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Research Article
Knowledge

Knowledge, attitudes and practices regarding infant feeding among mothers of children with severe acute malnutrition in the rural areas of Northern India

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Introduction: Malnutrition has been identified as one of the principal causes limiting India's global economic potential. The infant and young child-feeding practices determine the nutritional status, growth and ultimately the survival of infants and young children. The study aimed to assess the knowledge, attitude and practices of rural mothers with children diagnosed with severe acute malnutrition (SAM) regarding infant feeding. **Methodology:** A hospital-based cross-sectional descriptive study on 116 mothers from the rural area of Northern India with children diagnosed with SAM. Assessment of knowledge, attitude and practice of mothers regarding infant feeding was done through face to face interviews using a structured questionnaire containing 32 questions. **Results**: The mean age of admitted children was 14.48 ± 4.71 months. The majority of mothers (81.9%) studied till only primary school or were illiterate. The appropriate knowledge about early initiation of breastfeeding and the ideal time to start complementary feeding was found in 42.4% and 45.6% of mothers respectively which was suboptimal. The attitude towards ideal breastfeeding practices was positive in most mothers. However in practice only 59.4% of mothers exclusively breastfed their babies till 6 months and 54.3% delayed initiation of complementary feed beyond 9 months of age. The frequency of complementary feeding was inadequate in the 6-8 months age group as stated by 88.6% of mothers and minimum dietary diversity was not followed by 68.1% of mothers. **Conclusion:** The knowledge and positive attitude towards infant feeding are not applied in practice by mothers. Efforts should be made to improve knowledge, attitude and practice with an emphasis on complementary feeding indicators to reduce the burden of malnutrition in the rural population.67

Keywords: Attitude, Breastfeeding, Complimentary feeding, Knowledge, Practices, Severe acute malnutrition

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Introduction

The global burden of malnutrition is unacceptably high, with nearly half of all deaths in children under five years linked to poor nutrition [1]. Malnutrition is still responsible for 69% of under 5 mortality in India. Uttar Pradesh is among the states with the highest malnutrition-related disability-adjusted life years (DALY) rate along with Bihar, Assam, and Rajasthan [2]. Also rural areas have a higher prevalence of stunting and underweight in under-fives as compared to urban areas as found in the comprehensive National Nutrition Survey (CNNS) 2016-18 conducted by the Ministry of Health [3].

Optimal feeding practices during infancy and early childhood, comprising of early initiation of breastfeeding, exclusive breastfeeding in the first six months of life, continued breastfeeding through age 2 years, timely introduction of complementary foods, diversity of diet and frequency are critical for child survival, healthy growth and development of children under two years of age [4]. The first 1000 days of life is the most important period to intervene to prevent the lifelong damage caused by malnutrition [5].

Food and feeding behaviors in children are closely linked to and shaped by their family's preferences, practices and backgrounds [6]. Parents also may lack knowledge on appropriate foods and feeding practices for the child's age and have inadequate awareness and or means for proper caring and health-seeking which is a contributing factor leading to malnutrition in this age group. Addressing this problem of poor knowledge and poor adoption of appropriate child feeding practices can be one step closer towards reducing child undernutrition or child stunting thereby reducing under-five mortality.

With this background, authors conducted this study to find out the knowledge, attitude and prevailing practices among rural mothers of children with SAM regarding infant and young child feeding. Any gaps in knowledge and practices found during this study can be used to counsel the mother and other primary caregivers which will go a long way to improve the status of the severity of malnutrition in rural areas.

Material and Methods

A cross-sectional study was conducted on mothers of 116 children (diagnosed cases of SAM) aged between 6 and 24 months admitted in the Department of Paediatrics, Hind Institute of Medical College, Atria, Sitapur District, UP. The study was conducted from January-September 2019. Subjects were selected based on the convenience sampling method. Written informed consent was taken from mothers.

Inclusion criteria: Mothers of children 6 -24 month's age group with the presence of any of the following criteria for SAM were included in the study [7].

01. Weight for length/height < -3 standard deviation (SD) of median WHO child growth standards

02. mid-upper-arm circumference < 11.5 cm

III. Presence of bilateral pedal edema

Exclusion criteria: Mothers who were not available or refused consent were excluded.

