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RESEARCH PAPER

Determinants of Maternal Health in Punjab: Evidence from Multiple Indicator Cluster Surveys 2011-2014- 2018

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ABSTRACT

The current study aims at analyzing the trend of the key determinants of maternal health through Multiple Indicator Survey for the period of 2011 to 2018. Maternal health is an important phenomenon that determines the status of women in any society. Pakistan with its limited resources though has made some noticeable improvements in maternal health indicators but the country is still behind many internationally set targets and slandered that determine maternal health. The secondary data analysis was used and ten determinants of maternal health were selected. The trends of major determinants for Bahawalpur, Vehari, and Rajanpur districts were analysed by using descriptive statistics.The data retrieved from three major reports show less or no improvements in significant maternal health indicators, in the underdeveloped regions of the country. Programs like lady health workers and the role of mass media may be strengthened to disseminate information on maternal health among women.

KEYWORDS Health Determinants Multiple Indicator Cluster Surveys (MICS), Maternal

Introduction

Determinants of maternal health have become the fundamental perceptive that largely persuade the health and wellbeing of women before, during and after pregnancy. Maternal health is one among the most pressing development challenges globally and has become a culmination of numerous detrimental aspects in a woman's life (Gurara et al., 2023). Maternal ill-health is not solely a biomedical problem but the outcome of multidimensional and interrelated determinants such as biosphere, biological, socio-cultural, economic and expectations to gender roles among others that are largely associated with women's life and health especially in developing countries (Kusuma et al., 2024). Unfortunately, the rate of maternal mortality is high for Asia and even higher for South Asian courtiers which accounts for almost 1/5th deaths. Pakistan, the fifth largest country of the world has very high rates of maternal mortality in South Asia such as 186 deaths per 100,000 live births. This preventable loss of valuable lives of women is not only a tragedy, but also a flagrant human rights violation (Sageer et al., 2024).

Pakistan's chronic cycle of maternal mortality persists despite considerable efforts such as comprehensive awareness preventive health programmes, adequate training of health care officials, enhancing institutional births, provision of advance medication and equipment among others regarding pregnancy, childbirth and postnatal period (Dills et al., 2022). Pakistan is among the top six countries of the world where more than half of all maternal deaths were reported (Khalil et al., 2023). The most frequent contributing factors behind these deaths were ectopic pregnancy, anemia, hypertension, inadequate health care, distant facilities, malnutrition, unhygienic sanitary environment, obstructed and prolonged labor among others. While malaria, cholera, infections, and mishandling the cases among others are the common reasons of death after six weeks of delivery. Similarly, numerous societal drivers such as economic conditions, education, gender based inequalities, unfair

distribution of resources, underage marriages/pregnancy, cultural practice/rituals, interpersonal relationships with spouses and family members significantly contribute to maternal deaths (World Health Organization, 2023).

Keeping in consideration the sensitive nature and importance of the issue, the United Nations keeps maternal mortality on the top priority of global agendas presented in the form of Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) (UNICEF, 2023). Government of Pakistan and its alliance national and international organization working on the target set through sustainable development goal 3.1 of reducing the maternal mortality rate of 70 deaths per 1000,000 live births by the year 2030. To achieve the set targets within a stipulated time period, identifying and enhancing the key determinants of maternal mortality and their relative importance are critically imperative (Jafree et al., 2023). The common approaches to deal with maternal mortality are the direct investment in biomedical and socio-economic aspects of women's health particularly during and after pregnancy period. Traditionally the prime attention has paid to biomedical aspects and less consideration for underlying determinants that could mitigate the adverse impacts on maternal mortality. The affective contribution of associated determinants and their interrelated impacts gradually shift over time the pattern from high to low maternal mortality (Bhanbhro et al., 2020).

