Feeding of Low Birth Weight Newborns in Tertiary Care Hospitals in Pakistan: Do They Follow the World Health Organization Latest Guidelines?

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ABSTRACT
Objective: To determine the extent the World Health Organization (WHO) guidelines on the care of Low Birth Weight (LBW) newborns are followed in Pakistani hospitals and analyze any difference in policy compliance between different hospitals.

Study Design: Descriptive analytical study.

Place and Duration of Study: Data was collected from five tertiary care hospitals, one each from Peshawar, Lahore, Quetta, Karachi and Islamabad, from January to June 2012.

Methodology: LBW newborns data derived from medical records was used. It was collected using a questionnaire, which encompassed the recent WHO recommendations for feeding of LBW. Twenty questionnaires were collected from each hospital. STATA 11.0 was used to analyze the data.

Results: Fifty seven LBW newborns (57%) were fed with mother's own milk, and 9 (9%) were fed on donor human milk. Forty four newborns (44%) were initiated breastfeeding within the first hour after birth. Most of the babies not able to be breastfed were fed with intra gastric tube. Feeding practices varied markedly across hospitals, ranging from one hospital where all newborns were fed formula milk to one where all were fed breast milk.

Conclusion: The WHO guidelines were only partially implemented, with significant differences between hospitals in level of implementation of recommended practices. Given the benefits expected from the application of the guidelines, efforts should be made for the establishment and promotion of a single national policy for LBW feeding that follows the WHO new guidelines and streamlines the LBW feeding practices across the country.


INTRODUCTION

Fifteen percent of the 20.6 million infants born in the world every year are LBW babies. The vast majority of LBW babies are delivered in Low and Middle-Income Countries (LMIC). Globally, about 17% of the under 5 deaths are attributed to prematurity and LBW.

Studies in LMIC have shown that better care of LBW babies such as improved feeding practices, infection prevention and treatment, temperature control, and good skin and cord care can be very effective to reduce mortality rates. The importance of improved feeding practices for LBW infants was also demonstrated in high income countries.

Improving the survival of LBW is an important issue for the UN (United Nations) given its effect on the achievement of Millennium Development Goals (MDG) 1

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Over the 20 years between 1990 and 2009, an estimated 31 million newborns died in LMIC in South Asia. Neonatal deaths in Pakistan represented 6.9% of the total neonatal deaths in the world, the third highest. Although there have been great strides in the reduction of child mortality, with about 12000 fewer children died in the world in 2010 as compared to 1990, disparities still persist in different regions of the world, especially in LMIC.

Improving feeding practices in countries where neonatal mortality is the highest is one of the most effective interventions for reducing such disparities. Thus, the WHO has developed, based on a systematic review of the research literature, guidelines on optimal feeding practices of LBW babies.

The primary objective of this study was to determine to the extent the WHO guidelines on care of LBW infants are followed within a sample of tertiary care hospitals in Pakistan. A secondary objective was to compare the level of guideline implementation between the sampled hospitals.

METHODOLOGY

This descriptive analytical study conductive by retrospective review of the medical records of the care
provided to LBW babies in five tertiary hospitals in Pakistan situated in the four provinces of the country (Khyber Pakhtoonkhwa, Punjab, Baluchistan, and Sindh) and in the capital Islamabad. To preserve the anonymity of the hospitals, the names were replaced with codes 1 to 5. A sample of 100 LBW babies admitted to the hospitals was included, with each participating hospital contributing 20 cases. In Pakistan, Sindh has 53 out of the 75 Baby-Friendly Hospitals (BFH) as per the available information.11

The data collection questionnaire (Appendix) comprised of 17 items based on the current WHO guidelines for feeding of LBW. The form was used to gather information from medical records about feeding of LBW and VLBW babies. Data collection started in January 2012 and was completed over a period of 6 months. It was then sent to the principal investigator electronically for the analysis.

Consent was taken from the hospital administrations regarding the retrieval of medical records data. Patient information was anonymized. Ethical review and approval for the study was obtained from the Ethical Review Board of Hope, Karachi, Pakistan.

