Navigating Early Care: The Role of Integrated Kangaroo Mother Care and Standard Postnatal Care in Preventing Malnutrition in Low Birth Weight Children in India

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Abstract:

Using data from the National Family Health Survey (NFHS)-5 (2019-20), this study aims to evaluate the impact of early care in the form of Kangaroo Mother Care (KMC) and postnatal care (PNC) on the incidence of malnutrition symptoms in low birth weight infants up to age five. In India, where 18% of newborns are born with low birth weight, these infants face a higher risk of malnutrition during their early years. The analysis includes a time-to-event approach to compare the likelihood of avoiding physical signs of malnutrition between low birth weight infants who receive early care and those who do not. Initial findings suggest that early postnatal care, especially within two days of delivery, and KMC have significant potential to mitigate the risk of malnutrition in low birth weight infants during their first five years. However, socio-economic variables along with maternal health variables play a significant role in defining the risk profiles. The ultimate aim of this work is to create a cohesive KMC-PNC early care framework designed to strengthen early care practices. This framework will offer strategies to support low birth weight babies over their life course, ensuring their healthy development and overall quality of life.

Introduction:

Life course methodologies have garnered considerable international recognition for their efficacy in discerning the early phases and trajectory of the progression of specific morbidities. Owing to the scarcity of comprehensive longitudinal datasets, the availability of large-scale, data-driven life course investigations remains limited. This research work endeavors to bridge this gap by examining the associations between adverse birth outcomes and immediate postnatal care, with the overarching objective of comprehending their role in mitigating the prevalence of malnutrition among children aged below five years. Low birth weight has been closely associated with the risk of developing symptoms of malnourishment in children below five years of age. Unfortunately, the percentage of low birth weight children (children below 2.5 kgs at birth) has remained stagnant in India at 18% from NFHS 4 (2015-16) to NFHS 5 (2019-21). The percentage of stunted, wasted and underweight children is 10, 5 and 13

percentage points more in low birth weight babies compared to normal/ overweight babies (Fig 1). The primary objective of this research is to ascertain the factors that may impede the progression of malnutrition in infants with low birth weight. In a more specific vein, this research endeavor seeks to quantify the degree to which early care variables in the form of postnatal care and kangaroo mother care can serve as a protective measure against the emergence of malnutrition symptoms in low birth weight infants up to the age of five years. The overarching objective of this study is to contribute empirical evidence to underpin and inform policy interventions targeted at low birth weight infants, with the ultimate aim of retarding the onset of malnutrition-related manifestations during childhood.

Data sources: For the purpose of the study, the fifth round of National Family Health Survey (NFHS), 2019-20 will be used. NFHS has been collecting information on maternal and child health care variables since its inception in 1992. It has a rich source of data on maternal characteristics, child characteristics, pregnancy related information, delivery related variables and birth outcome measures. NFHS 5 provides child level information on all children below five years of age. For the paper, analysis is done on 173,047 last births as post-natal care variables are available for the last births only.

Analytical strategy:

The study will use last births' data to assess the role of postnatal care and KMC for low birth weight babies in mitigating the development of symptoms of malnourishment. Three main indicators of malnourishment among children below five years will be taken- stunting (low height for age), wasting (low weight for height) and underweight (low weight for age).

Low birth weight is estimated for all last births irrespective of the place of delivery. Only children with recorded birth weight are considered for the analysis to maintain objectivity of the measure. As per WHO guidelines, children below 2.5 kilograms at birth are considered to be low birth weight babies.

Post-natal period begins immediately after birth of a baby extending upto 6 weeks (42 days) after birth. The first 24 hours of birth is crucial for the initial post-natal visit by a health expert. We plan to use various components of post-natal care such as timing of post-natal care, post-natal care provider, practice of Kangaroo Mother Care (KMC) at birth of the child. Post-natal care is recommended by World Health Organization (WHO) in order to ensure proper after birth care of neonates and promote early detection of conditions that may adversely affect the health and well-being of the child. One such post-natal care practice that is found to be rewarding in the long run is the kangaroo care. Kangaroo care, as delineated by the World

Health Organization (WHO), encompasses the practice of facilitating skin-to-skin contact between an infant and its mother, accompanied by exclusive breastfeeding. In cases where the mother or birthing parent is unable to perform this care, an alternative caregiver can assume the responsibility. Commencement of this contact should be initiated promptly after birth and sustained for an extensive duration each day. Ideally, in accordance with WHO guidelines, infants, particularly those born prematurely or with low birth weight, are advised to partake in skin-to-skin contact for a daily duration ranging from eight to 24 hours. These recommendations are universally applicable to all infants falling into the aforementioned categories.

The initial phase of the study will employ logistic regression analysis to establish the likelihood of malnutrition occurrence among children born with low birth weight who have been subjected to postnatal care interventions, such as early postnatal visits conducted by healthcare professionals or immediate Kangaroo care following birth. Subsequently, a propensity score matching analysis will be conducted to evaluate the disparity in malnutrition incidence between low birth weight infants who receive postnatal care and those who do not.

Expected outcomes:

Fig 2 provides a brief overview of the disadvantages in malnutrition for babies born at a low birth weight. Low birth weight babies show significantly higher probabilities of being malnourished at all ages compared to babies born at a normal weight or babies who are overweight. It is therefore necessary to identify pathways in which care at the early stages of life can prevent the development of symptoms of malnourishment in such low birth weight babies. Table 1 shows the results of odds ratios from the logistic regression of low birth weight and PNC variables on the three indicators of child malnourishment- stunting, wasting and underweight. The odds of being malnourished is significantly higher (1.4 to 1.8) for low birth weight babies. However, the odds of being malnourished for low birth weight babies reduces significantly (0.9-1.2) for those who have either received post-natal care within 2 days of delivery or full Kangaroo Mother care at birth.