Socio-economic conditions of women are one among the most imperative aspects of maternal mortality globally. Empirical evidence (Aziz et al., 2020; Neerland et al., 2022; Sejati et al., 2023 & Mehta et al., 2024) endorsed that the women with poor socio-economic conditions have more than 100 times the risk of mortality as compared to women belonging from adequate economic conditions (Souza et al., 2024). To reduce the preventable incidents of maternal mortality intensive focus on socio-economic factors could prevent maternal deaths, reduce associated health risks and enhance global as well as regional healthcare systems (Satyawan et al., 2023).

A substantial gap existing among developed and developing nations with respect to maternal healthcare access (Meh et al., 2020). In most of the developing countries like Pakistan numerous geographical as well as demographic obstacles are faced by women to access the improved maternal healthcare services especially in rural and faraway areas. Maternal healthcare services such as family planning, antenatal care, skilled birth attendance, emergency obstetric, neonatal care are fundamental to reduce long lasting risk of morbidity and maternal mortality (Taher et al., 2024). The quality of maternal health coverage, healthcare institutions, visits to health centers, medication, equipment and available technologies did not meet the needs and standards in a huge proportion of world populations and became the leading cause of maternal mortality (Tshililo et al., 2022).

This study exploits the data from nationwide Multiple Indicator Cluster Survey (MICS) Punjab 2011, 2014 and 2018 conducted by Bureau Of Statistics, Planning & Development Department, Government Of The Punjab. The United Nations International Children Emergency Fund (UNICEF) provided technical as well as financial assistance. Moreover, the collected information from urban as well as rural areas from all provinces of Pakistan to generalization and effective policy making for across country needs. To study determinants of maternal health, researchers evaluates two main indicators such as antenatal maternal health (number of visits to health centers, antenatal coverage, content antenatal care, pre birth tests and medication, visit to health care institutions among others) and post-natal maternal health (postpartum health facility, postnatal health care for mother and newborn among others).

Literature Review

Maternal health connected with maternal age of women, as the risk of maternal mortality is very high in early age (mid-20s) pregnancy and older than age of 45 years

(WHO, 2020). The pregnancies during the period of adolescent (10-19 years) have been a deep concerns of health professionals which leadings teenage girls to multidimensional health risks and adverse effects such as premature rupture of membrane, sexually transmitted infectious, maternal anemia, postpartum consequences, stillbirth, prematurity and early neonatal demise among others. Similarly, the older women with pregnancy have to face high health risks such as preeclampsia, gestational diabetes, preterm delivery, complication in Cesarean section, labor and postpartum circumstances. At this age period women are mostly unable to eliminate these risks by emphasizing exercise, appropriate prenatal care, sleeping disorders, stress management and enhancing the immune system among others (Sari et al., 2024).

The lifetime risk of maternal mortality and morbidity occurs irrespective of advancement of health care facilities along with availability of trained personnel because of socio-cultural practices especially in developing countries (Tshililo et al., 2022). Traditional socio-cultural practices such as religious beliefs, herbal concoctions, early marriages/pregnancy, acceptations of childbearing, perceive health issue & treatment, patronize the treatment & institutions, consultations with older/untrained available women, domiciliary delivery and birth complications among others enhance the risk of maternal mortality (Sejati et al., 2023). Adequate interventions to mitigate the unsafe socio-culture practice with regard to maternal health will take proactive initiatives to curb the occurrence of maternal mortality during pregnancy and after child birth (Suzuki et al., 2023).

To enhance maternal health, effective health care service and achieve the targets of Sustainable Development Goals (SDGs) efficient policy and legislation process is imperative for any country. Empirical evidence (Moreno et al., 2020) from existing literature indicated that most of the developing countries like Pakistan have sufficient resources, working environment and supportive structure which can enhance maternal mortality rate significantly but there is dire need of comprehensive policy and practicable legislation (Srinivas et al., 2023). Proper coverage, stronger policy support, implementation at ground level, regulative process, review and proper reporting boost the positive outcome of maternal health and wellbeing of women. Favorable policies and their implementation circumstances for maternal morbidity & mortality can improve adoption of evidence-based integrated interventions that increase proper utilization of improved maternal health services in developing countries (Bhanbhro et al., 2020).