The samples were selected among the recent (6 months) cases of LBW births in each included hospital, starting from January 2012. Subjects were excluded if there was documentation of clinical instability that interfered with feeding. The proposed sample size of 100 LBW infants was calculated to allow a precision of estimates of the prevalence of feeding practices of plus or minus 10%, if the prevalence of the practice in the study population is 50%. This was a conservative estimate as for prevalence lower or higher than 50%, the precision of the estimate would be greater.

The data were entered into Excel and imported into STATA version 11.0 for analysis.12 Chi-square test was used for testing the differences between hospitals on feeding practices. The level of significance was set as p-values less than 0.05. Frequency and percentages are used as descriptive statistics to present data (categorical variable).

RESULTS

Table I shows that in the sample of 100 babies, 57 were LBW (weight between 2500 g and 1500 g), while the remaining 43 were VLBW (weight between 1500 g and 1000 g). For the gestational age, 6 newborns (6%) were aged between 25-29 weeks, while 31 (31%) were 30-34 weeks. Out of the five hospitals, three (hospitals 1, 3 and 5) had 10 LBW and 10 VLBW each. For hospital 2, the distribution of LBW and VLBW were 13 and 7, while for hospital 4, there were 14 LBW and 6 VLBW newborns.

More than half (57 out of 100) of the LBW newborns were breastfed as shown in Table II. The distribution of feeding practices per hospital is shown in Table III. All the newborns from hospital 1 and 13 (65%) from hospital 2 were not breastfed. For hospitals 4 and 5, more than half of the babies were breastfed (17 and 13 respectively). In the total sample, 30 newborns (30%) received standard infant formula as shown in Table II. In terms of gestational age, out of the total newborns receiving biological mother’s milk, 74% (42 out of 57) were 35 weeks or above, while out of the total newborns receiving standard infant formula, 57% (17 out of 30) were 35 weeks or above for gestation age. Nine percent of newborns (9 out of 100) were given donor human milk. The hospitals differ significantly (p < 0.001) on the type of milk fed (Table III). All of the newborns from hospital 1 (20 out of 20) received standard infant formula, while the majority of newborns at hospitals 3 and 4 (20 out of 20 and 17 out of 20 respectively) received biological mother’s milk as shown in Table III.

Ninety one newborns (91%) did not receive any form of fortifiers while 8 (8%) received human milk based fortifier. The use of fortifier did not differ significantly (p=0.155) across the hospitals (Table III). Of the different supplements, 15 (15%) newborns received calcium,
9 (9%) received Vitamin D, 4 (4%) received iron and 6 (6%) received Vitamin A as in Table II. Vitamin A and zinc supplements were only given in hospital 4 to 5 (5%) and 9 (9%) newborns respectively. 

Forty four newborns (44%) were breastfed within the first hour after birth (Table II). Time of initiation differed significantly (p < 0.001) across the hospitals (Table III). More than half of the babies in hospitals 3, 4 and 5 were breastfed within the first hour after birth (15, 12 and 12 respectively). None of the babies from hospital 1 was breastfed as shown in Table III. Breastfeeding initiation within the first hour for babies having gestational age 30 - 34 weeks and 25 - 29 weeks was almost 33% (10 out of 31 and 2 out of 6 respectively).

Most of the babies not able to be breastfed were fed with intra gastric tube (36 out of 43). The feeding of these babies differed significantly (p < 0.001) across the hospitals (Table III). Most of the babies from hospital 4 and 5, who were not able to breastfeed, were fed by intra gastric tube, while cup was used for feeding in half of the babies in hospital 1. Half (18 out of 36) of the newborns who were fed with intra gastric tube were from gestational age 35 weeks and above, with the percentage decreasing gradually as the gestational age decreased to 30-34 weeks (14 out of 36) and 25 - 29 weeks (4 out of 36).

Table II: The WHO guidelines on LBW infant feeding in relation to clinical practice in five hospitals in Pakistan.