A detailed history of SAM patients was noted on a proforma, including personal profile, feeding/dietary history, immunization, development, socio-demographic details of their parents, general and systemic examination and anthropometric details. Consenting mothers were interviewed using a self-designed questionnaire in their language by investigators themselves. A semi-structured interview guide was used to collect in-depth information from each participant. Mothers were assessed regarding knowledge, attitude and practice for breastfeeding and complementary feeding. The questions for the three components of the KAP study consisted of 32 closed and open yes/no or multiple-choice response alternatives as given in Table 2-5. The methodology followed was similar to the validated methods of WHO for 'Indicators for assessing infant and young child feeding practices [8]. The answers to various questions were categorized according to the responses to aid future pertinent action. The source of knowledge was also enquired to ascertain any lacunae in counselling by health care providers. Ethical approval was taken from the institutional ethical committee.

Statistical analysis: The findings are presented using percentage, mean and standard deviation (SD). The statistical analysis was carried out using the SPSS 20.0 version software.

Result

A total of 116 mothers with children diagnosed with severe acute malnutrition (SAM) were included in this study.

Knowledge, attitude and practices of the mothers regarding infant feeding was studied.

Table no. 1: Sociodemographic characteristics of participants

Characteristics	N =116 (%)
Sex of children	
Male	74 (63.8)
Female	42 (36.2)
Age of children (months)	
6-12	49 (42.2)
13-24	67 (57.8)
Religion	
Hindu	95 (81.9)
Muslim	21 (18.1)
Type of family	
Joint	106 (91.4)
Nuclear	10 (8.6)
Birth order	
1st	18 (15.5)
2nd	40 (34.5)
3rd	26 (22.4)
4th	14 (12.1)
5th or more	18 (15.5)
No. of siblings	
1	12 (10.3)
2	40 (34.5)
> 2	64 (55.2)
Socioeconomic status (Modified BG Prasad scale - updated Jan' 2018)	
Class I (Upper middle)	10 (8.6)
Class II (Middle)	20 (17.2)
Class III (Lower center)	37 (31.9)
Class IV (Lower)	49 (42.3)
Age of mother (yrs.)	
≤ 18	2 (1.7)
19-29	64 (55.2)
30-39	38 (32.8)
> 40	12 (10.3)
Mother's educational status	
Illiterate	14 (12.2)
Primary School	81(69.8)
Middle School	12 (10.3)
Secondary School or higher	9 (7.7)
Father's educational status	
Illiterate	22 (18.9)
Primary School	36 (31.1)
Middle School	45 (38.8)
Secondary School or higher	13 (11.2)
Immunization status	
Unimmunized	16 (13.8)
Incomplete	67 (57.8)
Complete	33 (28.4)

*Data are expressed in percentage

As shown in **Table 1**, in our study, out of all SAM patients 63.8 % were male. 57.8 % of children were between 12-24 months of age at the time of admission. The mean age of admitted children was 14.48 ± 4.71 months. The majority 81.4% were Hindus and belonged to a joint family (91.4 %). 86 (74.2 %) SAM patients belonged to a lower socioeconomic scale (III&IV). The birth order of SAM children was 2nd and 3rd in 34.5 % and 22.4 % children respectively and 64 (55.2%) children had >2 siblings. The mean age of respondents (mothers) was 29.48 ± 7.28 years. The majority of mothers (69.8%) studied till only primary school, moreover 14 mothers (12.1 %) were illiterate. Only 9 (7.7%) mothers studied till secondary school or higher. The majority of children, i.e., 67 (57.8 %), had incomplete immunization status acc. to age, and 16 (13.8 %) patients were not immunized at all.