Maternal Health in Pakistan

Pakistan had designed and implemented maternal health care initiatives at national and provincial level since 1990. The Government of Pakistan along with World Health Organization (WHO), United Nation International Children Emergency Fund (UNICEF) and United Nation Funds for Population Activities (UNFPA) among other organizations are intensively involved to provide technical, financial and moral support to enhance in maternal, reproductive, newborn health and wellbeing (World Health Organization, 2023). In Pakistan the nature of the healthcare system is mixed such as government healthcare infrastructure, private sector, parastatal healthcare system, philanthropic and civil society services, alternative and traditional health care practices are quite popular methods. With the 18th constitutional amendment in 2011 absolute authority was given to provincial divisions for efficient, accessible and more effective health care services (Sageer et al., 2024).

In order to achieve the targets of sustainable development goals and accelerate the fulfillment of world health standards, government of Pakistan along with WHO initiated a joint venture to enhance national health vision (2016-2025) into five years Costed Strategic Actions Plans, Pregnancy Childbirth and Postnatal Care (PCPNC), Nutritional Stabilization Centers (NSC), Essential Newborn Care (ENC) and Integrated Management of Newborn and childhood Illnesses (IMNCI) (UNICEF, 2023). These plans specifically focus and provide

assistance to enhance maternal health, maternal and child mortality among others. Numerous integrated interventions over the past two decades have positively impacted maternae in Pakistan but unfortunately, the situation is still alarming and far behind as compared to developed nations and set targets (Taher et al., 2024).

To deal with the extant and provide an adorable maternal health service empirical records / data required regarding adequate awareness, involvement of maternal health programs, antenatal visits, postnatal visits to professional healthcare providers or medical centers (Jafree et al., 2023). To make clear and evaluate the continuum maternal care services, various geographic, demographic, socio-cultural and economic determinants were evaluated through Pakistan Demographic Health Surveys (PDHS), Maternal Mortality Surveys (MMS) and Multiple Indicator Cluster Surveys (MICS). So this study provides a trend analysis of the determinants of maternal health on the basis of these surveys.

Material and Methods

This study is based on the pooled data of determinants of maternal health from three rounds of Multiple Indicator Cluster Survey (MICS) carried out during 2011, 2014 & 2018. Multiple Indicator Cluster Survey (MICS) is a nationally representative study provides accurate and reliable estimates for maternal health and related factors at regional and provincial levels.

The study mainly focuses on the determinants that are directly associated with Maternal health such as antenatal maternal health care or antenatal care (ANC) refers to factors associated with maternal health before delivery such as family planning counseling, visit to healthcare center / professional, nutritional factors, medical examinations. ii. Skilled birth attendance (SBA) is generally related to the delivery process with the presence of qualified healthcare professionals such as doctors, nurses, or midwives who have been qualified with adequate skills required to manage normal as well as complicated pregnancies. Factors such as Place of delivery, available facilities, and immediate postpartum requirements associated with SBA. iii. Postnatal maternal health care or postnatal care (PNC) deals with immediate after-postnatal conditions. After the delivery process the identification and management of complications, of mothers and newborns. The study also consists of numerous sociocultural, economic, and demographic factors such as mother's education level, economic condition, availability, accessibility, and functionality of healthcare institutes among others. The data regarding these three maternal health indicators is derived from the guidelines developed by the UNICEF and Bureau of Statistics, Government of the Punjab.

In this study, researchers employed multistage sampling techniques to evaluate the collected data regarding determinants of maternal health. One province (Punjab) from each four provinces was selected in the first stage. In the second stage, three administrative divisions such as D. G. Khan, Bahawalpur, and Multan from the south zone of Punjab province were randomly selected. Later on from each division Bhawalpur, Rajanpur, and Vehari districts were selected based on the previous data of the South belt indicating the poor maternal health indicators in the regions. The selection of women as respondents was made on the basis that almost all the MICs in Pakistan have remained women focused. In 2018 the total sample size was 53,840 households in 2,692 sample clusters. Women (age 15-49) - Eligible for interviews - Interviewed - Response rate 93.1%. in the year 2014, Households - Sampled were 41,413,) 61,286 women were Eligible for interviews and the Response rate was 87.6%. A sample of 102048 households has been considered appropriate to provide information in 2011.

