



Research Article

JMR 2018; 4(1): 42-47

January- February

ISSN: 2395-7565

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www.medicinarticle.com

Received: 01-01-2018

Accepted: 14-02-2018

Feeding practices and impact of nutritional counseling coupled with home-based follow-up on the knowledge of mothers of children hospitalized for severe acute malnutrition

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Abstract

Background: Nutritional education in the community would permit to optimize the advice with regards to the local specificities. The goal of the study was to consolidate the nutritional rehabilitation after hospital management of children severely malnourished. On long term, the impact is to modify feeding habits thus, reducing the prevalence of malnutrition. **Methods:** Nutritional education was provided to the mothers on how to use local food stuffs for proper feeding. Two random groups of 43 children were made; the first of 20 patients had 3 post discharge visits with the third after 2 months of observation. The second group received routine hospital follow up and only one home immersion for evaluation. Counseling continued during immersions. We compared the dietary diversity on admission and at the end the study between the two groups. **Results:** Most parents do not feed their children with respect to WHO norms; only 7.0% exclusively breastfed their children till 6 months and 53.5% stopped breastfeeding very early the first three months. At the end of the study, there was an improvement in the knowledge on the varieties of food used to prepare porridges of high nutritional value. The practices of mothers had also changed in particular with the increase in the number of variety food groups consumed by children. Meanwhile, the changes were better in the group followed up at home ($p=0.038$). **Conclusion:** In a context where food stuffs are available locally, personalized nutritional education can improve the dietary habits of the population using household immersion.

Keywords: Education, Nutritional rehabilitation, Immersion, Home, Dietary diversity.

INTRODUCTION

Malnutrition still remains a disturbing issue in the African child with about 38% of children malnourished and at least a third not satisfying the minimum criteria for nutritional diversity [1]. In Cameroon, 5.2% of children are emaciated with 1.3% severely emaciated and 31.7% have retarded growth with 12.9% having severe growth retardation (MICS, 2004). The WHO has developed foods to facilitate the management of severe acute malnutrition during hospitalization and in ambulatory treatment centers [2]. Meanwhile, mortality is still high in affected children [3]. It has been shown that despite proper hospital management, high death risk still persists in the community [4, 5]. In our context, ready-to-use therapeutic foods recommended by the WHO are only available in certain health facilities that carry out nutritional rehabilitation. Moreover, the WHO guidelines do not take sufficiently into consideration the family context which greatly influences the evolution of malnutrition. Personalized nutritional education in homes by health personnel is an effective measure in reducing morbidity and mortality in children [6, 7]. When implemented in homes, nutritional education would improve the nutritional status of the population [8]. Actually, nutritional education in homes would give orientation on the combination of local foodstuffs available in markets, gardens or farms in order to provide nutrition rich in energy and micronutrients to children. Properly composed porridges made with local ingredients would be doable at low cost. Porridges are largely consumed in Sub Saharan Africa and there is need to improve counseling on their enrichment. It is important to take into consideration the aspects of dietary diversity, specific food classes and sources of proteins during nutritional counseling [9]. In Kenya, fathers and grandmothers were called upon in order to improve dietary diversity and the use of meat products in children's nutrition [10].

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The authors of this study aimed to improve dietary diversity and nutritional recuperation in children in the community after hospital based rehabilitation of children with severe malnutrition. The long term impact of this intervention is to modify the feeding habits in homes in order to reduce the prevalence malnutrition in children.

MATERIAL AND METHODS

At the end of the hospitalization period, 43 patients admitted for acute severe malnutrition with medical complications were randomly divided into two groups. The attribution of patients to group A or B was oriented by the faces of a tossed coin and done by a third party designated from within the service. Informed consent was obtained from the mothers to participate in the study. Group A of the intervention was constituted of 20 patients followed-up at home and group B was made up of 23 patients followed-up at the hospital following the routine appointment schedule.

Course of the study and structuring of interview with mothers

A semi-structured individual interview was conducted with all the mothers from the first day of admission. A questionnaire on knowledge and nutritional practices of children was submitted. They then received nutritional education from a nutritionist based on the problems identified during the personalized nutritional survey. Discussions were on breastfeeding practices, complement feeding and food hygiene. Food ration models were then designed with their participation and put at their disposal. These models contained recipes for enriched porridges of high nutritional value. These were completed by a mash of local foodstuffs with respect to the child's age group. These food substances were made in such a way as to provide approximately 55-60%, 30-35% and 12-15% of total energy from carbohydrate, protein and lipid sources respectively.

