment protocols, or availability of equipment or training of personnel made any impact on the morbidity or mortality of women. There are very few ongoing projects having a potential to provide such evidence. An example is the Balochistan Safe Motherhood Initiative (an operations research project of The Asia Foundation), which was designed to test interventions to reduce each of the three delays considered to be responsible for maternal deaths.

Generally the clinical causes of maternal mortality are overlapping. Hemorrhage has been mentioned as the most important cause of maternal mortality. There is a general confusion in the studies to define cause of hemorrhage. It becomes more evident when uterine rupture is associated with it. In some studies it is then neither included in APH or PPH.

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<sup>2</sup> 'Near-miss' is defined as a serious obstetric complication where the woman would have died had she not been transferred to the secondary hospital in time.

Sepsis has been identified as main or associated cause of death in above-mentioned studies. But it is not clear what was the basis of assigning sepsis as cause of death. Additionally there is a dearth of information on intrauterine infections and pregnancy outcome. Similarly very few articles were found on hypertensive disease of pregnancy. As pregnancy induced hypertension, pre-eclampsia, and eclampsia are the important causes of maternal morbidity and mortality more research is needed in this field, for example testing of different treatment protocols for their prevention and management.

Obstructed labor is one of the major causes of maternal mortality as is reviewed earlier. The main causes of obstruction identified in various studies were cephalopelvic disproportion followed by injudicious use of Oxytocins. Most of the obstructed labor cases ended as uterine rupture.

Generally women with obstructed labor reached hospital in very serious conditions often tired, exhausted and dehydrated. In nearly all the studies the authors have mentioned late arrival of the women, long distances traveled, manipulation by the TBAs and injudicious use of oxytocin as some of the factors associated with ruptured uterus and subsequent maternal and perinatal mortality. The cases were managed by performing laparotomies, repair of uterus, tubal ligation, and hysterectomies. These studies did not identify the delay factors within their own facility, for example waiting time in emergency rooms, time taken to be examined by a skilled doctor, time spend on arrangement of blood, or operative management etc. As all these studies were retrospective case reviews this information was probably not available. Studies identifying these factors would be a useful contribution in preventing not only maternal deaths but would also help improve the hospital management of the patients. Additionally testing of other than conventional procedures could add more to the knowledge. For example an abdominal operation performed on dehydrated compromised patients may result in further spread of infection. Other alternatives to be tested in such cases when fetus is alive could be vacuum extraction, forceps delivery, symphysiotomy or internal podalic version. In cases where fetus is not alive, craniotomy or decapitation can help in saving the life of mother from added risk of infections. However, it requires a considerable amount of skill, judgment and competency. Rupture of the uterus must be excluded. In Karachi 32 cases of craniotomies were performed on dead hydrocephalic fetuses with obstructed labor, for, after coming head of breech, and failure to progress to the second stage of labor. This procedure showed maternal morbidity of 12.5 % and no maternal deaths. The authors concluded that craniotomy is safe and quicker than cesarean section in selected cases.

Regarding unsafe abortions very little is available in the literature on unsafe abortion from Sindh and Balochistan. Community based study has its limitation for not being representative of Pakistan nor Sindh. It represents women of three squatter settlements of Karachi. Rates mentioned might be an underestimate those women who may have died as a result of complication of unsafe abortion are not included. In the Study by F Fikree there were three deaths attributed to unsafe abortion. Due to the small denominator (maternal deaths n=34) and few numbers in the numerator can give deceptively high percentages, as in this case it is 8.8%.

Research is needed, in Pakistan, to identify extra cost incurred by the hospitals in treating patients with complications of induced abortion.

Intervention studies very helpful in designing future maternal health programs for women residing in rural areas.

**Table 1.1:****Selected indicators of women's health, major countries of South Asia.  
State of the World's Children, 2000**

<i>Country</i>	<i>Life expectancy females as % of males</i>	<i>Adult female literacy rate as a % of males</i>	<i>Contraceptive prevalence rate (%)</i>	<i>Percent of pregnant women immunized against tetanus</i>	<i>Percent of births attended by trained health personnel</i>	<i>Maternal mortality ratio</i>
<i>Bangladesh</i>	100	53	49	86	8	440
<i>India</i>	102	55	41	80	34	410
<i>Pakistan</i>	103	44	17	58	18	340*
<i>Sri Lanka</i>	107	93	66	78	94	60

\*Unconfirmed MMR estimated through mathematical models.

**Table 1.2:**

**Country estimates of number of maternal deaths, lifetime risk of maternal mortality and perinatal deaths, 1990.**

<i>Country</i>	<i>Number of maternal deaths</i>	<i>Lifetime risk of maternal death</i>	<i>Perinatal deaths per 1000 births</i>
<i>Bangladesh</i>	33,000	1 in 21	85
<i>India</i>	1,47,000	1 in 37	65
<i>Pakistan</i>	18,000	1 in 38	70
<i>Sri Lanka</i>	520	1 in 230	25

Source: Revised 1990 estimates of maternal mortality: A new approach By WHO and UNICEF. April 1996

**Table 1.3:**

**Maternal Mortality Ratios, Pakistan**

<i>Study and Author</i>	<i>Year the study was conducted</i>	<i>No. of Live Births</i>	<i>No. of Maternal Deaths</i>	<i>MMR/ 100,000 live births</i>
<b>Facility Based Information</b>				
<i>Jaffarey S. Maternal Mortality in Pakistan (14)</i>	1981-1990	53,987	384	700
<i>Jaffarey S. Maternal Mortality in Pakistan (14)</i>	1989-1990	1004,551	703	670
<i>Sachdev SP, Memon UG. An Analysis of Maternal Deaths in a Hospital In Hyderabad. JCPSP 1996;6:1-3</i>	1990-1995	11,542	268	2322
<i>Ashraf T. Maternal Mortality: A four-year review. JCPSP 1995;6:150-161.</i>	1991-1994	20,317*	128	630*
<i>Baloch R. Prevalence of Maternal Mortality a Critical problem in Rural Population. Pak.J. Obstet. Gynaecol 1997;10: 6-9</i>	1994-1995	1308	62	4740
<b>Community Based Information</b>				
<i>Fikree F, Midhet F et al. Maternal Mortality in different Pakistani sites: ratios, clinical causes and determinants. Acta Obstet Gynaecol Scand 1997; 76: 637-645</i>	1989-1992	45,247	196	433
<i>Fikree F, Gray HR, Berendes HW, and Karim SM. A community -based nested case-control study of maternal mortality. Int J Gynaecol Obstet 1994; 47: 247-255.</i>	1984-1989	12,112	34	281
<i>Midhet F, Becker S, Berendes HW. Contextual determinants of maternal mortality in rural Pakistan. Soc Sci Med 1998 Jun; 46(12): 1587-98.</i>	1991-1993	66582	261	392
<i>Bashir A, Mustansar M, Mahmood Aand Ahmad S. 5 years study of maternal Mortality in Faisalabad City (Pakistan). . Pakistan's J of Obs &amp;Gyn 1994, 7 (2): 9-17</i>	1989-93	2,76,717	215	77.6

\* Reported as per 100,000 Births

**Table 1.4:****Direct causes of Maternal Mortality, Pakistan**

<i>Study and Author</i>	<i>Hemorrhage (%)</i>	<i>Eclampsia (%)</i>	<i>Obstructed labor (%)</i>	<i>Sepsis (%)</i>	<i>Abortion</i>
<b>Facility Based Information</b>					
<i>Jaffarey S. Maternal Mortality in Pakistan (14) (n=384)</i>	19.7	19.8	5.5 (ruptured uterus)	15.3	10
<i>Jaffarey S. Maternal Mortality in Pakistan (14) (n = 644)*</i>	21.1	18.6	8.7 (ruptured uterus)	13.3	11
<i>Sachdev SP, Memon UG. An Analysis of Maternal Deaths in a Hospital In Hyderabad. JCPSP 1996;6:1-3 (n = 268)</i>	14.1	19.78	14.1	20.52	5.6
<i>Ashraf T. Maternal Mortality: A four-year review. JCPSP 1995;6:150-161. (n = 128)</i>	53.13	11.72	-	25	4.6
<i>Baloch R. Prevalence of Maternal Mortality a Critical problem in Rural Population. Pak.J. Obstet. Gynaecol 1997;10: 6-9 (n = 62)</i>	51.8	32.3	-	8.8	-
<i>Fikree F, Midhet F et al. Maternal Mortality in different Pakistani sites: ratios, clinical causes and determinants. Acta Obstet Gynaecol Scand 1997; 76: 637-645 (n = 153)**</i>	52.9	14.4	6.5 (CPD)	16.3 (puerperal)	5.2

**Table 1.5:**

**Direct causes of Maternal Mortality, Pakistan**

<i>Study and Author</i>	<i>Hemorrhage (%)</i>	<i>Eclampsia (%)</i>	<i>Obstructed labor (%)</i>	<i>Sepsis (%)</i>	<i>Abortion</i>
<b>Community Based Information</b>					
<i>Fikree F, Gray HR, Berendes HW, and Karim SM. A community -based nested case-control study of maternal mortality. Int J Gynaecol Obstet 1994; 47: 247-255., Pakistan (n = 34)</i>	47.1	20.6	2.9 (ruptured uterus)	11.8 (puerperal)	5.9 septic abortion)
<i>Midhet F, Becker S, Berendes HW. Contextual determinants of maternal mortality in rural Pakistan. Soc Sci Med 1998 Jun; 46(12): 1587-98. ( n = 261)</i>	40.7	8.4	5.2	12.4	3.6
<i>Bashir A, Mustansar M, Mahmood Aand Ahmad S. 5 years study of maternal Mortality in Fasisalabad City (Pakistan). . Pakistan's J of Obs &amp;Gyn 1994, 7 (2): 9-17</i>	30.2	15.8	-	11.1	1.8

\* Information on 59 women is missing

\*\* Deaths due to direct causes

**Table 1.6:****Estimated MMR from MIMS, by study area, Pakistan, 1989-1992**

<i>Study area</i>	<i>Maternal deaths</i>	<i>Livebirths</i>	<i>MMR</i>	<i>95% CI</i>
<i>Karachi, Sindh</i>	34	12,112	281	186-375
<i>Pishin, Balochistan</i>	19	6,573	289	159-419
<i>Lorali, Balochistan</i>	42	7,079	593	414-772
<i>Khuzdar, Balochistan</i>	40	5,945	673	465-881
<i>Lasbela, Balochistan</i>	23	4,967	463	274-652
<i>Abbotabad, NWFP</i>	15	4,170	360	178-541
<i>Mansehra, NWFP</i>	23	4,401	523	310-736
<b><i>Total</i></b>	196	45,247	433	372-494

Reproduced from F. Fikree et al: Maternal mortality in different Pakistani Sites: ratios, clinical causes and determinants. Acta Obstet Gynecol Scand 1997;76:637-645

**Table 1.7:**

**Direct causes of Hemorrhage leading to maternal mortality  
Sindh and Balochistan**

<i>Name of the Study</i>	<i>Jaffarey S. Maternal Mortality in Pakistan (14) (n=384)</i>	<i>Jaffarey S. Maternal Mortality in Pakistan (14) (n = 644)*</i>	<i>Sachdev SP, Memon UG. An Analysis of Maternal Deaths in a Hospital In Hyderabad. JCPSP 1996;6:1-3 (n = 268)</i>	<i>Ashraf T. Maternal Mortality: A four-year review. JCPSP 1995;6:15 0-161. (n =128)</i>	<i>Baloch R. Prevalence of Maternal Mortality a Critical problem in Rural Population. Pak.J. Obstet. Gynaecol 1997;10: 6-9 (n = 62)</i>
<b>Facility Based Information</b>					
<i>Hemorrhage (n)</i>	76	136	38	68	32
<i>APH</i>			22		
<i>-Abruptio-placentae</i>				17	7
<i>- Placenta previa</i>	76	136		3	3
<i>PPH</i>			16	12	5
<i>Uterine rupture</i>				36	14
<i>Ectopic pregnancy</i>				-	2
<i>Molar pregnancy</i>				-	1
	<i>Fikree F, Midhet F et al. Maternal Mortality in different Pakistani sites: ratios, clinical causes and determinants. Acta Obstet Gynaecol Scand 1997; 76: 637-645 (n = 153)**</i>	<i>Fikree F, Gray HR, Berendes HW, and Karim SM. A community -based nested case-control study of maternal mortality. Int J Gynaecol Obstet 1994; 47: 247-255., Pakistan (n = 34)</i>	<i>Midhet F, Becker S, Berendes HW. Contextual determinants of maternal mortality in rural Pakistan. Soc Sci Med 1998 Jun; 46(12): 1587-98. ( n = 261)</i>		
<b>Community Based Information</b>					
<i>Hemorrhage</i>	81		16		106
<i>PPH</i>	55		12		78
<i>APH</i>	26		4		28