Results and Discussion

This study comprises on various socio-economic, demographic, antenatal cares, skilled birth attendants and post-natal care indicators and results indicated the variation from 2011, 2018 and 2018 situation. The table 1 presents the women literacy rate

Table No. 1
Descriptive statistics of the Illiterate women in three districts in MICS 2011,2014,2018

Districts	2011	2014	2018
Bahawalpur	46.3	48	53.6
Rajanpur	70.8	62.9	73.9
Vehari	62.7	28.3	52.6

Data in table 01 depicts the illiteracy in three districts over the years. It is evident from the data that since 2011 the literacy rate among women has increased from 46.3% to 53.6% in Bahawalpur district. In the Rajanpur district this number increases from 70.8% to 73.9%. In Vehari district the situation is somehow better the number of illiterate women declined to 52.6% in 2018 as compared to 62.7% in 2011.

Table 2
Descriptive statistics of the Poorest / below the poverty line in years 2011,2014,2018

Districts	2011	2014	2018
Bahawalpur	41.9	31.5	38.3
Rajanpur	56.9	65.6	65.1
Vehari	24.0	19.2	20.4

Data in Table 2 explain the economic condition of women in three districts. In Bahalwapur district in 2011, the number of poor was 41.9% which decreased to 31.5% however this number again rose to 38.3% in 2018 indicating the adverse condition of the people in the region. In the Rajanpur district, the people below the poverty line were 56.9% in 2011 however this number increased in 2014 and later on in 2018. A somewhat better picture is represented in the Vehari district. However, overall, the comparative picture of three surveys reports the poverty level has risen over time indicating poor planning and ignorance of the region at the government level.

Table 3
Descriptive statistics of the women who did NOT receive any antenatal care years 2011,2014,2018.

Districts	2011	2014	2018
Bahawalpur	21.0	27.5	29.9
Rajanpur	45.2	39.0	19.4
Vehari	20.8	9.9	7.1

The prevalence of antenatal care is presented in table 03. In Bahawalpur district, in the year 2011, 21% of women had access to antenatal care, in year 2014 this number increases and 27.5% of women who received care and in 2018 about 29.9% of the women received care however number is still alarming that about two third of women still have not access to health facility. In Rajanpur district this number declines from 45.2% to the 19.4% and similarly in Vehari this number is alarming with only 7.1% of women got care.

Table 4
Descriptive statistics of the women who did NOT receive any post-natal care visits in years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	NA	52.2	85.2
Rajanpur	NA	65.4	86.7

Vehari	NA	84.9	75.3

Table four represents the data of post-natal care visit. IT indicates that in 2011 statistics are not available however in 2014, 52.2% of the women population of districts had no post-natal visits whereas this number alarmingly increased in 2018 where 85.2% of a big majority of the population did not have access to health facilities. In Vehari in 2014 it was 84.9% however in 2018 this number was 75.3%. Overall, this indicates the poor health facilities and awareness in the region.

Table 5
Descriptive statistics of the women who did NOT use contraception in years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	65.6	74.3	62.2
Rajanpur	74.8	78.2	79.7
Vehari	58.3	59.6	63.0

Out of three districts, in Bahwalpur in year 2011 65.6% of the population did not use contraception, this number increases to 79.7% in 2014 and later on in 2018 about 62.2% showing an inconsistent use. In Rajanpur district the non-user were 74.8% in 2011 and this number declines to 70% in year 2018. In Vehari situation exhibits little bit better results however still 58.3%, 59.6% in 2014 and 63% in 2018 were not using any contraceptives.