Table 2: Knowledge of mother

	N (%)
1. Do you know the importance of breast Feeding?	
Yes	95 (81.9)
No	21 (18.1)
2. Do you know the ideal time for breastfeeding initiation after delivery?	
< 1 hour	85 (73.3)
> 1 hour	24 (20.7)
> 24 hrs.	7 (6.0)
3. Do you know the benefits of colostrum for a newborn?	
Yes	94 (81.1)
No	22 (18.9)
4. For how long should an infant be Exclusively Breastfed only?	
4-5 months	25 (21.6)
6 months	49 (42.2)
> 6 months	7 (6.0)
No knowledge	35 (30.2)
5. Do you know the ideal duration of breastfeeding?	
6 months	7 (6.0)
1 year	68 (58.6)
2 year	25 (21.6)
No knowledge	16 (13.8)
6. Do you know frequent breastfeeding increases milk production?	
Yes	45 (38.8)
No	11 (9.5)
No knowledge	60 (51.7)
7. Do you know bottle feeding is dangerous for the baby?	
Yes	48 (41.4)
No	18 (15.5)
No knowledge	50 (43.1)

8. Do you know EBF is beneficial to mothers too?	
Yes	95 (81.9)
No	3 (2.6)
No knowledge	18 (15.5)
9. Do you know EBF prevents diarrheal, respiratory (EBF protects baby from illness)?	
Yes	21 (18.0)
No	62 (53.5)
No knowledge	33 (28.5)
10. Do you know the right time to start complementary (semi solid) foods?	
< 6 months	2 (1.7)
6-12 months	53 (45.7)
> 1 year	19 (16.4)
No knowledge	42 (36.2)
11. Do you know how often a baby between 6–8 months should be fed in a day along with breastfeeding:	
1 time	78 (67.2)
≥ 2 times	38 (32.8)
12. Do you know how often a baby between 9–23 months should be fed in a day:	
2 times	41 (35.3)
-4 times	75 (64.7)

*Data are expressed in percentage

Table 2 shows the mother's knowledge regarding optimal breastfeeding and complementary feeding practices. The majority of mothers (73.3 %) knew about the ideal time for initiation of breastfeeding and 81.1 % of mothers were aware of the benefits of first milk (colostrum) to newborns. However only 49 (42.2 %) mothers knew the duration of exclusive breastfeeding till 6 months and only 25 (21.6 %) knew that breastfeeding should be continued till 2 years. 60 (51.7%) mothers did not know that frequent breastfeeding increases milk production and 43.1% had no knowledge of the dangers of bottle feeding.

The benefit of breastfeeding to mothers was known to 95 (81.9 %) mothers however only 21 (18.1%) mothers knew that breastfeeding protects children from infections like diarrhoea and pneumonia. The knowledge about complementary feeding was poor in most mothers where only 53 (45.7%) mothers knew about the ideal time to start complementary feeding and only 38 (32.8 %) mothers knew the ideal frequency of complementary feeds in 6-8 months children. However majority of mothers 75 (64.7 %) knew about the frequency of feeding in older children (9-23 months).

Table 3. Source of information to mothers

Source of information	n (%)
Health institution/staff	73 (62.9)
Mass media/internet	42 (36.2)
Family	59 (50.9)
Friends/peer group	31 (26.7)
Books	23 (19.8)
Another source	13 (11.2)

More than 1 source of information

*Data are expressed in percentage

Table 3 depict the most common source of information regarding breastfeeding and complementary feeding were health institutions/staff (62.9%) during antenatal visits and delivery followed by family members in 50.9 % of cases and media/internet in 36.2 % of cases. There was more than one source of information for most of the respondents.

Table 4: Attitude of mother

	n (%)
1. First milk (colostrum) is nutritious for the baby?	
Agree	85 (73.3)
Disagree	9 (7.8)
Neutral	22 (18.9)
2. Exclusive Breast Feeding till 6 months is beneficial to the Child?	
Agree	98 (84.5)
Disagree	0
Neutral	18 (15.5)
3. Giving breast milk to a newborn immediately within one hour (early initiation) is important?	
Agree	89 (76.7) 11 (9.5)
Disagree	16 (13.8)
Neutral	
4. EBF is enough for a child for up to 6 months?	
Agree	102 (87.9)
Disagree	0
Neutral	14 (12.1)
5. Breastfeeding increases mother-infant bonding?	
Agree	93 (80.2)
Disagree	0
Neutral	23 (19.8)
6. Breastfed babies are healthier than formula-fed babies?	
Agree	87 (75)
Disagree	7 (6.1)
Neutral	22 (18.9)
7. Breastfeeding is beneficial to the mother too?	
Agree	92 (79.3)
Disagree	0
Neutral	24 (20.7)
8. Dietary diversity (diff. food groups) should be present in diet after 6 months of age	