\* Information on 59 women is missing \*\* Deaths due to direct causes

**Table 1.8:****Frequency and causes of rupture of uterus from tertiary Hospitals of Sindh and Balochistan**

<i>Name of the Institution</i>	<i>Time period</i>	<i># of deliveries</i>	<i>Ratio of ruptured uterus to all deliveries</i>	<i>Causes of Uterine Rupture*</i>			
				<i>Obstructed labor</i>	<i>Previous scar</i>	<i>Use of Oxytocin</i>	<i>Grand multipara</i>
<i>Department of Obs/Gyn, Sandeman Civil Hospital, Quetta (n=65)<sup>29</sup></i>	1995-1997	10321	1:158	41	9	6	3
<i>Department of Obs/Gyn, Bolan Medical College &amp; Hospital, Quetta (n=69)<sup>30</sup></i>	1993-1995	13072	1:189	47	13	56	38
<i>JPMC, Karachi (n=257)<sup>31</sup></i>	1986-1992	48,519	1:188	164	97	-	138
<i>JPMC, Karachi (n=23)<sup>32</sup></i>	1991-1992 (1 ½ yrs)	9124	1:396	-	7	1	-
<i>Department of Obs/Gyn, Civil Hospital, Karachi (n=50)<sup>33</sup></i>	1984-1987	4,496	1:90	-	16	-	-
<i>Department of Obs/Gyn, Civil Hospital, Karachi (n=35)<sup>34</sup></i>	1993-1995	3037	1:86	21	9	3	24
<i>JPMC, Karachi (n=195)<sup>35</sup></i>	1989-1993	35,468	1:182	52	92	30	-

\* Number does not add to total due to few selected causes and overlapping of the causes

**Table 1.9:**

**Percentage of Maternal deaths due to Induced Abortion,  
Tertiary Hospitals, Pakistan**

<i>Name of the Hospital</i>	<i>% of Maternal Deaths Due to Induced Abortion</i>
<i>Civil Hospital Quetta, 1991 – 1994<sup>16</sup></i>	4.6
<i>Civil Hospital Karachi, 1992 – 1994<sup>36</sup></i>	15
<i>A community based nested case-control study of maternal mortality<sup>21</sup></i>	8.8

# A review of research on maternal health Pakistan

## **Section-2: Maternal Morbidity**

- 
7. *Obstetric Morbidity*
  8. *Gynecological Morbidity*

In the absence of reliable data, assessing the burden of maternal morbidity is a difficult task. Maternal morbidity has many interrelated causes ranging from physiological or anatomical risk factors to the status of women in society. All of these are closely interwoven. Some of the methods to assess maternal morbidity are described below (13):

**Hospital-based case reviews**

These studies tell us about the nature and causes of the maternal morbidity and also provide information on how to manage these illnesses. Such studies give an idea of the burden of disease but cannot be generalized to situation in the communities, mainly due to the fact that the women included in such studies are the ones who sought treatment; hospital-based studies exclude the women who sought treatment elsewhere, for example from faith healers, or did not seek treatment at all. Unfortunately, hospital-based studies are the primary source of information on maternal morbidity, and a majority of studies reviewed for this report have used this method of research.

**Hospital discharge surveys**

Hospital discharge surveys are good in situations where majority of the population utilizes the facilities, where it can give an idea of the incidence of the disease. In countries like ours they can only be used to assess the satisfaction level of the client for the services provided. Very few studies in Pakistan have used this method of research.

**Cross-sectional studies with clinical examination**

These can be useful only for the chronic conditions where clinical examinations of the patients can be performed (e.g., prolapsed uterus). This method cannot be used retrospectively. However, health facilities and hospitals maintaining detailed and clear clinical records can provide an opportunity to organize and conduct historical prospective studies.

**Studies based upon self-reporting**

In such studies direct questions are asked to women about their perceived illnesses. Clinical examination may or may not have been carried out. Only in those cases where clinical examination were done perceived morbidities were validated. For example perceived vaginal discharge can clinically and through lab test be validated for infections. Such studies are expensive and time consuming. Conditions, which are not perceived as symptoms are missed by this method for example hypertension.

Morbidities can be divided into obstetric morbidities and gynecological morbidities. The review of the literature on reproductive morbidities was conducted under these two broad headings.

**Figure.3.1**

**Classification of Maternal Morbidity**

<i>Obstetric Morbidities</i>	<i>Gynecological Morbidities</i>
<p><b>1. During pregnancy</b></p> <ul style="list-style-type: none"> <li>- Hemorrhage</li> <li>- Discharge</li> <li>- Fever</li> </ul>	<p><b>1. Gynecological morbidity</b></p> <ul style="list-style-type: none"> <li>- reproductive tract infections—PID</li> <li>- cervical ectopy/ cervical cell changes</li> <li>- prolapse</li> </ul>

- *Headache*
- *Odema in limbs*
- *Burning micturition*
- *High blood pressure*
- *Convulsions in third trimester*
- *Natural pregnancy conditions*

- *menstrual problems*
- *dysperunia*
- *infertility*

## **2. Labor**

- *Hemorrhage*
- *episiotomy tear*
- *delivery by instrument*
- *c.section*
- *malpresentation of the fetus*
- *prolonged labor*
- *unsafe abortions*

## **2. Related morbidities**

- *urinary tract infections*
- *anemia*
- *obesity*
- *high blood pressure*
- *STDs*

## **3. Puerperium**

- *hemorrhage*
- *discharge or inflammation*
- *fever*
- *depression*

Most of the research on obstetrical conditions addresses issues under broad heading of maternal mortality. No research has been identified on obstetrical illnesses amongst women who survived hemorrhage, prolonged labor, uterine rupture and eclampsia etc. Though in certain research papers, illnesses subsequent to interventions or as a result of complications of pregnancy are mentioned but the emphasis was mostly on number of maternal deaths.

A selected review of gynecological morbidities is also included in this section as some of the morbidities are a consequence of some obstetrical mishap. For example unsafe birthing practices leading to sepsis or PID, urinary tract infections acquired during pregnancy, uterine prolapse as a result of repeated pregnancies, difficult labor or assisted delivery .

## **1. Obstetric morbidity**

It is the Morbidity faced by a woman who has been pregnant (regardless of the site and duration of pregnancy) from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes (12).

1. *Direct Obstetric morbidity* results from obstetric complications of the pregnant state (pregnancy, labor, and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. This can include temporary conditions, mild or severe, which occur during pregnancy or within 42 days of delivery, or permanent/chronic conditions resulting from pregnancy, abortion or childbirth. Some chronic conditions (such as anemia or hypertension) may be caused by pregnancy and delivery, but are equally likely to have other causes.
2. *Indirect obstetric morbidity* results from a previously existing condition or disease, such as sickle cell disease or tuberculosis, which was aggravated by the physiologic effects of

- pregnancy. Such morbidity may occur at any time and continue beyond the reproductive years.
3. *Psychological obstetric morbidity* may include puerperal psychosis, attempted suicide, strong fear of pregnancy and childbirth, and may be the consequence of obstetric complications, obstetric intervention, cultural practices (such as isolation during labor and delivery), or coercion.

## Direct obstetric morbidity

### 1.1. *Vesico-vaginal fistulas*

Vesico-vaginal fistulas (VVF) constitute a serious disorder resulting directly from complications during labor and leading to severe physical, psychological and psycho-social consequences. Most of the information available on VVF is through hospital-based studies. Two studies from tertiary hospitals of Karachi and other parts of Sindh addressed this issue, looking into the causes of VVF and methods and success rate of repair. One study from Department of Obstetrics and Gynecology, Dow Medical College and Civil Hospital, Karachi, looked into the causes of VVF in 19 patients presenting to the Hospital during a period of 30 months (60). The majority of the VVF (89.4%) resulted due to obstetrical trauma while cesarean section and cesarean hysterectomy were responsible for VVF in one patient each. Approximately 74 % of the patients belonged to age group 20-30 years. Thirty two percent of the patients were primiparous while 42 % were grand multipara. Complications associated with development of VVF were amenorrhea (47.3%) and vulval excoriation (26.3%) This study achieved a success rate 62.5 % for corrective surgery. The authors of the study recommended training of TBAs for early recognition of danger signs and referral. They further recommended provision of ambulance services for transport of patients. Once a patient is seen in obstructed labor, catheter drainage should be instituted prophylactically for 7-10 days to give rest to ischaemic area. Further recommendations are training of surgeons in fistula surgery.

Another study reviewed 102 cases of urovaginal fistulas over a period of 14 years from various hospitals of Sindh province (61). Commonest fistula seen in this series was vesico-vaginal and commonest cause was prolonged obstructed labor. Uretero-vaginal fistula were mainly due to operative trauma after abdominal hysterectomy while vesico-uterine fistulas were due to cesarean section. Urethro- vaginal fistulas were either due to perforating injuries or due to craniotomies. This study was informative in terms of identifying causes of VVF other than obstructed labor.

Information on duration of stay in the hospital, cost implications on facility and patients, disability days (keeping women away from performing household chores) or the social consequences of these mishaps etc. are not addressed in any of the studies mentioned.

A study from Allied Hospital/Punjab Medical College, Faisalabad during January 1992 to December 1993 looked into the causes of development of VVF. Twenty cases of vesico-vaginal fistula were admitted and repaired during this time period. Most of the women were in age group between 20-30 years. The major cause leading to formation of VVF was obstructed labour (60%). The majority, 50% of the women developed VVF between 2-10 days after the obstetric or gynecological trauma. The repair was successful in 100% cases (62).

In another carried out at PIMS, seven cases of repaired VVF by split skin graft during 1988 –1990 were followed-up for 1-2 years. The results were found to be satisfactory in all cases except one (63).

### **1.2. Grand multiparity and its complications**

The Department of Obstetrics and Gynecology, the Aga Khan University reported on the effect of grand multiparity (described as having five or more births earlier) on pregnancy-related complications for mothers and fetuses (64). This study was conducted from January 1991 to November 1995. During this period 9253 women delivered. Out of these women 206 were identified as grandmultiparas. One hundred and forty three were booked cases and had completed records. They served as cases (GMP). For controls (NGMP), 432 women that delivered at the same time, and had parity of less than five were randomly selected. On crude analysis GMP women had a higher mean age as compared to NGMP and this difference was statistically significant. More GMP women were anemic, hypertensive and had diabetes. Postpartum hemorrhage occurred in 9.1% of GMP group as compared to 3.5% in NGMP group. All these differences were statistically significant. On multivariate analysis after controlling for confounding factors women in GMP group were three times more likely to experience PPH as compared to NGMP group. The GMP group also had a three times higher risk for low Apgar scores (7 at 5minutes) as compared to NGMP group. The study concluded that grandmultiparity is a risk factor for pregnancy in this part of the world, even in the presence of reasonable antenatal care at the Aga Khan University Hospital. The authors suggested further studies to determine age as a risk factor for grandmultiparas. Due to small sample size some important associations could not be established in this study.

A retrospective comparative study (65) was conducted to evaluate the obstetric and neonatal outcome of grand multiparity in a population of with low socioeconomic status. The frequency of various obstetric and medical complications in the grand multipara was compared with those women with less parity. Grand multipara was defined as women having five or more previous births, while non-grand multipara women were defined as women having one to four previous births. The frequency of hypertension, diabetes, antepartum hemorrhage and macrosomia was found to be significantly higher in grand multipara as compared to women with less parity. Similarly rate of episiotomy was significantly less in grand multiparas as compared to non-grand multiparas. A seven-fold increase in maternal mortality was observed in grand multipara, but perinatal mortality remained the same in both groups.

### **1.3. Ectopic pregnancy**

Ectopic pregnancies can lead to death if not diagnosed early. They can have prolonged social, psychological and physical effects.

The literature on ectopic pregnancies is scarce. The information available is mainly facility based and addresses the clinical implications of ectopic pregnancies, for example presentation of the patients, causes, complications and interventions performed. Community based information, on prevalence of the problem, its social consequences, factors in third delay contributing to mortality and morbidity in the management of ectopic pregnancy is not available.

Sixty-two cases of ectopic pregnancies admitted in Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre, Karachi from July, 1989 to December,

1990 were assessed (66). It was a prospective study where 62 cases of ectopic pregnancy were diagnosed and managed. During this period 10,798 patients were delivered giving a frequency of ectopic pregnancies of 5.7 per 1000 births. In nearly half (48.3%) of the cases the cause was unknown, 16 % were due to pelvic inflammatory disease, 16% had history of D&E after incomplete abortion, 6.4 % had history of different types of pelvic surgery, 4.8 % had IUCD in-situ, and 1.6 % had recurrent ectopic pregnancy. In discussion section authors mentioned that the patients in this series were of younger age group (25-30 years) and of low parity in contrast to other studies where the risk of ectopic pregnancy increased with increasing age and low parity. All patients were diagnosed through culdocentesis (90.1%). On another 51 cases ultrasound was also performed and showed positive results in 91 % of the cases. Laparoscopy was performed on only 10 cases and had 100 % accurate results. Authors suggested culdocentesis as the method of choice for patients of poor socio-economic strata who could not afford other sophisticated methods of diagnosis.