Table 6
Descriptive statistics of the women who delivered the babies at home by traditional birth attendants in years 2011,2014,2018

District	2011	2014	2018
Bahawalpur	64.4	57.5	41.3
Rajanpur	83.8	70.5	62.5
Vehari	52.8	42.2	25.5

In the South belt of Punjab due to ignorance and poor health facilities most births occur in homes. Data shows that in 2011 in Bahawalpur 64.4% of births were performed by TBAs at home, this number declined in 2014 and later in 2018 about 41.3% births were delivered at home. The number is adverse in Rajanpur where in year 2011 83.8% births were at home, in 2018 this percentage declines to 70.5% and in 2018 it was 62.5% which shows a big number of births are still conducted at home endangering the lives of mothers and child. However, this picture is better in Vehari districts with 25.5% of births at home in the year 2018.

Table 7
Descriptive statistics of the women who had skilled birth attendants in years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	61.8	55.1	39.5
Rajanpur	82.3	64.1	59.7
Vehari	49.7	40.3	23.0

The births performed by skilled birth attendants in Bahawalpur in 2011 were 61.8%, in 2014 it was 55.1% and in 2018, 39.5% births were from the hands of skilled health professionals. In Rajanpur similarly, a decreasing trend is witnessed and in 2011 the number was 82.3% whereas in 2018 it was 64.1%. In Vehari it was 49.7% in 2011, 40.3% in 2014, and 23% in 2018.

Table 8
Descriptive statistics of the women who had NON-availability of health care services by lady health worker years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	60.3	31.3	31.3

Rajanpur	71.3	50.2	50.2
Vehari	52.8	27.4	27.4

Data in table 08 shows that in Bahawlpur about 60.3% of women did not have health care services provided by lady health workers in 2011, this number improved to 31.3% and later on 31.3% in 2018. Similarly a good trend is witnessed in this context in Rajanpur and Vehari districts where in 2018, 50.2% women in Rajanpur and 27.4% in Vehari were out of health care facility, rest were having at least lady health workers for help.

Table 9
Descriptive statistics of the women who had Early child bearing (before the age 18 years) years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	22.1	16.9	15.3
Rajanpur	28.9	23.9	13.6
Vehari	12.5	18.4	16.2

The marriage at very young age and motherhood are the main factors associated with high maternal mortality in South Punjab. Data indicates that 22.1% girls under age 18 were bearing child in Bahawalpur and this number declines in 2014 in 2018, 15.3 % girls were bearing child at such an early age. This figure is better in Rajanpur where number declines from 28.9% to 13.6% in 2018. In Vehari district, however this number increases from 12.7 in 2011 to 18.4% in 2014 and 16.2% in 2018.

Table 10
Descriptive statistics of Infant mortality rates per 1000 live birth in years 2011,2014,2018.

District	2011	2014	2018
Bahawalpur	100	92	61
Rajanpur	82	86	54
Vehari	97	72	75

The infant mortality rate per 1000 live births is presented in table 10. Data shows it was 100 in 2011, reduce to 92 in 2014 and 61 in 2018. In Rajanpur district it was 82/1000 in 2011, 96 in 2014 and 54 in 2018. In Vehari district it was 97 in 2011, 72 in 2014 and 75 in 2018.

Discussion

Despite of Pakistan's efforts to bring improvement in overall health indicators, the country is still contributing in a continuous manner towards high maternal morbidity and maternal mortality(Shaeen et al,2022).The aspects that are significant and considered as an important determinants of maternal health are still ignored in a country. It is a recognized scientific phenomenon that maternal death causes in the entire world are largely treatable and preventable. Besides in developing worlds, the socio-economic indicators and cultural factors are influencing much on maternal health situations in many developing and under developing countries including Pakistan (Midhet et al,2023) .The scientific researchers have revealed that women need to access ante/post natal care during child birth. In addition to that it is significant for women to have their deliveries under the supervision of skilled birth attendants. There is a also dire need to identify role of traditional birth attendants who are becoming reason of multiple complication for women, in particular in the rural settings (Ali, Sadique, & Davis,2021). Besides the researches have noticed the women own independence, literacy and decision making influence a lot on her maternal health (Kharazi, Peyman, & Esmaily, 2020). The pivotal cultural element of early marriage and its relation to high chances of maternal deaths is also contributing towards women vulnerabilities in relation to their maternal health care. Furthermore,the relationship of infant mortality and maternal death is a phenomenon known worldwide as chances of infant deaths are very high when maternal death is reported (Sanchez, Rivera, Lozada & Best, 2023). The current study

