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Prevalence of Low Birth Weight Neonates during COVID-19 Pandemic in a Tertiary Care Hospital at Larkana, Sindh, Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. Author MPS collected and analyzed the data. Author ANA coordinated the study, author MRAM reviewed the final draft critically for important scholarly content. All authors read and approved the final manuscript.

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ABSTRACT

In comparison to other middle-income countries, Pakistan has a high prevalence of low birth weight. Currently the situation has worsened because of the COVID-19 pandemic where stress can have a negative impact on intrauterine development, leading to a rise in preterm birth rates and the incidence of low birth weight babies. The goal of this study is to estimate the prevalence of low birth weight in a tertiary care hospital in Larkana, Sindh, Pakistan, during the COVID-19 pandemic.

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In this cross-sectional study, the hospital records of two thousand, two hundred and seventy eight neonates were analyzed from patients' data register for the year 2020. Data were analyzed using Microsoft Excel spread sheet. Of 2278 children admitted to the neonatal ward, only 29.2% babies had birth weight within normal range, 0.7% neonates were high birth weight, and the rest of the admitted babies (70.1%) during the year 2020 had birth weight below 2500 grams. Smallest birth weight observed in the study was 0.9 kg and 4.8 kg was highest birth weight (mean 2.35 kg, SD 0.88, SE 0.012). Female neonates were 895 (39.3%) and the rest of the 1383 (60.7%) babies were male. This study revealed that in Sindh province of Pakistan, the prevalence of low birth weight is extremely high during COVID-19 pandemic. Therefore, the findings suggest that there is need for a lot more emphasis on improving maternal mental health, nutrition and several other relevant factors to reduce the prevalence of low birth weight.

Keywords: COVID-19; low birth weight; neonate; Pakistan; tertiary hospital.

1. INTRODUCTION

The neonate's birth weight is defined as the first weight measured within the first hour after birth. While, low birth weight (LBW) is defined as a weight of less than 2500 g at the time of birth. LBW is further classified into very low birth weight (VLBW, <1500 g) and extremely low birth weight (ELBW, <1000 g) [1]. The prevalence of low birth weight (LBW) show a discrepancy widely across the globe. It ranges from 7.2% in developed countries to 17.3 % in Asia. The highest prevalence of LBW was reported from Southern Asia sub-regions [2]. According to the World Health Organization, around 30 million low birth weight babies are born each year. Which consist of almost quarter of all births globally [3]. Few studies showed that the prevalence of LBW in Pakistan were range between ten to 23 per cent [4,5,6].

There are two key processes that determine LBW, the intrauterine growth rate and duration of gestation. Several studies have found that a baby's decreased birth weight is caused by either reduced intrauterine growth or premature birth before completion of 37 weeks of gestation) [7,8]. There is widespread agreement that birth weight has a significant influence on infant mortality, morbidity, development, and future health. Low birth weight, in particular, is the most significant risk factor for negative health outcomes, such as common childhood disorders. [9].

The causes of LBW differ across the globe. In more developed countries, LBW is associated with premature babies (delivered before completion of 37 weeks of pregnancy) as a result of late pregnancy, smoking, multi-parity and lower segment caesarean section. Meanwhile, in less developed countries, LBW is mostly caused by poor growth of the fetus that linked to poor maternal antenatal nutrition [10]. Determining the causes of LBW is an important aspect in developing effective prevention programs.

Low birth weight has shown to be directly related to cardiac and renal problems, maternal blood pressure, respiratory disorders, alcohol intake and smoking during pregnancy [11,12]. Antenatal care is very much vital for both maternal health and fetal development, without good antenatal care there is greater chance for reduced and stunted development of the baby and higher chances to become LBW [13].

Mass counseling of pregnant mothers for antenatal care in general & their nutrition in particular and institutional deliveries are some of the interventions to avert low birth weight. To meet the Sustainable Development Goals (SDGs)-2030 targets for reducing child mortality, sufficient knowledge regarding the severity of low birth weight and associated variables must be generated in order to contribute to the development of timely interventions [14].

The outbreak of COVID-19 initially appeared in Wuhan city, Hubei, China when multiple cases pneumonia of unknown etiology has been reported. World Health Organization (WHO) declared the Chinese outbreak of COVID-19 to be a Public Health Emergency of International Concern in January 2020. Following that, WHO has declared the novel coronavirus (COVID-19) outbreak as a Global Pandemic on 17th March 2020. The initial vigorous measures to limit the spread of SARS COV-2 virus include early detection, isolation, early treatment, and the execution of a robust system to trace contacts [15].