In another interesting study from the same institution culdocentesis was tested as a useful procedure for diagnosing ectopic pregnancy for developing countries (67). Over a period of five years culdocentesis was carried out in 156 cases of suspected ectopic pregnancy using needle aspiration through the pouch of Douglas. The result was positive in 134 cases, with 131 being true positive and 3 false positive. In 22 cases the result was negative, 6 of which were false negative. Gold standard test used here was laparotomy. Out of 256 patients 134 were found to be positive on culdocentesis, 131 were true positives and three were false positives. In 22 patients the results were negative, 16 were true negative and 6 false negative. These 6 patients were reassessed with culdocentesis after 48 hours. Four showed positive results but two were still negative for which laparoscopy was carried out. The specificity of the test was 97.8 % and sensitivity 95.6%. Authors concluded that culdocentesis is an effective method of diagnosing disturbed ectopic pregnancy. There is some confusion in the paper about the calculation of sensitivity and specificity of the test. Ideally a separate test is used as a Gold Standard test to assess the screening test. Presumably authors have used laparotomy as the gold standard, which was performed on each patient. Confusion starts with those patients who tested negative on culdocentesis. They have mentioned 16 patients as true negative and 6 as false negative. We assumed that, this comment was based on laparotomy findings. But further in the result section they mentioned that 6 patients who were false negative were sent back to the ward for observation and they later had other procedures (laparoscopy) done on them to diagnose ectopic pregnancy. Further more, authors have not commented on the positive predictive value and negative predictive value of the test. On restructuring of the 2x2 tables from given data the sensitivity of the culdocentesis is 95.6% and specificity is 84.2 %. Even though the positive predictive value is high (97.7%) the negative predictive value is 73 %. Which means that more than a quarter of the patients who in fact have the condition will be left untreated or have long stay in hospital without sophisticated intervention or diagnosis.

A 5 years study (68) of 79 cases of ectopic pregnancy was conducted in Lady Willington Hospital, Lahore, to study the clinical presentation, diagnosis and management of ectopic pregnancy. This study also looked into the trend of cases of ectopic pregnancies presenting over the years. No increase in cases of ectopic pregnancy was seen over the years. The classic triad of pain, bleeding and adnexal mass was seen in only 38% of cases. Presence of an adnexal mass was the most frequent ultrasonic finding (60.7%). All patients were treated surgically. Maternal mortality rate was 12.7 deaths per 1000 ectopic pregnancies. The study shows that suspicion is the best method to diagnose Ectopic and that the comparison of data shows no increase in trend of ectopic pregnancy, as seen in westernized world. Though a good study but poor write up and non-clarity of information in the tables have affected the

internal validity of the paper. Additionally, though it is a recent publication, the references cited in the paper are of more than a decade ago and the reader is left with the thoughts whether the facts have changed over the years or not.

In another study, 50 cases of ectopic pregnancy were studied during a two years period (1991 & 1992) at the Department of Obstetrics and Gynecology at Services Hospital Lahore (69). During this period 4954 pregnant women were admitted giving a rate of ectopic pregnancy as 1:99 to normal pregnancy. In 19 cases, the cause of having an ectopic pregnancy remained unexplained, 15 followed pelvic inflammatory disease, 5 had a history of infertility, 4 followed abortion, 4 had recurrent ectopic pregnancy, one was on low dose progestogen, one had IUCD insertion and one followed tubal ligation. The presenting complaint with most of the women was lower abdominal pain; 42 had amenorrhea, 35 had abnormal vaginal bleeding, 15 presented with a history of syncope, and 6 had shoulder pain. Thirteen had a classical picture of ruptured ectopic pregnancy. Diagnosis was made by clinical features, serum Beta-HCG levels, abdominal or trans-vaginal ultrasound and by laparoscopy in five cases. Laparotomy was performed in 49 cases; salpingectomy was done in 38, salpingo-oophorectomy in four, fimbrial expulsion in one, repair in one, and salpingostomy in five cases. Laparoscopic prostin injection was given in one case of unruptured ectopic pregnancy. No mortality was encountered.

A study from Peshawar reviewed the management of ectopic pregnancies during a two years period (June 1995 to June 1997) at the Department of Obstetrics and Gynecology, Hayat Shaheed Teaching Hospital, Peshawar (70). Cases of 54 patients were reviewed to assess and evaluate the management procedures adopted for ectopic pregnancies. The commonest site of ectopic pregnancy was the fallopian tube. A majority of the patients came in the emergency with intra peritoneal bleeding and having low and unstable blood pressure. As a result the gynecologist had no choice but to carry out surgery to save the life of the patient. The study concludes that early diagnosis and treatment, and high levels of awareness among doctors and patients regarding the signs and symptoms of ectopic pregnancy were important factors in reducing maternal deaths.

#### ***1.4. Trauma In pregnancy***

Only one study has addressed the important issue of trauma in pregnancy (71). Reporting and documentation of trauma during pregnancy is negligible. M Younus Khatri from the Department of Anesthesiology, Jinnah Postgraduate Medical Center, Karachi, Pakistan reported 16 cases of trauma in pregnancy from 1991-1995. There were 9 cases of motor vehicle accidents, 3 cases of assault, and 4 cases of fall. Emergency laparotomy was performed on one case and caesarean section in five. Nine cases were discharged undelivered after 72 hours of monitoring and two cases died in emergency unit during resuscitation. There were two fetal losses one with a direct bullet injury and the other with placental abruption due to fracture of pelvis of mother. Both these fetal deaths were associated with maternal deaths.

In the discussion section the author has pointed out that in comparison to other international studies, maternal and fetal deaths reported in this study were comparatively much higher. He has attributed this to lack of awareness, and liaison between different units like trauma, management surgery, Obstetrics/gynecology, and neonatology and also to lack of timely appropriate management. In conclusion author has suggested a need of appropriate management of trauma cases in unity and coordination with different disciplines and a need

for aggressive management. The evidence on which these conclusions are based is not found in the paper and is probably author's own reflections.

In another interesting study, seventy-one cases of obstetrical injuries during a period of 1 ½ year were reviewed. Twenty cases had rupture of uterus, 16 developed vesicovaginal fistulas following prolonged and obstructed labor. In 13 cases vulvo vaginal hematoma was seen. Four patients had recto vaginal fistulas and 7 suffered from 3<sup>rd</sup> degree perineal tear. One patient was admitted with inversion of uterus (45).

### **1.5. Gestational Diabetes**

The Department of Obstetrics and Gynecology, the Aga Khan University carried out this study (72). In order to determine the prevalence of glucose intolerance in pregnancy, 1267 consecutive women attending the antenatal clinic of The Aga Khan University Medical center were subjected to 75gram glucose challenge followed 2 hours later by plasma glucose determination irrespective of gestational age on the first antenatal visit. The glucose challenge test was abnormal (24 hrs plasma glucose >140mgs %) in 8.6% of the screened population. Follow-up glucose tolerance test on these patients revealed a prevalence of 3.2% of gestational diabetes and 1.9% of impaired glucose tolerance test based on the modified O'Sullivan criteria. Based on the result of this study the authors proposed that women who are found to have a 2hr plasma glucose level on Glucose challenge test of <170mgs% (which is the mean +2SD of the plasma glucose level of the subjects with normal GTT) could be used as a cut-off point above which a diagnosis of abnormal glucose tolerance could be made without the need for a GTT. Such an approach will increase the cost-effectiveness of screening programs, which is very important for developing countries where resources are limited.

### **1.6. Gestational Thyrotoxicosis**

An interesting study was conducted among South Asian women belonging to Pakistan, Bangladesh and India, to assess the risk of gestational thyrotoxicosis. The Department of Chemical Pathology, Medicine and Immunology, Northern General Hospital in Sheffield, UK, conducted this study (73). Gestational thyrotoxicosis is now widely believed to result from excessive thyroidal stimulation by HCG. The Authors' impressions are that this condition is more frequent in Asian women than in those of European origin. Thyroid hormone levels in sera of 294 Asian women, obtained as part of a screening program at 15-16 weeks of pregnancy, and compared these with 292 sera from age –and parity-matched European women at a similar time of gestation. TSH levels were significantly lower in Asian group (P < 0.001). Suppressed TSH levels (0.35 mIU/L) were found in 15.7% of Asian women and 4.8% of European women. In both groups of women with suppressed TSH values, HCG and Beta-HCG levels were higher than in the women with normal TSH levels. Free T<sub>4</sub> levels in the Asian women were significantly higher in those with suppressed TSH (P < 0.001), but this was not found in the European women. There was also a significant increase in the free T<sub>3</sub> index in the Asian women with suppressed TSH compared to that in an age-matched group of Asian women with normal TSH levels (P < 0.02), but this was not observed in European women with suppressed TSH. None of the women with suppressed TSH had thyroid-stimulating antibodies. These results show that Asian women more frequently develop biochemical evidence of thyrotoxicosis at the beginning of the second trimester of pregnancy than those of European origin and are, therefore, likely to be at greater risk of clinically apparent gestational thyrotoxicosis and hyper emesis gravidarum. Genetically determined differences in the production or metabolism of HCG isoforms may account for this increases risk. In the discussion section authors mentioned that the maternal thyroid function during pregnancy is complex and varies with each stage of pregnancy. There

is considerable evidence that HCG causes thyroid stimulation and that excessive stimulation leads to gestational thyrotoxicosis, which may manifest in some as hyperemesis gravidarum. The authors concluded that the reasons for these ethnic differences are unknown. One possibility is the production of HCG with higher biological (but unaltered immunological) activity among Asian women. This could be due to the genetically determined variability in glycosylation or peptide heterogeneity.

### **1.7. Labor**

A very interesting study (74), conducted at a private clinic in Islamabad, compared two different types of management protocols, which were provided to patients at different period of time and their impact on perinatal mortality. The case records of 100 women registered in the hospital from January 1988 to July 1992 with premature labor and who were given conservative treatment protocol (which was usual during those times) were compared with case records of another group of 50 women with premature labor, and who were given active treatment protocol with antibiotics and heavy doses of steroids. The change in the treatment protocol was made after high perinatal mortality was noticed in previous years. The babies born to mothers on conservative treatment were limp, with weak cry and sucking reflex. The mortality was also very high in these babies. While babies whose mothers were given active treatment were more active, with healthy cry and better sucking reflex. The mortality was significantly less in these babies as compared to babies of mothers on conservative treatment. To the best of our knowledge this was the only study reviewed, which compared the two treatment protocols. There were no ethical issues in the study as two groups of women in different era were compared.

Another study (75), was conducted at the Rawalpindi General Hospital, Rawalpindi at the Department of Gynecology and Obstetric from June 1995 to June 1996. The study subjects were 50 pregnant women with spontaneous rupture of membranes after 35 weeks of gestation with an unripe cervix. In these subjects PGE<sub>2</sub> vaginal pessary was used to stimulate labour or make the cervix favorable for syntocinon use. The results showed that there was spontaneous vertex delivery in 68% of the cases, forceps delivery in 18 %, vacuum extraction 6 % and by cesarean section in 8% of women. The study did not have any comparison group to truly identify the efficacy of the PGE<sub>2</sub>.

In a study from Faisalabad (76), Dinoprostone E<sub>2</sub> was tested for induction and augmentation of labor. This study was conducted in two trust hospitals (A.F.T. and MMT) over a period of 24 months, from Aug 1995 to Aug 1997. The subjects were 98 pregnant women (55 primigravidas & 43 multigravidas) with poor Bishop score of cervix. All the patients were evaluated beforehand for induction to achieve vaginal delivery. The pessary was inserted into the posterior fornix. Foetal monitoring was done as routine and progress of labour was watched, doing augmentation whenever needed. The results showed that vaginal delivery was achieved in 32 cases (58.18%) of primigravidas and 35 cases (81.40%) of multigravidas. Neonatal outcome was not affected adversely as noted by Apgar score at 1 & 5 minutes. Cesarean section was carried out in 23 (41.82%) cases of primigravidas and 8 (18.60%) cases of multigravidas for various indications. Complication rate for example fetal distress was identified in 12.2% and hyperstimulation of uterus in 11.02% cases. In conclusion, the authors state that the study proved that if supervised properly, Dinoprostone E<sub>2</sub> use is safe, effective and easy. Further more it also reduces the rate of C- sections.

### **1.8. Complications of unsafe abortion**

Community based information on rates and proportions of induced abortion from Pakistan is limited. However, some information on contribution of induced abortion to maternal mortality is available through facility-based data. Table 2.3. Information on abortion-related complications is available from women who reported to Civil Hospital Karachi, from January 1992- to December 1994 (53). Twelve hundred and one patients were identified as having abortion complications. Of these 37 cases were illegally induced. Fifteen patients presented with clinical trauma, 9 had hemorrhage, 11 presented with septicemia and two had anemia and cardiac failure. The illegal induced abortions accounted for 15 % of the total maternal deaths, and approximately 25% in this series of 37 cases. The causes of death were mainly sepsis and trauma.