<table>
<thead>
<tr>
<th>WHO policy item</th>
<th>Practices in five hospitals in Pakistan according to the sample of medical records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should be fed mother’s own milk if the above is not possible:</td>
<td></td>
</tr>
<tr>
<td>They should be fed donor human milk</td>
<td>9% (9)</td>
</tr>
<tr>
<td>Or standard infant formula</td>
<td>30% (30)</td>
</tr>
<tr>
<td>The breastfeeding should be supplemented by:</td>
<td></td>
</tr>
<tr>
<td>Vitamin D</td>
<td>9% (9)</td>
</tr>
<tr>
<td>Calcium</td>
<td>15% (15)</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Iron</td>
<td>4% (4)</td>
</tr>
<tr>
<td>Breastfeeding should not be supplemented by:</td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>94% (94)</td>
</tr>
<tr>
<td>LBW should be breastfed ASAP (within 1st hour postnatal)</td>
<td>44% (44)</td>
</tr>
</tbody>
</table>

Table III: The WHO feeding guidelines and the practices in each of the five hospitals in the study.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>1 (n=20)</th>
<th>2 (n=20)</th>
<th>3 (n=20)</th>
<th>4 (n=20)</th>
<th>5 (n=20)</th>
<th>Total</th>
<th>Chi-sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the infant fed?</td>
<td></td>
<td>p=0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s own milk</td>
<td>0% (0)</td>
<td>35% (7)</td>
<td>100% (20)</td>
<td>85% (17)</td>
<td>65% (13)</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Donor human milk</td>
<td>0% (0)</td>
<td>40% (8)</td>
<td>0% (0)</td>
<td>5% (1)</td>
<td>0% (0)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Standard infant formula</td>
<td>100% (20)</td>
<td>5% (1)</td>
<td>0% (0)</td>
<td>10% (2)</td>
<td>35% (7)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>0% (0)</td>
<td>20% (4)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Infant received milk fortifier</td>
<td></td>
<td>p=0.155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bovine milk based</td>
<td>0% (0)</td>
<td>5% (1)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Human milk based</td>
<td>0% (0)</td>
<td>20% (4)</td>
<td>0% (0)</td>
<td>10% (2)</td>
<td>10% (2)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>No fortifier</td>
<td>20% (20)</td>
<td>15% (15)</td>
<td>20% (20)</td>
<td>18% (18)</td>
<td>18% (18)</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Vitamin D supplement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100% (20)</td>
<td>65% (13)</td>
<td>100% (20)</td>
<td>90% (18)</td>
<td>100% (20)</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0% (0)</td>
<td>35% (7)</td>
<td>0% (0)</td>
<td>10% (2)</td>
<td>0% (0)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Calcium supplement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100% (20)</td>
<td>40% (8)</td>
<td>100% (20)</td>
<td>85% (17)</td>
<td>100% (20)</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0% (0)</td>
<td>60% (12)</td>
<td>0% (0)</td>
<td>15% (3)</td>
<td>0% (0)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Phosphorus supplement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Iron supplement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100% (20)</td>
<td>80% (16)</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>100% (20)</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0% (0)</td>
<td>20% (4)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Vitamin A supplement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100% (20)</td>
<td>95% (19)</td>
<td>100% (20)</td>
<td>75% (15)</td>
<td>100% (20)</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0% (0)</td>
<td>5% (1)</td>
<td>0% (0)</td>
<td>25% (5)</td>
<td>0% (0)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>At what time did breastfeeding start?</td>
<td></td>
<td>p=0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within first hour</td>
<td>0% (0)</td>
<td>25% (5)</td>
<td>75% (15)</td>
<td>60% (12)</td>
<td>60% (12)</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>After first hour but day 1</td>
<td>0% (0)</td>
<td>10% (2)</td>
<td>0% (0)</td>
<td>5% (1)</td>
<td>0% (0)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>If not breastfed, how was the baby fed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cup</td>
<td>50% (10)</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>14% (3)</td>
<td>10% (2)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Intra gastric tube</td>
<td>20% (4)</td>
<td>26% (5)</td>
<td>100% (20)</td>
<td>70% (14)</td>
<td>90% (16)</td>
<td>59</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

The study shows that there is a significant disparity between the practices of feeding LBWs recommended by WHO and those followed in the Pakistani hospitals included in this study. There is considerable room for improving practices especially regarding initiation of breastfeeding, supplemental feeding and the route infants were fed, if they cannot be breastfed.