The paper expects to have more robust findings through time to event analysis that can highlight the advantage of early care among low birth weight babies to decelerate the incidence of any form of malnourishment among these children in the first 5 years of birth. The paper will attempt to develop an integrated KMC-PNC early care framework that can provide inputs to fortify early care variables that can provide safety nets to low birth weight babies over their life course and ensure healthy growth and quality of life.

Figure 1. Percentage of children with some form of malnourishment by birth weight, NFHS 5, 2019-21

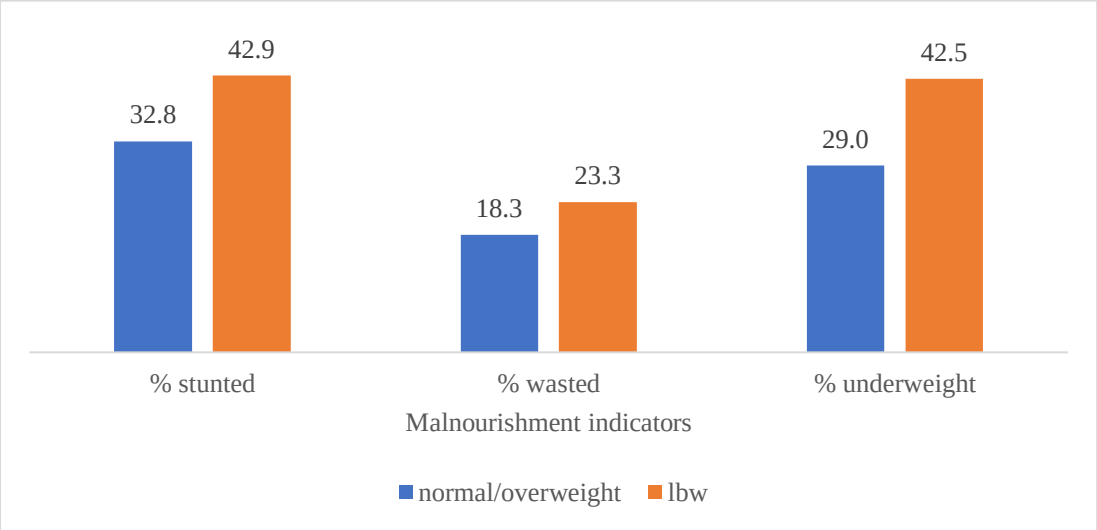


Table 1. Odds ratios from the logistic regression on indicators of child malnourishment by low birth weight and post-natal care variables, NFHS 5, 2019-21

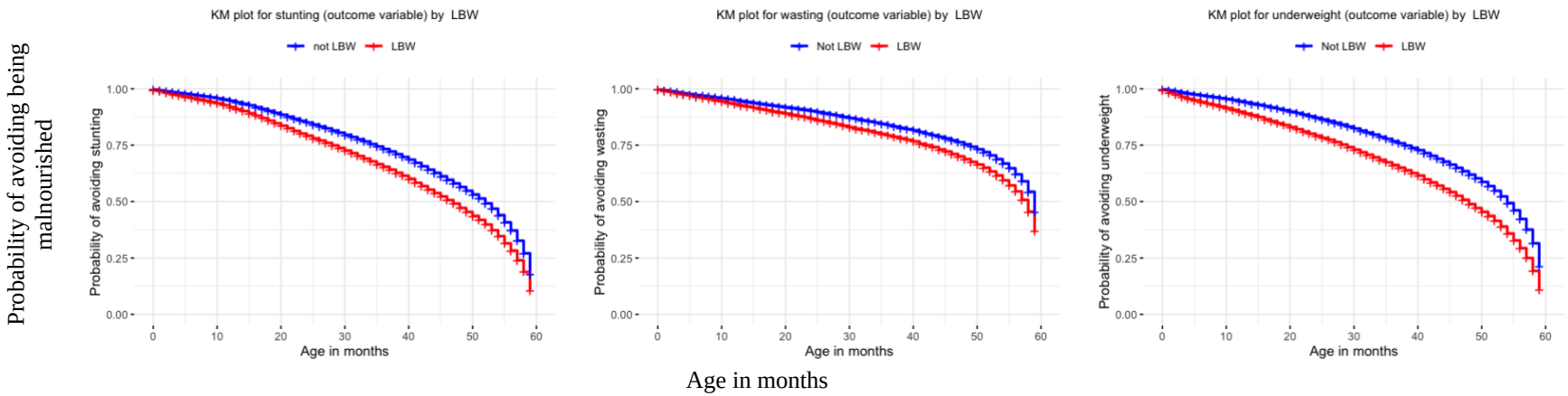
Characteristics	Odds ratios of		
	Stunting	Wasting	Underweight
Birth weight (Ref: Normal/ overweight)			
Low birth weight babies	1.5**	1.4**	1.8**
PNC within 2 days (Ref: Not within 2 days)			
Within 2 days	0.8**	1.0	0.9**
Kangaroo Mother Care (Ref: No KMC)			
Full KMC	1.1**	1.2**	1.3**
Partial KMC	1.1**	1.2**	1.2**
Interaction variables			
Low birth weight X PNC within 2 days	1.1*	1.1	1.2**
Low birth weight X full KMC	0.9*	0.9*	0.9**
Low birth weight X Partial KMC	0.9*	1.0	0.8*
Constant	0.5**	0.2**	0.3**

Note: ** -p-value< 0.01 and * -p-value<0.1

Figure 2. Kaplan-Meier plots of avoiding malnutrition by birthweight of children below 5 years in age

Outcome variable

A. Stunting **B. Wasting** **C. Underweight**



Age in months