A four-year study was carried out from July 1992 to June 1996 in Lahore. There were 1993 cases diagnosed as abortions. Eighty-three cases were of induced abortions, 72, induced illegally and 11 were medically indicated. In 31 (43.25%) women, TBAs carried out illegal abortions and the most commonly used method was instrumentation. The commonest complication detected was hemorrhage in 31 (43.25%) patients, sepsis in 24 (33.33%) and trauma in 13 (18%) cases. Indications of therapeutic abortions included maternal malignant diseases and fetal anomaly (54).

In a community-based study from Karachi the maternal deaths, which were attributed to, induced abortion were 8 % (24).

The Department of Community Health Sciences, The Aga Khan University, Karachi, conducted a large community based study on induced abortion (55). The qualitative component of this study consisted of 10 focus group discussion with ever-married women of reproductive age group and 15 in-depth interviews of women who ever had an induced abortion. Women's perspective was obtained regarding abortion methods, providers, reasons for abortion and cost of abortion. The Quantitative arm of the study estimated rates of induced abortion from the three squatter settlements of Karachi.

In the qualitative arm women mentioned helplessness (*majboori*) as the main reason for opting for induced abortion. This was linked to poverty, too many children, increased cost of living and family and spousal conflicts. The quantitative study estimated that ever-married women on an average experience 0.86 abortions during their reproductive life. The abortion rate for the past year (prior to survey) was estimated as 25.5 per 1000 ever married women of reproductive age group. Facility Based study from four tertiary hospitals revealed that abortions in the hospitals are generally classified as spontaneous unless a woman presents with extreme conditions such as rupture of uterus or foreign body is retrieved from vagina, or she admitted inducing the abortion. Two hundred and eighteen women who presented with vaginal bleeding were interviewed. Only four admitted inducing abortion before the doctors. Only after in-depth interviews by the study team did the remaining 13 confide that they had induced their abortion.

In another community-based study by the Aga Khan University, amongst 283 pregnancies reported by 34 women, 11.7 percent were terminated by inducing abortion (56). These studies suggest that Pakistani women living in low squatter settlements of Karachi seek voluntary termination of their pregnancies, with complete knowledge of the dire consequences. They do it with permission of their husband and for the purpose of birth spacing and limiting family size. Both these community based studies did not look into maternal deaths as a result of induced abortion. Yet another community base study, which is

the qualitative arm of bigger project, gave the perceptions and reasons why women opt for induced abortions (57).

In a follow-up study conducted by Asghari K. Awan and Muhammad Akram Parvez, a group of 1576 women in early pregnancy from rural communities were followed-up to determine the outcome of pregnancy. In this cohort of women, 12.8 percent of the pregnancies were reported as unwanted. Four percent of women terminated their pregnancies as induced abortion. Women who opted for induced abortion had on an average 5.9 living children as compared to 2.5 living children with those experienced spontaneous abortion. These women were generally older than women who experienced spontaneous abortion. The providers for induced abortion were doctors, nurses, dais and dispensers. (58)

In another study (59), which was conducted in 1997 by the Family Planning Association of Pakistan, the magnitude of unsafe abortion, characteristics of the women seeking induced abortion and the profiles of abortion clinics were sought. The study sites included a teaching hospital and a maternity hospital in each of the three provincial capitals (Lahore, Karachi and Peshawar), and a total of 32 “abortion clinics” in the three cities. Ten clinics were managed by qualified lady doctors, 13 by LHVs, 6 by nurses and 3 by other paramedics. During the study period, 452 women (81.2%) got their pregnancies terminated at abortion clinics while 104 women were interviewed in the hospitals. Out of these 104 women, 91 women were admitted to teaching/maternity hospitals with abortion-related complications while in 13 women pregnancy was terminated due to medical indication. Induced abortions constituted 2.3% of all gynecological admissions in the six hospitals included in the study. There was one induced abortion for every 97 deliveries (an abortion ratio of 103/10,000 deliveries). The typical profile of induced abortion seeker coming to hospitals was a married woman of high parity, advanced age and low educational status. The predominant reason for resorting to abortion were contraceptive failure (43.3%) “too many children” (34.5%), medical reasons (12.5%), pre-marital affairs (7.7%) and extra marital affairs (2%). About 47% of abortions were induced by *Dais*, 23.4% by LHV or Nurse and 19.6% by physicians; 10.2% women did not know the type of abortion provider. Bleeding and infection were found to be the two major complications of abortion.

The study found that, at the abortion clinics, the commonest procedure used to terminate the pregnancy was dilatation and curettage (D&C). Only one clinic in Karachi was using Manual Vacuum Aspiration (MVA). The fee charged varied from clinic to clinic, but on an average it was Rs.1,500 per month of pregnancy. The socio-demographic characteristics of the women going to abortion clinics were slightly different from those being admitted in the hospitals. The women going to abortion clinics were older, better educated and came for termination at an earlier stage of pregnancy. The predominant reasons for seeking abortion were too many children (64.4%), contraceptive failure (20.8%), premarital affairs (8.6%) medical reasons (4.9%) and extramarital affairs (1.3%). Most of the women were unaware of the abortion complications.

## **2. Gynecological morbidity**

This includes any condition, disease, or dysfunction of the reproductive system which is not related to pregnancy, abortion, or childbirth, but may be related to sexual behavior.

- a) *Direct gynecological morbidity* includes reproductive cancers, premenstrual syndrome (PMS), endocrine system disorders, bacterial or viral sexually transmitted diseases

- (STDs) and their sequel (cervical cancer, pelvic inflammatory disease (PID), secondary sterility, AIDS), reproductive tract infections (RTIs), coital injuries.
- b) *Indirect gynecological morbidity* includes primarily traditional practices, some of which are for treatment of real or perceived gynecologic conditions (such as genital mutilation, gishri cuts)
  - c) *Psychological morbidity* includes psychological disorders associated with STDs, infertility, traditional practices, dyspareunia, fistulae, rape conditions.

### **2.1. Maternal and perinatal infections**

Scant literature is available on Maternal and perinatal infections. The growing recognition of the major role that reproductive tract infections play for maternal, children, and community's health at large, demand a greater commitment for their prevention and control. Particularly compelling is the need to reduced fetal wastage, prematurity, and complications of the newborn, especially in developing countries.

Rahat N Qureshi et al have looked into the effect of bacteriuria and pregnancy outcome. They conducted a prospective study from 1988 –1990 (77). All women presenting for antenatal care were requested for a midstream sample of urine. Out of 1579 pregnant women, 77 had bacteriuria (4.8%). These patients were then compared with patients without bacteriuria. The authors failed to show any association between the mean age, gravidity, gestational age at delivery, birth weight, and presence of eclampsia, cesarean delivery, preterm delivery low birth weight and bacteriuria. This was mainly because of the poor study design as the cases were treated with antibiotics as soon as they were identified with the infection. Had the patients not been treated with antibiotics on identification of infection, this would have raised serious ethical concerns. A more carefully elected study design would have given better and useful results.

Another study investigated frequency of Chlamydia trachomatis in pregnant women. The purpose of the study was to assess the sensitivity and specificity of the two methods to detect Chlamydial infection in 85 pregnant women (78). Endocervical swabs were collected from each registered patient coming to antenatal clinic of Jinnah Postgraduate medical Center to screen for Chlamydial infection. Swabs were examined by direct immunoflorescent method and wet mount iodine method. The frequency of true positive method was 8.23% (7cases). The direct immunoflorescent test detected Clamydia trachomatis elementary bodies in 14 (16.47%) patients alone and demonstrated 50% sensitivity and 92.9 % specificity, where as by Iodine method 14.11 % patients were found positive with 58.3 % sensitivity and 90.4% specificity. In order to calculate the sensitivity and specificity of a test, we must know who “really” has the disease and who does not from another source than the test being used. This means comparing the result of the tests with some “gold standard”. The authors in this study have not mentioned what test they have used as a gold standard, and how they have assessed the sensitivity and specificity of both methods. Ideally the tested subjects should fall into two categories, that is true positives (those tested positive also have the disease) and true negative (those who tested negative and do not have the disease. The other two categories are false positives and false negatives. The issue of false positives is important because those who are labeled false positives are subjected to more tests, causing a burden on the health care system. For false negatives, if the person really has the disease and the treatment is available, then the problem is indeed serious. This study did not mention those who were false positives

and false negatives. The positive predictive value and the negative predictive values of the tests performed were also not mentioned.

Yet another Pakistani study described in the Australian NZ Journal of Obstetrics and Gynecology (1997:37:4:462) was published with a special note reminding readers about the prevalence of Chlamydia Trachomatis infection to warrant routine screening even in asymptomatic women attending antenatal, family planning and infertility clinics (79). This was a prospective study undertaken to investigate the relative prevalence of Chlamydia Trachomatis in non-symptomatic pregnant women of two socio-economic groups and those attending the family planning clinics. Group 1 consisted of women attending the antenatal clinic of the Aga Khan University Hospital, which caters to the affluent strata (n=100). Group 2 comprised women attending the antenatal clinic of the Lady Duffrin Hospital, which provides free obstetric care to women belonging to the lower socio-economic groups of Karachi (n=100). Group 3 consisted of sexually active women attending the family planning clinics of Lady Dufferin Hospital (n=100). Endocervical swabs were taken from women assigned to each group. Two percent of women had Chlamydia Trachomatis infection in Groups 1 and 2 and 12 % in Group 3. Early age at first intercourse was significantly associated with Chlamydial infection. Authors concluded that considering the high frequency of this infection in group three, such women should be screened for the infection and this can be incorporated in the family planning services. Such early detection and treatment would decrease the rate of pelvic inflammatory disease and its long-term sequelae. Though a very informative and interesting study, authors did not identify the reasons for variation in the frequency of positive cases between the groups.

Beta Hemolytic Streptococci (BHS) carriage rate in pregnant women during labor and its acquisition by their newborns just after birth was investigated in 60 mother baby pairs, by a combined study conducted by PMRC Research Center, Institute Of Urology and Transplantation, Dow Medical College, and Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre, Karachi (80). The carriage rate of group B Streptococci (GBS) was 11.6%, acquisition rate by the newborns of carrier and non-carrier mothers was 85.7% and 1.8% respectively. A total of 28.5 newborns were carrying GBS on all the skin sites and were heavily colonized and therefore, at higher risk of developing early onset of Streptococcal infections. The most effective antibiotics were Penicillin G and Ampicillin followed by Septran, Erythromycin and Cephalothin. In their discussion authors have compared the results with other few studies conducted in Pakistan and Internationally. Within Pakistan, the results were inconsistent with other studies due to the use of different culture media and techniques applied to isolate the organisms. Due to the small number of study subjects of the results are not generalizable.

A hospital-based observational study was carried out among pregnant women presenting with either acute hepatitis or fulminant hepatic failure (FHF) during January 1990-December 1994 at the Internal Medicine and Obstetrics and Gynecology Departments of The Aga Khan University Hospital, Karachi (81). Of the 53 patients, 20 (38%) developed FHF. Non-specific (non A/non B) hepatitis was the commonest cause (62%) followed by hepatitis B in 17% and hepatitis A in 4% cases. Eight women died (giving a case fatality rate of 15%). Perinatal mortality was about 30%. The poor prognostic factors, identified in the study included lack of antenatal care, severity of jaundice, history of somnolence, gastrointestinal bleeding and a high grade of encephalopathy. During the five years, 8,940 obstetrics patients were

admitted in the hospital giving a prevalence of viral hepatitis of about 6 per 1000. The authors concluded that enterically transmitted non A/non B virus seems to result in high case fatality rates. The control of this enterically transmitted viral hepatitis remains a public health challenge. The authors suggested the need for public health education programs to improve awareness about this infection, frequent testing of waste-water for the presence of viruses, promotion of better sanitation and hygienic practices and supply of safe drinking water. Pregnant women affected with this illness should be provided institutionalized care.