findings has thrown light on significant indicators of maternal health like women literacy, ante/post natal care, use of family planning and contraceptives among couples, early child bearing age and its relation with infant death. The statistics taken from multiple indicator cluster survey reports from 2011 to 2018 depicts Pakistan's performance in the maternal health especially in the rural areas. The significant indicators, in particular in the southern Punjab does not reveal the desired results and shows Pakistan's poor performance in relation to country's international agreements in the area of maternal health. The findings of the study reveal better figures in few indicators for instance infant mortality is significantly reduced in the study area as compare to 2008 reports. But still infant mortality currently in Pakistan is very high as Pakistan stands in number five in terms of high infant mortalities (Mehmood & Bashir, 2023). Literacy and maternal health care is also close connected with each other. However the current study reveals very slow improvement in women literacy. In fact a rise in illiteracy in reported in 2018 reports, particularly in Rajunpur. The researches indicate a literate woman better understands her reproductive rights and do not fall prey of certain cultural elements that can harm women health during pregnancy (Lepcha & Ghosh, 2023).The poverty indicators of the currents study still show large number of women living in poverty, thus comprising towards their heath. As a matter of fact, the almost stagnant indicators of poverty reveal a dismal situation. Besides, a little improvement in child bearing age has been though witnessed in the data retrieved from MICS reports from 2011to 2018 . Though Pakistan still reports high number in child marriage and girls becoming pregnant before 18 years(Scott et al,2021) .In addition, the use of anti/ post natal care in the present study though reveal some better results as increase in post and antenatal care in general has been witnessed over the past years. In contrary to that, skilled birth attendance does not show desirable results over the years in the tables. Similarly, the use of contraceptives for spacing in children also shows very slow or undesirable results in the given tables. The spacing between children is significantly important for good health of mother. Poverty checks and general unawareness continue to worsen the factors related to maternal death. The current study reveals quite stagnant figures as far as poverty is concerned in the study area. There are still high rate of births reported by the hands of traditional birth attendants in the study. The tables show still large majority of rural women prefer birth at home with the help of traditional birth attendants. The scientific evidence has revealed the high chances of complications a women can develop when giving birth with the help of these traditional birth attendants (Byrne, A., & Morgan, A. (2011). Furthermore, lady heath workers as key persons of the rural area are playing a pivotal role in Pakistan's health system, specially awareness on family planning, reproductive rights etc. (Bechange et al,2021).The current study show that areas of vehari and Rajunpur over the years have seen slight improvement in lady health workers presence and services in the area over the years.

Conclusion

Maternal health indicators are the key source of knowing and understanding status of women in any society. In the era of science and technology where medical illness and its treatment are touching the heights of revolutions and innovations, the maternal deaths reported in any country does throw light of on certain social and cultural elements more than the medical causes of death. Pakistan, with its limited resources, though has made some commendable efforts in improving maternal health indicators. But the country's large population is living in underdeveloped and rural areas and the situation over there presents a dismal picture when we look as maternal health indicators.

Recommendations

There is a dire need to improve women's general situation in order to see improvements in these indicators. The country will have to deal with increasing number of illiteracy among girls, less employment opportunities for women that make them dependent on their families. The general awareness on reproductive rights, family planning and infant

and mother care needed to be increased while using channels of social media. The lady health workers role may be strengthen further in order to increase the reach and approach to villages to disseminate information on maternal health. There may be strict implementation on available laws on child marriages. The government spending on overall health budget is the need of hour to be increased as per the set standards of world health organization.

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