Agree	54 (46.6)
Disagree	21 (18.0)
Neutral	41 (35.4)
9. Feeding should be decreased during illness?	
Agree	23 (19.8)
Disagree	72 (62.1)
Neutral	21 (18.1)
10. Do you encourage other mothers to Exclusively breastfeed their infant?	
Yes	89 (76.7)
No	27 (23.3)

*Data are expressed in percentage

Table 4 shows the mother's attitude about breastfeeding and complementary feeding. The majority of mothers agreed with ideal breastfeeding practices. 89 (76.7 %) mothers encouraged other mothers to exclusively breastfeed their infant.73.2%,76.7% and 84.5% of mothers respectively agreed that colostrum is nutritious to baby, initiating breastfeeding within one hour of delivery and EBF till 6 months is beneficial to the child. 87.9 % of mothers agreed that EBF is enough for a child for up to 6 months, 80.2 % of mothers agreed that breastfeeding increases mother-infant bonding and 75% of mothers agreed that breastfed babies are healthier than formula-fed babies. 72 (62.1 %) mothers disagreed that feeding should be decreased during illness while 19.8 % agreed. However the attitude about complementary feeding including the presence of dietary diversity after 6 months of age was neutral in 41 (35.3%) mothers and only 54 (46.5%) mothers agreed with the statement.

Table 5: Practices of mother

	N (%)
1. When did you start breastfeeding after delivery?	
Within one hour	64 (55.2)
After one hour	52 (44.8)
2. Did you give colostrum to your baby?	
Yes	77 (66.4)
No	39 (33.6)
3. Did you breastfeed your baby exclusively?	
Yes	69 (59.5)
No	47 (40.5)
4. Have you given your last baby anything before initiating breastfeeding (Prelacteal food)?	
Yes	18 (15.5)
No	98 (84.5)
5. Till when you breastfed your last child?	
6 months	32 (27.6)
1 year	56 (48.3)
2 year	21 (18.1)
> 2 year	7 (6.0)
6. When did you introduce complimentary foods?	
< 6 months	0
At 6 months	32 (27.6)
6-9 months	21 (18.0)
> 9 months	63 (54.3)
7. Frequency of complementary feeding in 6-8 months child?	N=53
1 time	47 (88.7)
≥ 2 times	6 (11.3)
8. Frequency of complementary feeding in 9-23 months child?	
≤ 2 times	74 (63.8)
3-4 times	42 (36.2)
9. Preferred food for complementary feeding at 6-9 months	
Biscuit	32 (27.6)
Dal	61 (52.6)
Khichdi	12 (10.3)
Dalia (porridge)	11 (9.5)
10. Minimum dietary diversity present in diet children aged 6-23 months?	
Yes	37 (31.9)
No	79 (68.1)

*Data are expressed in percentage

Table 5 shows the mother's practices regarding infant feeding. 64 (55.2 %) mothers started breastfeeding within 1 hour of delivery but it was delayed in 52 (44.8 %) respondents. 77 (66.4 %) mothers gave colostrum to the baby and 98 (84.5 %) mothers did not give any prelacteal feeds. However only 69 (59.5 %) mothers exclusively breastfed their babies till 6 months, moreover only 21 (18.1%) mothers breastfed till 2 years of age. The majority of them (75.8 %) breastfed till 1 year or less. Complementary feeding practices were poor with delay in initiation of complementary feed beyond 9 months of age as told by 63 (54.3%) mothers. The most preferred food for complementary feeding was dal (52.6 %) followed by biscuit (27.6 %). The frequency of complementary feeding was inadequate in 88.6% and 63.7% cases of age group 6-8 and 9-23 months respectively. Also minimum dietary diversity was not followed by 68.1% of mothers.

Discussion

India has failed to witness any remarkable progress in infant feeding practices over the years. According to the recent Comprehensive National Nutrition Survey (CNNS), only 6% of all children aged 6 to 23 months were fed a minimum acceptable diet. The percentage increased slightly with higher levels of maternal schooling and household wealth.

Moreover the state of Uttar Pradesh faired lower to the national average with only 4.8% of children receiving minimum acceptable diet [3]. In this study we assessed the knowledge, attitude and practices regarding infant and young child feeding among rural mothers in Uttar Pradesh with children with SAM. The study has highlighted the paucity of knowledge among these mothers regarding infant feeding and the discrepancy between knowledge and its implementation in reality. Although the breastfeeding practices are better but complementary feeding practices were found to be inadequate.