A study from the Department of Pathology, Karachi Medical and Dental College and Abbasi Shaheed Hospital Karachi, investigated the serological correlation of Toxoplasmosis and abortion (82). This study involved the analysis of serum samples and the products of conceptions among 105 patients. These women belonged to spontaneous abortion group (AB) and therapeutic abortion group (TA) who were on list for dilatation and curettage. These cases were collected from various hospitals and maternity homes. Three to five ml of blood and product of conception were taken from each patient. Fifty-four women belonged to AB group and 51 to TA group. All samples of sera were also screened for human immunodeficiency virus (HIV) to rule out that toxoplasma infection was not due to immuno suppression. The product of conception was used for making wet mount, stained preparation and mice inoculation with saline control. One group of mice was killed on 3<sup>d</sup> or 4<sup>th</sup> day and the other on or about the third week. Out of 105 samples tested for IGM antibodies specific to Toxoplasma, 16 (15.2%) were seropositive (both groups). Fourteen sera (25.9%) were positive for IgM antibodies in 54 patients having had spontaneous abortion and 35 (33.3%) samples were sero-positive for IgG antibodies out of a total of 105 cases. In the AB group there were 27 (50%) sero-positive out of the 54 screened, while in the TA group, eight out of 51 (16%) cases tested positive. The sero-positivity of Toxoplasma was not due to immuno suppression. Products of conception were subjected to wet mount for microscopic examination, but the parasite was observed in only two cases. Serum study on 3<sup>d</sup> week gave 2 (3.1%) seropositivity for IgG and IgM specific to toxoplasma in AB group out of 54 cases. The Author concluded that Toxoplasma Gondii is quite prevalent (25-50%) in our women of childbearing age. Results of EIA techniques are highly sensitive and specific, and can be used as a routine serodiagnostic tool. The Authors further suggested for conducting a similar study having a larger sample size. The Authors recommendations was for preparing a vaccine against Toxoplasma Gondii to overcome the complications caused by the parasite.

The same author has also looked into the presence of Toxoplasma IgM antibodies and reproductive losses in women of childbearing age (83). A survey of reproductive losses in women of child bearing age was carried out in hospitals of Karachi to find out the prevalence of and association with Toxoplasmosis. The study included 1330 women comprising pregnancy wastage group with or without history of handling animals and women with normal reproductive performance. All cases were tested for IgM class of anti-toxoplasma antibodies by Enzyme Immune Assay (EIA) technique. Of 1330 women, 402 had normal reproductive performance while rest had abortions. Three hundred and eighty eight women gave history of handling animals. Over all there were 269 cases (20.23%) that were sero-positive. The highest number of sero-positive cases was seen in the pregnancy wastage group who were animal handlers (30.4%). The authors concluded that Toxoplasma is one of the major risk factors of reproductive losses in women of child bearing age, a situation which demands an

urgent program for its screening, awareness treatment and prevention at national level.

As a part of this study, the authors also looked into other causes of pregnancy losses, for example, Herpes simplex (84) and Rubella (85). For Herpes Simplex a total of 180 women, 92 who had an abortion and 88 with normal pregnancy were screened. Out of 180 cases 11 (6%) were sero positive for IgM anti bodies and 33 (18.3%) IgG specific for Herpes Simplex . In women with history of abortion out of 92 cases there were 8(8.6 %) seropositive for IgM and 23 (25%) for IgG. In women with normal reproductive performance out of 88 cases, there were three (3.4%) seropositive for IgM and 10 (11.4%) for IgG types of antibodies. These differences were statistically significant with a p-value of less than 0.05.

For Rubella antibodies, three hundred and fifty-five pregnant women were tested for IgM and IgG type of anti bodies. Sero-positivity for Igm and IgG antibodies were 13% and 29% respectively. Of 212 women with abortion 39 (18%) and 80(38%) were sero-positve and 143 pregnant women with normal pregnancy 7 (5%) and 23 (16%) were positive for IgM and IgG antibodies respectively.

A prospective study (86) was performed on mycologicalley diagnosed 50 cases of vaginal candidiasis. All these cases were treated with 150 mg of a single dose of oral flucanazole. After therapy, 38 women had complete clinical and mycological effectiveness, while 4 cases had partial improvement and 3 cases showed no improvement. Five cases were excluded form the study because they did not come for follow-up as they lived inn far fung area. The overall cure rate in this study was 76%. However a study that investigates the efficacy of a drug that is supported by the company manufacturing the drug raises concerns about the results being biased more so when there is no comparison group.

## **2.2. *Pelvic Inflammatory disease and infertility***

A study from the Department of Obstetrics and Gynecology, The Aga Khan University looked into the reasons for infertility and pelvic pain. Five hundred and nine laparoscopic examinations were performed between 19987-91 (87). One hundred and forty seven procedures were performed for the evaluation of pelvic pain and 313 for infertility. This revealed ectopic pregnancy (27%), twisted ovarian cyst (18%) and acute pelvic inflammatory disease (16%) as reasons for chronic pelvic pain. Adhesions (20%), tubal block(15%), endometriosis(9%) and polycyctic ovary (7%) were common findings in cases of infertility. Laparoscopies were performed for primary and secondary infertilities in 62 % of the cases, for acute and chronic gynecologic pain in 29% and for primary and secondary amenorrhea in 2.5 % of cases. Pelvic pain was the second most common indication for the laparoscopy. PID was more common in secondary cases of infertility. The Authors concluded that their series of patients had low prevalence of tubal block and pelvic inflammatory disease as compared to other literature reports. This may have important implications for simpler assisted reproductive techniques like super-ovulation, semen swim-up and intrauterine insemination in the infertile population.

## **2.3. *Community-based studies on maternal morbidity***

A joint community-based study of The Aga Khan University and Liaquat Medical College, Jamshoro looked into the prevalence and risk factors of symptoms of pelvic inflammatory disease (PID) in a rural community of Jamshoro, Sindh (88). The study

included 738 ever-married women, who were interviewed from July-September 1997. Nine percent (65/738) of the women had symptoms consistent with PID and 24% (156/738) reported ever using a modern contraceptive. Symptomatic women were 3.6 times more likely to have used IUD or tubal ligation (95% CI: 1.9-6.9), and 1.8 times more likely to have married at an earlier age (< 15 years) (95% CI: 1.1-3.0) compared to the women who did not report symptoms of PID. The authors defined symptoms of PID as lower abdominal pain or vaginal discharge with continuous or intermittent fever in last 6 months. However, self-reporting of symptoms is known to give high estimates of disease prevalence. The authors have also not mentioned the duration since the onset of symptoms in relation to identified risk factors. For example, the study does not show the temporal relationship between the use of IUD and development of symptoms of PID. Similarly the relationship of early age at marriage and development of symptoms just six months prior to survey does not seem to convince the reader to accept it as one of the factors leading to PID.

Another study explored the perceived gynecological morbidity amongst young ever-married women living in urban squatter settlements of Karachi (89). The objectives of the study were to estimate the prevalence of specific gynecological morbidities and investigate the predictors of PID. This study was conducted in eight squatter settlements, focusing on decision-making, mobility and gynecological morbidity amongst users and non-users of modern contraceptive methods. Information on menstrual disorders, uterine prolapse, pelvic inflammatory disease, and urinary tract infections was sought on 625 women. The risk factors investigated were women's education, occupation, urban residence, household assets, age of women age at marriage and duration of marriage. Current use of family planning was defined as use of modern methods of family planning during the last 12 months. Nearly 45% of women reported either heavy bleeding, prolonged bleeding or painful menses. The prevalence of uterine prolapse was 19%, of PID 12.8% and of urinary infections about 5%. The significant predictors of PID were IUDs use (OR 3.1; 95% CI 1.7 – 5.6); age less than 21 years (OR 2.3; 95% CI 1.1 – 4.8) and urban life style (OR 2.1; 95% CI 1.0-4.6). Other socio and demographic characteristics such as educational status, occupation and household assets were not significantly associated with PID.

A community-based study in rural Sindh reported the prevalence and risk factors of urinary tract infection (UTI) in a rural community of Jamshoro, Sindh (90). The sample size was 738 women interviewed in 8 villages of rural Sindh. UTI was defined as a reporting of increased frequency of urine with burning sensation, with or without feeling of pain or fever, during three months prior to interview. No laboratory tests were performed. One hundred and twenty five women had symptoms of UTI. Women with UTI were 2.7 times more likely to be the current users of IUD and condoms (95% CI; 1.3-5.6) and 1.6 times more likely to be housewives (95% CI; 1.0-3.0) as compared to women who did not have UTIs. In their discussion the authors have mentioned that this study highlights a high occurrence of urinary tract disease (17%) in the rural community of Jamshoro, Sindh. Beside this association between current use of IUD or condoms and being a housewife with a UTI have also been highlighted in the discussion. Even though a useful study, all the results are based on the assumption by the authors and the respondents. This study also relied on perceived symptoms of illness. Such studies are more useful when accompanied by laboratory tests. Diseases not having perceivable symptoms are often not reported in this type of study.

Another study based on the same data described earlier, reports the prevalence and risk factors of anemia among women in a rural community of Jamshoro, Sindh (91). Sixty-six percent of the 738 rural women had symptoms consistent with anemia. Women having anemia were 2.4 times more likely to be housewives (95% CI 1.6-3.6) and 2.0 times more likely to be of high parity as compared to the women who did not have anemia. In the discussion, the authors mention high parity, and factor contributing to anemia, suggesting the low status of women, resulting in their poor access to food, and medical care young age as well as biological mechanisms, increased blood loss during repeated deliveries could be the additional factors. The Authors associated with suggested the need for strengthening of the family planning program in rural areas and have promotion of women's socio-economic status. This study also drew conclusions that went beyond its scope. Also, the results were based on reported symptoms only, which may or may not have been related with anemia.

A report by the Maternity and Child Welfare Association of Pakistan (MCWAP) looked into the reproductive morbidities in an urban community of Lahore (92). The study subjects comprised of 629 women of reproductive age (15-44 years), systematically selected from a population of 3982 women registered with the MCH center. Out of 663 women included in the study, thirty-four mothers were not available at the time of interview/examination.

Sixteen percent of women reported having an induced abortion throughout their reproductive life. Of the 629 women 2,620 gynecological diseases i.e., 4.16 disease per women. Among gynecological morbidity, menstrual problem topped the list as 81.8% of the menstruating women complained of some menstrual disturbances. The next common gynecological morbidity was lower reproductive tract infection (78.4 %). The major morbidities reported were vaginal discharge (38.9 %), vaginal discharge and itching (8.7%), vaginal discharge and bad odour (24.9%). The cervical lesions were present among 65.8% of women. Major lesions were cervical erosions (60%), cervical polyps (0.3%), cervicitis (4.3%), and cervical tears (0.8%). Urinary tract infections were present in 38.6% women and 33.9% women had vulval lesions, which included pruritis vulva (27.5%), vulvitis (5.1%), and others (1.3%). Vaginal lesions contributed to 17.6% gynecological morbidity. Among this group were included vaginitis (14.9%), vaginal cysts (0.3%), and vaginal tears (0.6%).

The obstetric problems faced by the study population included post-partum complications (78.7%) followed by ante-partum (63.5) and intra-partum (38.1%) complications. Prolapse was the next reported obstetric morbidity (67.1%) followed by dyspareunia (44.0%). Prolapse of vagina/uterus constituted 67% of the gynecological morbidities. Out of 422 women, who on examination, were found to have prolapse, 331 women (78.4%) had only vaginal prolapse, while 91 women (21.6%) had vaginal as well as uterine prolapse. The prevalence of prolapse had a direct relationship to gravidity. While only 5.5% of those, who didn't have any child had prolapse, more than 90% of those having 8 or more children had prolapse.

The pregnancy related complications faced by study population during their last pregnancy included ante-partum complications; swelling of hand and face (43.4%), severe vomiting (36.6%), hypertension (29.9%) and urinary problems (26.5%) were the major complications. The major symptoms among those suffering from urinary tract infection were frequency (27.2%), and burning (72.4%). Intra-partum complications were reported by 231 women (38.1%). The significant complications were loss of consciousness (27.30%), prolonged labour (23.47%) and excessive

bleeding (22.9%). As compared to ante-partum and intra-partum complications, an unusually large number of women complained of post-partum complications (78.7%). Lower abdominal pain (72.5%) high fever (70%) and foul discharge (47.4%) were major post-partum complications.

Based on the data for 606 last pregnancies, 91.9% women sought ante-natal care and more than half of them (56.9%) came for first ante-natal visit by 3<sup>rd</sup> month and an almost equal percentage (50.66%) had 4 to 8 ante-natal visits. The mean duration of labour was 4.6 hours and only 8.9% had a prolonged labour (> 18 hours). Of the place of last delivery, and person who conducted the delivery; two third women (66.8%) were delivered at home and 27.2% in hospital. Nearly half of the deliveries (47.9%) were conducted by trained TBA's and 28.9% by doctors, 10.2% by untrained TBAs and 1% by female relatives.

The utilization of health services was according to the type of ailment. Fifty three percent women sought Medical care from MCH Complex, 13% from government hospitals, 11% from LHVs, 9% from trained TBAs, 4% from Private Doctors and only 2% from untrained TBAs. The maximum number of women (87-91 %) sought medical care for ante-partum, intra-partum or post-partum complications, and the lowest number (49%) for anemia.

## **2.4. Miscellaneous**

### **2.4.1. Dysfunctional uterine bleeding**

This study (93) carried out by the Department of Obst. and Gynae. in PGMI/LRH, Peshawar investigates two hundred women with clinical working diagnosis of dysfunctional uterine bleeding during the year 1992. The aim of the study was to know the frequency of uterine pathology in patients presenting with initial diagnosis of dysfunctional uterine bleeding and responding poorly to drug therapy. All patients except 16 were treated and followed up for 18 months. Response to drug therapy was assessed in terms of improvement, deterioration or static condition in uterine bleeding. Hysterectomies were done for persisting or deteriorating conditions and the uteri were examined for any pathology.