Table 1. Distribution of birth weight based on WHO classification

Birth Weight Category	Frequency	Percentage
High Birth Weight, HBW (>4000 g)	17	0.7
Normal Birth Weight, NBW (2500 g - 4000 g)	665	29.2
Low Birth Weight, LBW (1500 g - <2500 g)	1357	59.6
Very Low Birth Weight, VLBW (1000 g - <1500 g)	159	7.0
Extremely Low Birth Weight, ELBW (<1000 g)	80	3.5

There were increasing demand for COVID-19 management, however the need for maternal health care should be among the most priority. Maternal health impact could be seen in various aspects for instance clinical view, psycho-social, socio-economic, public health aspect and others. Nevertheless, the studies in regards to the effect of COVID-19 towards mothers' health are inadequate globally as well as in Pakistan.

Hence, this study estimated the prevalence of low birth weight during COVID-19 pandemic in a tertiary care hospital at Larkana, Sindh, Pakistan. This study could give further knowledge about the prevalence of low birth weight during COVID-19 pandemic in order to compare it with the prevalence before the year 2020.

2. MATERIALS AND METHODS

2.1 Study Setting

The study was conducted in neonatology ward of pediatric department at Chandka Medical College Hospital at Larkana City, formerly known as "Chandka". According to the Pakistan Census report 2017, population of Larkana is 490,508. It is the fourth most populated city of the province of Sindh after Karachi, Hyderabad, and Sukkur.

2.2 Study Design

A cross sectional study was conducted based on secondary data sources from the hospital records. There were 2278 neonates admitted at the neonatal ward in year 2020, from 1st January to 31st December. All the neonates admitted to the hospital in year 2020 were included in the study.

2.3 Data Analysis

Using the data CPDR (complete patient data record register), a Microsoft Excel sheet was created including all the available variables in the register. Data were analyzed on Microsoft Excel by creating pivot table and using descriptive statistics.

3. RESULTS

Out of 2278 children admitted to the neonatal ward only 29.2% babies had birth weight within normal range (2500 g to 4000 g), 0.7% neonates were high birth weight, HBW (>4000 g), low birth weight, LBW were 59.6% (1500 g to <2500 g), very low birth weight, VLBW were 7.0% (1000 g to <1500 g) and extremely low birth weight, ELBW were 3.5% (<1000 g) (Table 1). Mean birth weight was 2.35 kg (SD 0.88, SE 0.012). Smallest birth weight observed in the study was 0.9 kg and 4.8 was highest birth weight. Out of 2278 total admitted babies, there were 895 (39.3%) female and 1383 (60.7%) were male babies. (Table. 1)

4. DISCUSSION

The design and implementation of public health programmes targeted at reducing neonatal and infant mortality require information on birth weight or size at birth. A child's birth weight, or size, not only determines his or her susceptibility to childhood illnesses, but also predicts chances of surviving. Over one-fifth (22%) of children in Pakistan who had their birth weight recorded had a low birth weight, a statistic that policymakers and programme administrators must take seriously [16].

Low birth weight (LBW) is a strong predictor of perinatal survival, infant morbidity and mortality and the likelihood of developmental abnormalities and illnesses later in life. [17]. LBW is a common problem in Pakistan and it causes perinatal mortality and morbidity. Studies have showed that maternal age, parity, income of family, gestational age, maternal occupation, degree of illiteracy, birth interval less than three years were found to be the important risk factors contributing to LBW babies in Pakistan. Maternal age, parity, family income, gestational age, maternal occupation, level of literacy, and birth

interval shorter than three years have all been identified as key risk factors for LBW babies in Pakistan [4].

Some of the findings from Pakistan Demographic and Health Survey 2017-2018 revealed that mother's below 20 years are more susceptible to deliver low birth weight compared to those between 20-34 years, 34% of live babies born to mothers younger than 20 were low birth weight, while 21% of all births were low birth weight among mothers aged between 20 to 34 years. Babies born to smoking mothers (28 percent) are more likely to deliver LBW than babies born to non-smoking mothers (22 percent). In the meanwhile, neonates born in the lowest wealth quintile are more likely to be LBW than those born in the highest wealth quintile. (33% and 19% respectively) [16].