Early initiation of breastfeeding (EIBF) and feeding of colostrum helps in ensuring young infants the best possible start to life. It stimulates breastmilk production, fosters bonding between the mother and newborn, protects the newborn from infection and illness thereby reducing neonatal mortality, and increases the duration of breastfeeding [9]. Despite the benefits of EIBF, its prevalence remains low in India with a CNNS survey showing that overall only 57% of children born in the two years before the survey initiated breastfeeding within one hour of birth with an even lower percentage in states like Uttar Pradesh and Bihar [3].

In the present study although 85 (73.3 %) mothers knew the ideal time for breastfeeding initiation after delivery as within 1 hour and 94 (81.0 %) mothers were aware of the benefits of first milk (colostrum) to the newborn, in practice only 64 (55.2 %) mothers started breastfeeding within 1 hour of delivery and only 66.3% mothers gave colostrum to the baby. The most common reasons for the delay in initiation of breastfeeding in our study were; delay in shifting the mothers from labour room, Caesarean section, babies requiring admission, mother too tired to feed and less secretion of milk.

The data in various studies in India show that initiation rates are variable from 16 to 54.5% [10]. Studies from developing countries like India, Pakistan, Bangladesh and Nepal indicated that higher maternal educational attainment in the total population was associated with EIBF compared to those with no schooling [11-14]. In our study majority of mothers (69.8 %) studied till only primary school and 12.1% were illiterate. This emphasizes the need for health professionals to make antenatal mothers more aware of the importance of initiation of early breastfeeding and providing facilities of rooming-in immediately after delivery.

Exclusive breastfeeding is recommended for the first six months of life which in turn leads to a reduction of early infant morbidity and mortality [8]. In the present study, the majority of mothers (81.9 %) knew about the importance of breastfeeding, however only 49 (42.2 %) knew about the appropriate duration of exclusive breastfeeding. Majority of mothers had a positive attitude that exclusive breastfeeding (EBF) till 6 months is beneficial to the child. However in practice only 69 (59.4%) mothers exclusively breastfed their babies which is similar to CNN survey that reveals that only 58% of infants (0-5 months) were exclusively breastfed [3]. Our result was also comparable to surveys done in the rural population of our neighbouring states like Rajasthan (57.5%), Maharashtra (60.6%), and Madhya Pradesh (60.6%) [15]. The most common reason for discontinuation of EBF in the present study was insufficient breastmilk as reported by mothers followed by the perception that newborns require supplementation apart from breast milk to gain weight. Almost half of the mothers (51.7%) were not aware that frequent breastfeeding increases milk production. The benefits of breastfeeding should be emphasized during the initial antenatal visits to increase EBF rates among all mothers. Also mothers should be educated regarding techniques to increase breastmilk and that consistent and exclusive breastfeeding is critical for stimulating milk production [16].

WHO also recommends continued breastfeeding beyond the six months, along with the provision of nutritionally adequate and safe complementary foods. According to CNN survey, the majority (83%) of children aged 12–15 months continued to be breastfed at age one and a higher proportion of children residing in rural areas (85%) were breastfed at age one year, compared to children in urban areas (76%). This is in contrast with our study in a rural population where it was found that only 25 (21.5 %) mothers knew the ideal duration of breastfeeding, 58.6 % mothers felt that breastfeeding should be continued till 1 year only and in practice only 21 (18.1 %) mothers did breastfeed till 2 years. The majority of them (48.3 %) stopped breastfeeding around 1 year of age. A study conducted in Allahabad, India, found that only **21.7% and 23.2% of children were breastfed till the age of 6-12 months and 1 year respectively and observed that** children breastfed less than 1 year were at greater risk of underweight and wasting [17].