Another study from Bahawalpur looked into the factors responsible for abnormal uterine bleeding (94). Additionally this study also looked into the inaccuracies of the procedure performed for management, complications of the management and compared it with recent techniques like hysteroscope. This study was conducted between January 1996 to December 1996 at Department of Obstetric and Gynecology Bahawal Victoria hospital Bahawalpur. About 500 cases of abnormal uterine bleeding (excluding known cases of incomplete abortion) amongst different age groups were studied with symptoms lasting for more than three months. The results showed that at perimenopause and menopausal ages (40, 45 to 50 years) EUA, D&C is mandatory due to increased incidence of benign organic lesions. Endometrial carcinoma at 40 years of age was present in 4% of cases, 15% in age groups of 45-50 years and 20 % in women above 50 years of age. Overall 10 percent of women had endometrial carcinoma for a cause of dysfunctional uterine bleeding. Forty-five percent of cases had no histopathological findings. The author concludes that EUA, D&C as treatment for dysfunctional uterine

bleeding is mandatory after age of 40 years. It is as effective as hysteroscopy, requiring less skills and can be easily performed in any hospital setting.

#### **2.4.2. *Disseminate intervacular coagulation***

A three years study (95) from November 1991 to November 1994 was carried out at Nishtar Hospital to evaluate different aspects of disseminated intra-vascular coagulation in obstetrics. Results showed that lots of patients did not have any symptoms and a few presented with peripheral thrombosis and gangrene. In some there was associated organ failure and some presented with bleeding from skin, mucous membranes, incisions, venepuncture and catheter sites as well as massive obstetric hemorrhages. The majority of the cases were in age group 15-25 years with low parity. Maternal deaths were reported 57% of cases.

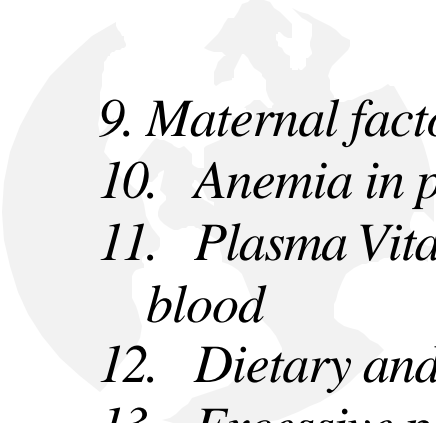
#### **2.4.3. *Placenta Previa***

In one study from Lahore, conducted at the Allama Iqbal Medical College (96), one hundred cases of placenta previa were studied retrospectively during a two-year period. Out of 4,501 pregnant women, ninety-seven (2%) had placenta previa. These were diagnosed on clinical features and placental localization by ultrasonography. Expectant management by hospitalization, blood transfusion, iron therapy and close foetal maternal monitoring was carried out on eighty-seven patients. Eight patients of preterm labour were given aggressive expectant therapy, by liberal blood transfusions, sedation, volume expansion in addition to tocolytic therapy.

Thirteen patients were managed by blood transfusion and Caesarean section, as five patients were severely bleeding. Elective delivery at 37<sup>th</sup> week was planned in forty-two patients and hemorrhage was a determinant in timing delivery in forty-six cases. Out patients expectant management was prescribed in thirteen selective and counseled cases. Double setup examination in operating room was carried out in thirty-two patients, not severely bleeding. Ninety-six patients were delivered by lower segment caesarean section. Four cases had no placenta praevia, when examined at 37 weeks. Bishop score being favourable, these cases were delivered vaginally after induction of labour with 'ARM' and oxytocin infusion. There were 5 neonatal deaths (birth weight <2000 grams). One patient underwent caesarean hysterectomy for placenta accreta.

# A review of research on maternal health Pakistan

## **Section-3: Maternal Nutrition**

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9. *Maternal factors affecting birth weight*
  10. *Anemia in pregnancy*
  11. *Plasma Vitamin A and Carotene levels in maternal and cord blood*
  12. *Dietary and Serum Calcium in pregnant women*
  13. *Excessive physical work and birth weight*
  14. *Community based health evaluation of pregnant women*
  15. *Vitamin D deficiency in pregnancy*

## **1. Maternal factors affecting birth weight**

In a study conducted at the JPMC, 200 full term pregnant mothers with no complications of pregnancy and no associated disease were studied for their nutritional status and other characteristics. Total calorie intake per capita per day was low being 1913. The mean birth weight was 2.9 Kg, but 26% infants weighed 2.5 Kg or less. Factors having significant effect on birth weight of newborn were maternal age at first delivery, maternal weight and maternal total calorie intake. Dietary history revealed that over 70% of mothers took no fish, no eggs and no vitamins during pregnancy. The total calorie intake was mainly from carbohydrates, while protein intake was minimal. Compared to recommended daily intake assigned by Pakistan Planning Division 1980, the diet was low in calorie, proteins, vitamin A, riboflavin and niacin and was deficient in animal protein, calcium and iron. Vitamin C intake was good. No sex differences in the birth weights were observed in this study, probably due to the undernourished status of the mother (97).

## **2. Anemia in Pregnancy**

Serum ferritin concentration was measured in 206 mothers and their newborns. Umbilical cord samples were collected during delivery. Iron deficiency as assessed by serum ferritin assay was detected in 38 percent of the women. The mean serum ferritin level was low in pregnant mothers compared to non-pregnant women, indicating depleted iron stores at term. Serum ferritin level were higher in cord blood as compared to maternal blood indicating that the mothers were iron deficient with low serum ferritin and the fetuses in a state of iron sufficiency with high serum ferritin. Maternal ferritin had no correlation with cord ferritin, and babies born to iron deficient mothers had low serum ferritin. This difference was not statistically significant. This suggests that iron storage in the mother and iron metabolism in the fetus is not directly related. However, there seemed to be a level of maternal iron stores below which the newborn was endowed with decreased iron stores. The criterion for iron deficiency used in this study was serum ferritin levels below 16ng/ml. In the discussion section authors mention that anemia as determined by haemoglobin level was present in 69% of mothers but iron deficiency as assessed by serum ferritin levels was identified in 38 percent of women. This indicates that anemia due to iron deficiency was present in only 38 percent of women. Study design and sampling methodology of the study was found to be confusing. The researchers tried to compare the serum ferritin level of 206 pregnant women with 32 non-pregnant and apparently healthy women of approximately the same age group. The criteria and purpose for the selection of controls were not clear. In the study the mean serum ferritin, hemoglobin and PCV were significantly lower among pregnant women compared to the non-pregnant women. The other factors apart from age which could confound the results in the study subjects were not addressed; for example, menstrual history, parity, history of present and past illness, worm infestation, nutritional factors etc. In the discussion section authors have related these low parameters in pregnant women to the state of pregnancy and hemodilution, which occurs during pregnancy, and did not justify for the need of controls. (98)

Another study from Lahore investigated anemia in pregnancy (99). A total of 115 patients with iron deficiency anemia in pregnancy were studied over a period of 2 years. These patients were selected randomly from the antenatal ward of Lady Willington Hospital, Lahore, with selection based on clinical assessment and hemoglobin of less than 10 gms/dl. PCV, red cell count and peripheral blood smear were done on all patients and MCV, MCH, MCHC were calculated. Serum iron/TIBC and serum ferritin was checked in a few patients. The factors associated with anemia were, malnutrition and multiparity.

A study, from Peshawar, compared the serum iron levels of babies born to anemic mothers with those born to non-anemic mothers (100). Iron status of 10 babies born to anemic mothers (Hb<9.5 g%) and 21 babies born to non-anemic mothers (Hb<9.5 g %) was studied using serum ferritin as the best indicator of body iron stores. Serum iron, T.I.B.C. and percent transferrin saturation were also assessed in both groups of babies and their respective mothers. Babies' hemoglobin levels at birth were significantly higher ( $P>0.01$ ) and ferritin non-significantly higher ( $p>0.01$ ) than their respective mothers. Nineteen percent non-anemic mothers were iron depleted (serum ferritin <10 ng/ml) but none of their babies was iron depleted. Serum iron and percent transferrin saturation had a high value and T. I. B. C. lower value in both groups of babies as compared to their mothers, the difference being significant in the anemic group ( $P>0.05$ ) as compared to non-anemic group ( $p<0.01$ ). Thus fetus is at a considerable advantage with respect to iron status due to an efficient placental mechanism, which transfers iron against a concentration gradient from the mother to the fetus. A significant positive correlation between maternal & baby serum ferritin was found only in non-anemic group.

In another study from Karachi (101). Eighty anemic women aged 13-45 years were divided into three groups. They were supplemented with placebo, vitamin A alone and multivitamins combined with iron respectively for 8 weeks. Maximum benefit in hemoglobin was achieved in the third group with combined therapy for 8 weeks, while the vitamin A supplemented group failed to show significant improvement in iron status. All study subjects belonged to lower and lower middle strata of general public. Before the trial all women went through clinical and anthropometric evaluations. The females were randomly assigned to any one of the three planned groups as follows. Base line level of hemoglobin was also assessed in all the three groups. The study did not show any effect on the serum ferritin levels of Vitamin A supplementation only. The vitamin A only group and the multivitamin with iron group also showed improvement in the serum retinol levels. There was no improvement in the serum retinol levels in the placebo group. The change was significant in the Vitamin A only supplemented group, while in the multi vitamin and iron supplemented group a very little change was noted and this change was statistically insignificant. Authors failed to describe why this change was noted in this group as multivitamins prescribed in this group also contained Vitamin A in the same strength (50, 000 IU /day) as Vitamin A only group. RBC indices were low in all the three groups but showed improvement in all except the placebo group.

Simultaneous therapy with haematinics vitamins and iron resulted in better response, as compared to the group whose supplements consisted only of vitamin A. This is in contradiction to many international studies which claim that improvements in Vitamin A status results in significant increase in hemoglobin levels. It is not clear from the study whether diet had any effect on the improved levels of iron or retinal or the absorption of dietary iron in the group, which failed to show any improvement.

### **3. Plasma vitamin A and Carotene in maternal and cord blood**

This study (102) provides some information on vitamin A nutritional status of the pregnant mothers and their babies in middle and low socio-economic groups. In this study mean plasma vitamin A and carotene levels in 200 women at term and in their newborns were assessed. This was done by clinical, dietary and biochemical methods. Diet was recorded for one week by recall method. The concentration of vitamin A and carotene in plasma was low in Pakistani expectant mothers as compared to women in western countries. . Women who had higher levels of vitamin A had a higher intake as compared to those who had a lower

intake. Similarly, the new born babies of mothers with higher levels of vitamin A also had high levels as compared to those babies whose mothers had low levels of vitamin A. The Authors suggested that vitamin A supplementation might be given to pregnant mothers to improve the fetal hepatic storage and thus reduce the morbidity and mortality from PEM, respiratory tract infections, measles and diarrhea during infant life.

#### **4. Dietary and Serum Calcium in pregnant women**

Dietary and serum calcium levels were estimated in 200 normal pregnant women between 37 – 41 weeks of gestation and in the cord blood of their newborns. Calcium intake per person per day was also low(1.9mmol/L) and only 20 percent of mothers had serum calcium within normal range.. Mean serum calcium value in cord blood was at lower limit of normal range, being 2.3 mmol/L; 38.5 % of cord samples were below the normal range. Authors comment that a correlation has been observed between hypocalcaemia and hypertension and raise an important question that with 80 percent Pakistani mothers having low serum calcium, is gestational hypertension and pre-eclampsia more common in them? They suggest further studies on hypocalcaemic mothers and newborns to provide answers to this question (103).

#### **5. Excessive physical work and birth weight**

The effect of excessive physical work during pregnancy on birth weight was studied in 329 full term pregnant mothers with no complications of pregnancy (104). Birth weight was influenced by excessive physical work amongst mothers on diet deficient in calories according to calorie allowance recommended by WHO but not in mothers on recommended calories. Level of physical activity was assessed for individual mothers by asking about their daily working habits, number of family members and their use of domestic servants or relatives to share their household work. Also if they themselves were working in one or more than one house on hired basis. Physical work was then defined into two categories heavy and light, according to the number of hours of work performed with or without helping hands. Those mothers on low calorie diet but physically less active had better birth weights neonates as compared to their counterparts who were involved in excessive physical work. If maternal dietary intake was good (85% of the WHO recommended allowance) adverse effects of excessive physical work during pregnancy was not seen. The Authors suggest that efforts to improve fetal growth through supplementation of diet need to be coupled with efforts to reduce heavy muscular work.