In this study, it was observed that 70.1% of all the admitted neonates at Chandka Medical College Hospital, Larkana, were low birth weight (<2500 g). Percentage of LBW neonates in our studies is exceptionally higher compared with findings of several studies. Percentage of LBW was reported as 10.04% among 1863 newborns registered in Shaikh Khalifa Bin Zayad Al-Nayan Hospital Muzaffarabad, Pakistan. The study was conducted before the COVID-19 pandemic for 5 months in 2013 [4]. Another study in Pakistan also found that the prevalence of LBW among term pregnancies was 10.6% [5]. This study also conducted before the COVID-19 pandemic among 947 singleton live births at Dow Medical College & Layari General Hospital Karachi from January 2007 to July 2008. In another research done by Jalil, et al. [18], the incidence of LBW babies was observed to be 24.5% from Punjab. The huge inconsistency in the prevalence of LBW might be because of COVID-19 pandemic that affect not only in Pakistan, but also involved other countries in the world. This finding of having such a enormous percentage of low birth weight neonates translates the latest projections indicate that more than 50% of the world's LBW babies are born in South Asia [2].

In this study the mean birth weight was much lower than the other studies done in Pakistan. Iltaf et al. [4] found that the mean birth weight of their samples was 3065 ± 12.52 g in male and 2791 ± 6.2g in female. Meanwhile, other study revealed that the average weight of babies born in Karachi was 2915 g. These two means are still above the cut-off point for the LBW category.

Psychological impact visualizes from the fear of being infected by COVID-19, as well as fear of being forced quarantine. The government of Pakistan placed lockdown throughout the country from 1 April 2020 and extended twice until 9 May 2020. In the long run, the countrywide lockdowns were claimed to cause acute panic, anxiety, compulsive behaviours, hoarding, paranoia, and depression, as well as post-traumatic stress disorder (PTSD). [19]. Meanwhile, citizens in solitary confinement may feel restricted and obsessed on the disease's progress. [20]. Besides, the number of newly confirmed cases of coronavirus illness was positively linked with depressive rates in 2019. [21]. Review by Brooks et al. [20] found that the majority of research found undesirable psychological consequences such as PTSD symptoms, disorientation, anger and aggression.

COVID-19 pandemic not only affects the clinical aspects but also has a profound effect on belief, behavior, psychology, and social aspects in any person who are badly exposed and pressured by the virus. It is more worrisome and disturbing when this virus affects vulnerable group such as pregnant women. A study of expecting women during second and third trimesters was done in Dublin to analyze the link between behavioral changes and health anxiety during COVID-19 pandemic. The researcher found that the COVID-19 pandemic has risen the significant health concerns among the pregnant women. More than 50% from 71 participants worried about their health often or repeatedly and they also have higher level of anxiety towards their older relatives' health and children [22].

Low birth weight is caused by a variety of factors and lowering it requires initiatives to strengthen mothers' mental health and nutritional condition, as well as to ensure sufficient maternal services and care before, during and after birth to boost social support.

Improving the quality and frequency of birth weight reporting is also essential for lowering the global prevalence of low birth weight. Strengthening national surveillance systems increases low birth weight data collecting and reporting, allowing governments to establish goals, design effective initiatives, and track progress [2].

5. CONCLUSION

Study observed that low birth weight problem in Pakistan is at alarming condition. The findings of

the study highlight that there is a lot to be planned and executed to improve maternal nutrition and a number of additional important factors that can help to reduce the occurrence of low birth weight. There is a huge room to conduct research at community level to estimate country wide prevalence and strategize polices to improve the factors causing low birth weight.

6. RECOMMENDATIONS

The study's findings show that there is still a lot to be planned and done to enhance maternal nutrition. There is a lot of potential for community-level research to determine national incidence and plan policies to reduce the variables that cause low birth weight. More relevant and specific research in the study setting is the dire need of the hour.

7. LIMITATIONS

The major strength of the study is that the data was used for a whole year using the complete patient data record register, which gave a clearer picture of all the admitted neonates during the year 2020. However, this was only hospital based study; therefore there is still gap to conduct similar community based studies.

CONSENT

It is not applicable.

ETHICAL APPROVAL

The guidelines established in the Declaration of Helsinki were followed in this investigation. The Universiti Kebangsaan Malaysia Research and Ethics Committee granted ethical permission (approval number: UKM PPI/111/8/JEP-2020-731). Approval from the hospital administration of Chandka Medical College Hospital Larkana, Pakistan to retrieve the patient records was also obtained.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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