In a systemic review of majority Asian studies, the combined prevalence of breastfeeding up to two years of age or beyond was 33% with a trend towards an increase in prevalence in the past three decades, especially in South Asia [18]. In the present study only 53 (45.7 %) mothers knew about the appropriate time to start complementary feeding and only 32 (27.5%) started complementary feed after 6 months of age. This was much lower than the CNN survey in which over half (53%) of the infants aged 6 to 8 months received timely initiation of complementary feeding, however lesser proportion (51%) of children residing in rural areas were given complementary foods from six months of age, compared to their urban counterparts (58%). Our results are comparable to the studies done by Singhal et al and Das et al wherein 29.8% and 33.3% of children respectively, complementary feeding was started at the appropriate time [19, 20]. In our study, the majority of mothers, 54.31% delayed complementary feed after 9 months. Although only nearly half of mothers exclusively breastfed their child but still complementary feed (semi-solid diet) was delayed as most mothers were giving animal/packed milk. The most common reason for the delay was no knowledge, a child not accepting feeds, regurgitation/vomiting or the elderly of the family suggested for starting complementary feeding only after one year etc.

The three core indicators of minimum dietary diversity, minimum meal frequency, and minimum acceptable diet are recommended by the WHO to assess the quality of complementary feeding practices for children aged 6 to 23 months. In the present study, the majority 78 (67.2 %) of the mothers had incorrect knowledge about minimum meal frequency in a 6-8-month-old child, however 75 (64.7 %) mothers were aware of the frequency of breastfeeding as 3-4 times/day for 9-23 months child. In contrast, only 11.3% and 36.2% of infants in the age group of 6-8 and 9-23 months received WHO recommended frequency of 2-3 times/day and 3-4 times/day, respectively [8]. In the CNN survey, while 42% of children aged 6 to 23 months were fed the minimum number of times per day for their age, only 21% of children aged 6 to 23 months were fed an adequately diverse diet containing four or more food groups. Among both breastfed and non-breastfed children, a higher proportion of children residing in urban areas (26.9%) were fed an adequately diverse diet compared to children in rural areas (19%) [3].

Insufficient dietary diversity and meal frequency play a key role in nutritional deficiencies among infants and young children, leading to increased risks of childhood morbidity and mortality [1, 21]. In the present study only 54 (46.6%) mothers agreed that dietary diversity (diff. food groups) should be present in diet after 6 months of age and in practice also only 61 (52.6 %) mothers gave adequately diverse diet to their children. Until 6–11 months of age, complementary feed in infants comprised mostly of liquids (diluted dal/rice starch) in 52.5% of cases along with some solid (often biscuits) as stated by 27.5% of mothers. Studies have shown that dietary diversity scores generally improve with higher maternal education and household wealth [22].

In the present study lower maternal educational status may be the reason behind insufficient dietary diversity. Lack of awareness, ignorance of mothers and lack of motivation emerged as prime factors responsible for these faulty infant feeding practices in the present study. Although breastfeeding knowledge and attitude was good but it was not reflected in their practices. Also delayed initiation of complementary foods and inappropriate complementary feeding concerning lack of knowledge about quality, quantity and consistency and practice of insufficient dietary diversity can be a contributing factor of malnutrition in these children. This study points that complementary feeding remains a challenge to be addressed in the rural population of India, hence, stressing the need for intensive health educational programs which will in turn improve the nutritional status of these infants.

Also the auxiliary nurses and midwives which are the primary point of contact in rural areas should be sensitised about repeated interpersonal communication and to improve the frequency, method and quality of the counselling process. There were some limitations in this research. First, since this was a hospital-based analysis, the results cannot be generalized to the general population. Second, since the study relied on answers given by the mother hence, the findings are subjected to recall bias.

Conclusion

The present study concludes that there is a discrepancy between knowledge and practices as adequate knowledge is not implemented in practice.

Even though the government has been implementing several programmes for minimizing malnutrition, still the knowledge, attitude and practices of infant feeding among rural mothers are suboptimal. Improving the complementary feeding practices can serve as a major determinant in reducing the burden of malnutrition, in turn reducing infant mortality. Thus it is important to strengthen the public health education campaigns and to provide, repeated counselling and support to mothers and other family members regarding infant feeding with the ultimate goal of preventing malnutrition.

What this study adds

Knowledge and practices regarding complementary feeding are suboptimal in rural mothers. Although there is knowledge about breastfeeding its implementation in practice is inadequate which need to be addressed to prevent malnutrition.

Contributions

Both DV and SKS were involved in the planning of study, data collection, analysis and manuscript preparation. All authors approved the final version of the manuscript.

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