#### **6. Community based health evaluation of pregnant women**

A community-based study (105) did a rapid assessment of the nutritional and health status of 163 women in low squatter settlements of Karachi with the objective of assessing morbidity and nutritional status of pregnant women. Twenty nine percent of women reported fever, 14 % diarrhea, and 33 % respiratory infections in the previous week. The mean weight was 54.8 ± 10.6Kg, mean height was 151.6 ± 6 cm and mean mid arm circumference was 25.6±3.2 cm. The mean uterine height at gestational age 8months and over was 32.1±10.2 cms which was below the 10<sup>th</sup> percentile. These results suggested a chronic mildly malnourished population with a high rate of infections. Authors made suggestions that maternal height and uterine height be used to assess women at high risk for low birth weight. In this study questions on specific morbidities were ask and these were not related to current pregnancy. This study was a classical example of cross sectional survey asking for symptomatology for the illnesses, and assessment of nutritional status.

Few studies look at nutritional practices in pregnant women. One study (106) assessed the nutritional beliefs and practices in pregnant and lactating mothers in an urban and rural area of Pakistan. Information on nutritional beliefs and practices was sought on 100 pregnant and 100 lactating women. Eight-four percent of mothers mentioned change in diet during pregnancy and lactation for example by increasing, adding or avoiding some special food items. However, 65.5% actually practiced this change in diet. Authors suggest that knowledge about dietary practices in general and vulnerable groups in particular can be improved through media and MCH services. Improvement of applied nutritional knowledge of medical professionals is also necessary

The MCH Centre, Pakistan Institute of Medical Sciences (PIMS), Islamabad, conducted a community survey regarding knowledge about nutrition (107). The results revealed that mothers lacked knowledge about nutrition and also had many dietary misconceptions. Majority of the women (90%) mentioned that tiredness, pallor and dizziness were the signs & symptoms of anemia, however more than 70% also believed that pain in abdomen and fever were signs and symptoms of anemia too. About 80% of the women had no knowledge about balanced diet.

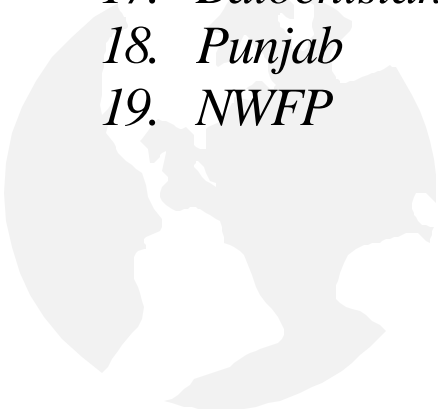
## **7. Vitamin D deficiency in pregnancy**

This deficiency was found to be wide spread amongst pregnant Pakistani women in Norway (108). This study was conducted to determine whether vitamin D deficiency was also common among pregnant Pakistanis in Pakistan and to test the hypothesis that vitamin D deficiency in nulliparous pregnant women is associated with mechanical dystocia This study was carried out at Civil hospital on poor women of Karachi, and had a case referent design. Thirty-seven nulliparous women with caesarian section due to mechanical dystocia served as cases, and 80 nulliparous women with uncomplicated vaginal delivery were taken as controls. All blood samples were drawn before parturition. The mothers with obstructed labor were shorter (150 cms vs. 155 cms p-value 0.0001) and lighter (58kgs vs. 60.5 kg, p-value = 0.005 as compared to their controls. Seventy percent of all the women had marginal or low vitamin D status defined as serum level of calciferol below 30nmol/l. Vitamin D deficiency was , however not more wide spread among the mothers with obstructed labor (20/37 vs. 63/80). Furthermore, there were no significant differences in the serum levels of the carboxyterminal telopeptide of type 1 collagen, a sensitive biochemical marker of bone resorption (7.2 vs. 6.5 ug/l ), and bone specific alkaline phosphate (18.1 vs. 22 U/l) a sensitive marker of bone formation. Vitamin D deficiency in pregnancy is common in Karachi, but is not associated with mechanical dystocia.

# A review of research on maternal health Pakistan

## Section-4: Work in Progress

16. *Sindh*
17. *Balochistan*
18. *Punjab*
19. *NWFP*



In Pakistan a number of governmental and non-governmental organizations are working in the area of maternal health. The projects vary in size and in the research activities they are engaged in: Several of these organizations, medical colleges and universities were contacted to seek information about ongoing research in safe motherhood and maternal health. A majority of the ongoing research and intervention projects have service delivery as their primary objective. There is a wide array of research designs, but the quality and reliability of data are generally poor. The following is a brief province-wise list of selected ongoing projects in maternal health and safe motherhood that also have a research element. This list is by no means exhaustive and reflects only those projects on which information was available.

## **1. Sindh**

### **1.1. Health Oriented Preventive Education (HOPE)**

#### ***Maternal nutrition***

A survey is being conducted to assess the nutritional status of mothers in two low-income *katchi abadis* of Karachi. This involved a sample of 250 households and is a cross-sectional study to assess the nutrition status including the body mass index (BMI) of mothers. The study also includes an assessment of the risk factors associated with poor nutrition, including parity, dietary history, income etc.

Status. This survey is in progress.

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#### ***Testing community-based interventions in safe motherhood***

This project is a replication of the Balochistan Safe Motherhood Initiative (BSMI), which is described below in detail. The main objective is to develop and test a package of community-based interventions (including IEC to women and men, training of *Dais* in recognizing, stabilizing and referring common obstetric emergencies and setting up transport and telecom systems). The impact of the intervention package is being evaluated through an operations research design comprising intervention and control sites and including baseline and follow-up surveys. The project is being implemented in rural Karachi and parts of Thatta district in Sindh. The Asia Foundation provided initial financial and technical support.

Status. The study is in progress.

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### **1.2. Health and Nutrition Society Development Society (HANDS)**

#### ***Reducing maternal Mortality by NGO-Community Partnership***

This is an operation research project to develop and test intervention strategies for reducing maternal mortality and morbidity in a rural district of Sindh. The proposed research aims at identifying and developing those elements of adequate obstetric care, which are missing from existing health services. The proposed intervention has a two-pronged approach of mobilizing and developing community resources and strengthening the existing primary level care health services offered by HANDS.

The specific objectives of the project are:

- To increase the number of pregnant women receiving appropriate pre and postnatal care (defined as three or more visits by a trained provider, (the first visit being in first or second trimester) to 15 % or more than the existing rate over a period of 18-24 months.
- To increase the proportion of births attended by trained health care providers (including the TBAs trained by this project) to 15% more than the existing rates over a period of 18-24 months
- Increase the utilization of PHC center of HANDS by women for reproductive health care 15% more than the existing rates.
- Increase the proportion of obstetrics complications referred to a secondary EOC facility to be developed through this project by a VHW or TBA, to 15% more than existing rates.

Currently the project has been implemented and is supported by AKF. Report of Baseline Survey for this project is available from Department of Community Health Sciences, Ziauddin Medical University, Karachi and the Head Office of HANDS.

### **1.3. Thardeep Rural Development Program (TRDP)**

#### ***Scale of Malnutrition in Tharparker; Thardeep's assessment***

A survey was conducted in Thardeep in September 1999. The report of this survey is available by Thardeep Rural Development Program with the title "An assessment of Drought in Tharparkar Arid Zone 1999". This survey was conducted in women and children presenting to the MCH center, Civil Hospital Mithi during the months of August and September 1999. Pregnant women were examined for hemoglobin levels. Out of the total women examined 53.8% were found to have hemoglobin level, below 10grams %. The major cause of anemia was malnutrition. These women were also at high risk of developing complications of pregnancy for example abortion, premature labor, still births and hypovolumic shock leading to death. The report suggests that consequences may affect the babies born with low birth weight and having less probability for breast-feeding and more vulnerability towards infections. Malnutrition in mothers, in this context, plays a major role in the infant and maternal mortality.

Contact person; Allah Nawaz Samoo, Manager Program Support Unit

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E-mail: thardeep@hyd.infolink.net.pk

Program Operations Units: Telephone: Islamkot 02342 63014, Chachro 37, Chelhar 10

### **1.4. Muhammad Medical College Hospital, Ratanabad, Mirpurkhas**

#### ***Breast (diseased) feeding; advantages vs. disadvantages***

The principal investigators for this project are Dr. Syed Razi Muhammad, FRCS, FRCS, DIP.URO and Dr Rehamatullah Soomro FCPS. This is a prospective study that is being implemented from February 2000. A team of FWWs, including lady doctors, and nursing staff will test, whether breast feeding from a diseased breast is advantageous to the new born or not and if not then what is the best alternative.

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### **1.5. The Women's Health Project**

The Government of Pakistan has approved a multimillion-dollar project funded by the Asian development Bank. Maternal Health is a very visible component of this project. It will be implemented in selected districts of all the provinces. In Sindh 4 Districts have been selected. Further details of the project can be obtained from the National Coordinator, Women's Health Project Islamabad.

### **1.6. Women's Right to Life and Health Project**

In November 1999, Columbia University and UNICEF entered into an agreement with the aim to "To contribute too the realization of women's right s to life and to the highest standard of health by reducing maternal death and disability in a sustainable manner". Through UNICEF this project will be carried out in few selected districts of Sindh. The objectives of the project are 1) to expand the availability of EOC by improving the functioning of district hospitals and other suitable facilities, 2) build teams , networks and linkages at national, sub national, district and community levels to make these services accountable and sustainable, 3) Establish an ongoing monitoring system for EOC, using the process indicators, 4) build capacity of he health system and civil society to make life-saving services truly accessible to all women who need them, 5) promote a shared vision which focuses on the purpose and activities of this project and 6) carry out these activities in ways that express and embody human rights principles. The focus of the project is on timely and appropriate Emergency obstetric Services that save women's life.

### **1.7. Improved Access and availability of Emergency Obstetric Care Services, UNICEF**

In 1999 a situation analysis of EmOC in four districts of Sindh was carried out by SOGP and NCMH. This analysis revealed that the first level care centers do not have comprehensive health care facilities and whatever services are available, are available till 2pm. The secondary care hospitals i.e. Taluka and Districts hospitals neither provide round the clock services nor EOC. They refer cases to other public or private sector hospitals. This is due to a combination of factors for example non-availability of properly trained staff, shortage of essential drugs, blood and equipment. The tertiary level hospitals though providing 24 hours services could not provide EOC due to shortage or lack of proper equipment and competent medical personnel.

### **1.8. Prevalence, perceptions and health seeking behavior for obstetric complications, Korangi 8, Karachi, Pakistan. Dr Fariyal Fikree, Dr Sadiqua N. Jafarey, Ms. Nazo Kureshy**

The final report of this project is available from Department of Community Health Sciences, The Aga Khan University, Karachi.

This research was conducted in Korangi # 8, a squatter settlement of Karachi with a population of 60,000 to provide baseline indicators regarding knowledge of complications during pregnancy, delivery and the postpartum period for the purpose of development of the information, Education and communication (IEC) material. This material is available from the office of NCMH and Reproductive Health Program of Department of Community Health Sciences, The Aga Khan University Karachi.

## **1.9. Ready Reckoner: Women's Health in Sindh, 2001**

This publication has been prepared for the Society of Obstetricians and Gynecologists of Pakistan and UNICEF (Pakistan), by Department of Community Health Sciences Ziauddin Medical University, Karachi, Pakistan. *Ready Reckoner* is an effort to consolidate existing information on women's health and make it readily accessible for policy makers, researchers, programme planners and implementers. Information and data for this document has been collected from diverse sources including institutions, organizations, individuals and various government departments. Every effort has been made to include scientifically sound data, but in some cases, where no published data was available, unpublished material has also been used.

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### *Reference Information*

- Safdar, S. & Inam, S. N.B. (2001) *Ready Reckoner: Women's Health in Sindh-2001*, Society of Obstetricians and Gynecologists of Pakistan & UNICEF. Karachi.

## **2. Balochistan**

### **2.1. Institute of Public Health Balochistan**

#### ***Male involvement in improving Reproductive Health***

Principal Investigator Dr Farid Midhet, Asia Foundation

This project was launched in June 1999. Baseline survey was conducted in peri-urban Quetta (Killi Kechi Beg and Burma Hotel areas). Twelve clusters of 300 hundred households each were surveyed. Six clusters formed intervention area and six as controls. In intervention areas couples were motivated through health education regarding reproductive Health. Pictorial booklets, audiocassettes, counseling through health workers were the methodology used. Intervention was started in May 2000. Post intervention interviews are planned after 18 months.

## **2.2. Reproductive Health Project Quetta**

The project is located in Sandeman Provincial Hospital, Department of Obstetric and Gynecology, Quetta. Principal Investigator is Dr Shehnaz Baloch (Professor and Chair, Department of Ob/Gyn., Bolan Medical College Quetta). It is a World Bank funded project and comes under the World Bank's Family Health Project, which has an objective to improve the reproductive health in Balochistan. Under this project training of health care providers were conducted, medicines and equipment were supplied to the hospital. Interdepartmental coordination and better referral was also emphasized. The project includes peripheral health facilities that are linked to the Hospital. Five intervention facilities were identified. Advanced delivery kits were supplied to all of these facilities and 5 MCH centers.