According to WHO recommendations, the most important postnatal practices involving feeding and supplemental feeding is breastfeeding from mother; if that fails feeding with donor human milk and if that is not possible then standard infant formula for LBW and VLBW. According to the findings from this study most of the newborns were breastfed with biological mother milk. However, there was considerable variability across the hospitals: this practice was mostly adhered to in hospitals 3 and 4, while none of the LBWs at hospital 1 was given mother's milk. Vitamin A and Zinc is not recommended by the WHO for feeding LBW newborns, as there is not sufficient evidence to support such a recommendation. Still, Vitamin A and Zinc was given to a small percentage of the newborns in this study. LBW newborns should start breastfeeding as soon as possible after birth if they are clinically stable. However, less than half of the newborns in the study were started on breastfeeding within the first hour after birth.

The WHO recommendations state that pre-term infant formula for VLBW newborns be given if they fail to gain weight despite adequate feeding with standard infant formula. Additionally, those VLBW newborns requiring intra-gastric tube feeding should be given bolus intermittent feeds, with the tube placed by either nasal or oral route. According to the findings from this study, almost half VLBW newborns were not breastfed.

The mothers' of the LBW babies from the five hospitals had different ethnic background, which might have an impact on the breastfeeding practices of the babies. Though the practices in the study reflected more the hospital's practices/guidelines rather than mothers' decisions. There is no explicit document as the national policy for the LBW infants feeding or breastfeeding by the Government of Pakistan. However, different measures taken by the Government show the policy directions of the health ministry on these issues. At hospital level, pediatric textbooks from the national and international authors are usually followed.

This is one of the few studies available about LBW feeding practices in Pakistan as per authors' knowledge, not to mention the examination of differences between the health facility practices. It indicates that a clear national policy might be helpful to promote necessary improvements in hospital practices. There is a need for increasing the awareness of the WHO guidelines in Pakistani hospitals and its reflection into a national policy document on LBW feeding.

A limitation of this study is that the sample size was small for each study and covers a period of up to 6 months, which may not fully represent the individual hospital practices. A major strength of the study is that the data about the feeding of LBW newborns was taken from the medical records rather than reported by mothers at the hospitals or in household surveys, therefore, it is more likely to reflect actual hospital feeding practices.

Appendix: Questionnaire for the LBW study.

Hospital
Infant identification (if any):
Mother name

Infant characteristics:
Birth weight
Sex
Gestational age

1. Can the infant be breastfed?
Yes
No
Others

2. What is the infant fed?
Biological mother's own milk
Donor human milk/wet nurse milk
Standard infant formula
Other

3. Does the infant receive any milk fortifier?
Bovine-milk based human milk fortifier
Human milk based human milk fortifiers
No
Other

4. Does the infant receive any supplements?
Vitamin D
Calcium
Phosphorus
Iron
Vitamin A
Other
No

5. When was the infant put to the breast?
As soon as possible after birth
First hour after birth
After first hour but day 1
After day 1
Never

6. If not breastfed, how was the baby fed?
Bottle
Cup
Intra gastric tube
Other

7. LBW infants feeding depending upon the hunger cues in intra gastric tube feeding except if the infant remains asleep for more than 3 hours
Yes
No
Not applicable

8. LBW infants who cannot be breastfed directly are fed on
Oral route
IV route
Not applicable

9. LBW infants feeding depending upon infant hunger cues in intra gastric tube feeding except if the infant remains asleep for more than 3 hours
Yes
No
Not applicable

10. LBW infants on intra gastric tube feeding, daily feeding volume is
Continued....
There is significant scope for improvement in the feeding of LBW newborns. Just over half of the recruited infants were fed the mother's milk and fewer than half initiated breastfeeding within the first hour. Cup was not used as a priority for feeding those LBW infants in need of alternative to breastfeeding. There were significant differences in between hospitals in terms of compliance with WHO LBW feeding guidelines. This diversity in practices may reflect the lack of a national policy for LBW feeding in the country.

REFERENCES

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