## **2.3. Balochistan Safe Motherhood Initiative, Khuzdar Project**

The Balochistan Safe Motherhood Initiative (BSMI) is an operations research project, which aims at developing and testing community-based interventions to reduce maternal mortality and morbidity in Khuzdar district of Balochistan. In the first phase, comprehensive baseline research was conducted including situation analysis of health facilities and a baseline survey. Also during this phase, intensive qualitative research was conducted to assess the prevailing beliefs and practices related with safe motherhood. Information from the baseline research was used to develop specific intervention strategies to reduce maternal mortality and morbidity in the project area. An intervention package comprising four strategies was developed, including: IEC to women and their husbands; training of *Dais* and LHWs in recognizing, stabilizing and referring common obstetric emergencies; training, motivation and monitoring of public transporters for referral of women in need of emergency obstetric care; and setting up telecommunications to link traditional *Dais* with government health facilities and transporters.

The project had a quasi-experimental OR design. The project area comprised 32 village clusters, which were randomly allocated to the intervention and control arms of the study. The interventions remained in place for almost two years. A follow-up survey was conducted during February-March, 2002.

Preliminary results from the follow-up survey are available. There was a statistically significant difference in maternal mortality rate, perinatal mortality rate, neonatal mortality rate and early neonatal mortality rate between the intervention and control sites, whereby the levels of these indicators were higher in the control site. Contraceptive prevalence rate among women aged 25-39 years was significantly higher in the intervention site. Although maternal mortality ratio (MMR) was lower in the intervention site, the difference was not statistically significant. Further analyses of the data from the baseline and follow-up surveys are underway at the Johns Hopkins University (School of Public Health) in Baltimore, USA, and a detailed report will be available shortly. The project was completed under the auspices of The Asia Foundation Pakistan office. After the follow-up survey, the project interventions were replicated in the control sites. While The Asia Foundation officially pulled out of the project area in September 2002, the project assets were handed over jointly to the district health department and a local NGO, who are currently replicating the project interventions in the entire district of Khuzdar. The provincial government is also planning to replicate these interventions in some of the other rural districts under the Women's Health Project.

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### **3. Punjab**

#### **3.1. The Pakistan Red Crescent Society**

The Society is conducting a research study entitled “Population Welfare Programme”, with its own funding. The starting date was January 1994 and the project is continuing. The main objective is to provide high quality maternal and child health care services integrated with family planning. There is no research element in this project.

#### **3.2. The Directorate General Health Services, Lahore**

The DG Health, Punjab, is currently coordinating a number of projects in safe motherhood, what are spread over a number of locations in the province, including:

- District Jhelum.
- District Mandi Bahauddin
- District Multan
- District Bahawalpur
- Medcin Du Monde- Reproductive Health Care Project, Khanpur.
- Second Family Health Project.
- Women’s Health Project in eight rural districts.
- Bond of Care, Rawalpindi

The starting date of the project/study was November 24, 1999 and concluding date was July 6, 2000. The main objective of the project/study was to reduce ill health and death in women by bringing the TBAs of the Project Area through linkage development.

#### **3.3. The National Research Institute of Fertility (NRIFC), Ministry of Population Welfare, Government of Pakistan**

They have conducted number of studies in last 10 years, mainly in the field of family planning/contraceptives. The name/s of the research study/project:

- A comparative study of IUCD & Norplant users.
- Pre-introductory field trial of Norplant (Funded by UNFPA).
- Clinical Trial of Norplant (Funded by FHI).
- Treatment of Norplant induced bleeding (on-going).
- Field study of once-a-month Injectable Mesigyna (Phase-II ongoing).
- Contraceptive use during lactation.
- Motivation & Management of Norplant acceptors in rural family welfare workers.
- Personal/Social factors effecting discontinuation of contraceptive use.
- Incidence of Trichomonal & Monilia infection in contraceptive users.
- Study to assess clients who regret sterilization and who request for recanalization.
- To study long-term side effects of IUCD – study of cervical dysplasia.
- Study of the effects of long-acting Progestogen (net-en) on lipid & lipo-protein.

- Impact of integration of family planning with MCH & other development program.

The main objective was to study the Impact of integration of family planning with MCH & other development program. The specific objectives were;

- To undertake a detailed study of the problems and deficiencies of the existing integrated Population Welfare Program.
- To study the role of influential persons, medical practitioners and Population Programme personnel in enhancing the acceptance level of contraceptives.
- To formulate intervention strategies which will be implemented and tested in second phase of the study for its efficacy in improving the functioning of Population Welfare Programme and acceptance of family planning

The type of methodology used was fieldwork, clinical work and laboratory work.

#### **3.4. Department of Community Medicine, Allama Iqbal Medical College, Lahore**

The following research is being conducted:

- Study of Hemoglobin levels among married women of reproductive age group (15-49 years) in a rural community of District Lahore.
- Socio-demographic Differentials & Abortion in a Rural Community of Lahore District

## **4. NWFP**

### **4.1. Save the Children (USA)**

They have a number of projects that are being implemented in district Haripur, NWFP. The names of the projects are as follows:

- KPC Survey: Community Survey of selected RH & Child Health Parameters.
- KPC Survey: Use of private vs. Public Health Services with regard to RH in District Haripur.
- PRA Research: RH needs & practices in Khanpur area of District Haripur.
- Safe motherhood needs assessment of 30 Public Sector Health & Population Facilities in District Haripur.

The commencing date of the project/study was August 1999 and the concluding date of the project/study is July 2002. The main objective is to improve the RH status and quality of life of mothers, Children, and Families in Haripur District, particularly with regard to safe motherhood/birth timing & RTI's. The project also provides technical & facilitation support to existing services and for community mobilization.

### **4.2. Khyber Medical College/Khyber Teaching Hospital, Peshwar**

The work being conducted is as follows:

- Reproduction Health states of women in NWFP.
- A study on efficacy and safety of single dose oral fluconazole in maternal vaginal candidiasis.
- Incidence of sepsis in obstetrics. & gynaecological studies.

The funding agency of the project/study is Pfizer Pharmaceutical Company and Pharmacia Upjohn Company.

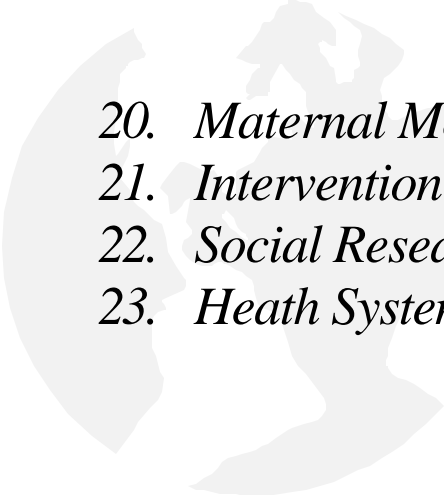
### **4.3. Obstetric & Gyneacology Department, Ayub Teaching Hopsital, Abbottabad**

They are currently involved in the following studies;

- Dissertation on Ruptured Uterus
- An ongoing study on Pre-eclampsia and Eclampsia.
- A four-year analysis of maternal death.
- Hormone replacement therapy.
- Uterine rupture (a 2 years review).

# A review of research on maternal health Pakistan

## **Section-5: Gaps in Maternal Research**

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20. *Maternal Mortality and Morbidity*
  21. *Intervention Research*
  22. *Social Research*
  23. *Health Systems Research*

Most of the literature reviewed about maternal health in Pakistan consisted of research conducted in Tertiary care hospitals. Few of the studies were community based. The studies from hospitals were mainly retrospective, based on hospital records collected over a period of time ranging from 1 to 10 years. Additionally lack of completeness of information, standardized definitions for assignment of causation of death, standardized definitions for morbidities and procedures performed for treatment and management of maternal condition puts to question the internal validity of the results and the recommendations made by the author. Similarly, for community based studies, ambiguity in sample size calculations, selection of study sites and subjects make the generalizability of the results questionable.

Some of the gaps in maternal health research are summarized below. Hospital-based studies have addressed issues that are encountered in the attending physician when the patient has been brought to the hospital. Therefore mostly information on the condition in which the pregnant mother was brought to the hospital (moribund, dead) diagnosis made, treatment given, etc is frequently available. Some studies have explored the factors resulting in late arrival of mothers to the hospitals, for example, distance traveled, late referrals made etc. However, the factors that lead to the third delay for example. Delay in obtaining purchase and reaching the right place within the facility, time taken for Obs/Gynae physician to attend the case, time taken for admission procedures, delay in making arrangement for blood transfusion, medicines, syringes, preparation of OT, time taken for anesthetist to arrive and management by the undertrainees etc. have largely being overlooked and not studied in depth.

The lack of research skills of some of the authors was also evident by the way the studies were written. Some common epidemiological terms such as incidence, and prevalence were used indiscriminately though they have specific meanings. In few studies lack of understanding of the research design (selection of controls, treatment to non-intervention group) have made the study results and recommendations questionable for future replication or policy interventions.

The recommendations made by the researchers were generally found to be too ambitious. Such ambitious recommendations create confusion in the minds of the readers and policy makers too. Hence there is a need for training health professionals in research methodology. Training for writing grants should also be provided to the Government institutions so that the quality of research can be improved.

## **1. Maternal Mortality and Morbidity**

Some of the gaps identified under this heading are as follows:

- There's a need for standardization of assignment of causation of death for the purpose of comparisons
- Need for community based surveys (on the pattern of MIMS) on maternal deaths every 10 years or so to assess prevailing situation
- Testing of process indicators for assessment of reduction in maternal mortality
- Testing of new indicators for example case fatality rates for assessment of maternal deaths (in tertiary care hospitals) as opposed to MMR
- Need for intervention studies for example impact of better referral linkages, provision of EmOC, upgrading of facilities and their impact on maternal mortality and morbidity in catchment populations
- Testing of useful cost effective interventions and treatment protocols for management of poor patients at community and facility levels. At community level for example

use of partograms by midwives and TBAs for early referrals. For hospitals, use of craniotomies for dead fetuses and symphysiotomies in case of obstructed labor, use of manual vacuum aspiration in incomplete abortions, and modifications in treatment protocols etc.

- Intervention studies for example training of skills of craniotomy, symphysiotomy to midwives and seeing the impact of this training in saving the lives of mothers
- Need for identifying factors delaying management once the patient has reached the facility (Third Delay)
- Information on morbidities occurring as a result of management provided in the maternity homes/hospitals etc.
- Information on social impact on women surviving complications for example prolapse of uterus, cervical tears, gaping of episiotomies, damage to ureters/bladder, or development of VVF
- More research is needed on maternal morbidities. Available information is incomplete and insufficient. Studies reviewed do not reveal morbidities of public health interest
- Unsafe abortion is one of the major causes of maternal deaths or illness. More research is needed in this area for example national representative estimate of induced abortions, cost implications of unsafe abortion and its management, post abortion care and family planning, and gender differences about induced abortion.
- Role of men in supporting induced abortion

## **2. Intervention Research**

This is the most needed and most neglected area of maternal research. The factors behind high maternal mortality and morbidities are quite well understood. What is required is the testing of strategies keeping in view the country's meager resources, social and cultural norms.

- Creation of revolving drug funds, better way of record keeping, interventions to reduce cost or duration of stay in hospitals, testing of new indicators for maternal survival, maternal deaths audits, etc. can be some of the interventions ??? can be tested.
- IEC interventions can result in community mobilization for blood donations, timely maternal care, availing of EOC, seeking care when needed. Such studies can also help in finding answers to the issues of poor roads, non-availability of vehicles etc. in the area
- Trying out transport schemes, better communication systems, the establishments of maternity waiting homes, or local insurance schemes or formation of local safe-motherhood committees can result in improved maternal health
- There is a need for qualitative research, which can give insight into reasons for non-utilization of government health facilities

## **3. Social Research**

This is yet another neglected area where not much research has been conducted. It is important to know about the attitudes of people towards maternal health. Only one published paper on this subject was identified. Some of the gaps identified are

- Identification of health seeking behavior of an individual or family during and after pregnancy, and their pattern of resort.
- Involvement of men in maternal care

#### 4. Health Systems Research

##### *For Planning and Management*

- Strengthening of various levels of referral systems and their impact
- Improvement in human resources, e.g. community based hands-on midwifery training programs and their impact
- Development and use of case management protocols for midwives and their impact on maternal health
- Utilization of health information and improvement in quality of care and its impact

##### *Interventions to improve EmOC*

- Effect of upgrading facilities and equipment
- Improvement in staff capabilities and coverage
- Availability of blood, and life saving equipment
- Development and testing of maternal health indicators appropriate to our needs
- Development and testing of maternal health indicators appropriate for our needs
- Development and testing of maternal health indicators appropriate for our needs