Structuring of home-based follow-up visits

Every home in group A received 3 home visits. The first two visits carried out by the same nutritionist who carried out nutritional education at the hospital were done at 2 week intervals from the day of discharge from the hospital. The first home visit was to evaluate the socio-economic and demographic environment of the families especially valuable property. Interviews with mothers permitted to verify the application of the counseling received and to correct errors. The questionnaire for individual dietary diversity for the child was submitted at each immersion. During the second home visit, a session of culinary preparation for the children was observed. The third visit on the other hand was done 2 months after discharge from hospital and was for the summarization of knowledge and feeding practices. This was done by a trained surveyor who collected data averaging the same questionnaires pre-formulated for individual dietary diversity (IDD), household dietary diversity (HDD) as well as the weight, mid upper arm circumference and the height of children.

This study aimed to test the hypothesis by which mothers who received nutritional education at the hospital and at home would have better knowledge in nutrition and better dietary diversity scores than mothers who received just the routine follow-up.

Estimation of the purchasing power of homes

The economic status was estimated by taking census of 10 valuable possessions which were cable television, radio, cooker, refrigerator, fridge, bicycle, motorcycle, car and generator. Five other possessions concerned the type of habitat, roof, toilet, access to portable water and access to electricity. For every property that existed, a score of 1 was assigned and a score of 0 if it did not exist. These scores were then added and classified into 4 socio-economic levels [11]. The socio-economic level was classified as low, low-upper, average, high-low and high [12] when the scores were 0 to 1, 2, 3, 4 and at least 5 respectively.

Evaluation of the knowledge of mothers on the ingredients needed for enriching porridges

We tested the knowledge of mothers on the different types of foods that a child has to eat and which also serve for enriching cereal based porridges. These ingredients were legumes and nuts, meat products (meat, fish, poultry, liver/giblets), eggs, fruits, vegetables rich in vitamin A, other fruits and vegetables, oils and foods cooked in oil, milk and dairy products. Each group mentioned counted for 1 point and 0 if not cited.

Estimation of IDD and HDD scores (IDDS and HDDS)

Dietary survey was based on the listing of the foods or different food types consumed at home or food cooked at home to be consumed outdoors by the members of the household within 24h before the survey [13]. These were grouped into 7 in order to estimate the IDDS of children aged between 6-23months [14]. For those aged above 24months, 8 food groups were counted, and 12 for the estimation of the HDDS [15]. When patients consumed less than 3 groups, 3-4 groups, or at least 4 different food groups, the IDDS was low, average or high respectively. IDDS at the start and the end of the observation of the period were compared. The HDDS was said to be low, average or high when 3 food groups, or 4 to 5 groups or at least 6 groups were consumed respectively in the household.

The variables analyzed were mothers' knowledge on food groups, IDD and HDD scores. This knowledge was compared between the start and the end of the study and also with group B of the study.

Statistical analysis

Data was analyzed using the software package Epi-Info version 3, 5, 3. Quantitative variables were estimated according to proportions or median with inter quartile ranges or mean. Kruskal-Willis H statistical tests and Fischer's exact test were used to compare variables. The difference between proportions was significant for p values<0.05.

RESULTS

General characteristics of the study population

The mothers were aged between 18-39 years and the median age was 26 [IQR: 23-32] years. Less than half (46.5%) had secondary education and 58.1% of them were housewives. Most of them (60.5%) were not house owners. Most of them (81.4%) resided in urban areas and only 2.3% of them were classified as poor according to their low quintile, against 62.9% who had a higher quintile; notably in 65.0%, and 60.8% in the respective groups (table 1).

Feeding practices of children from birth

A minority of mothers (13.2%) said to have discarded colostrum, 35.0% gave prelacteal liquids; that is 26.3% and 42.9% in group A and B respectively. They were made of water (93.3%); either sweetened or hot given at birth. Even though breastfeeding was initiated in 88.4%, only 7.0% of mothers practiced exclusive breastfeeding. More than half, that is, 50.0% of group A and 66.9% of group B prematurely gave artificial milk or other food substances between 0-3months. On admission, only 14.0% of parents were still breastfeeding (table 2)

Knowledge and feeding practices of mothers after the intervention

Before the study, mothers used less than 4 ingredients to prepare porridges (figure 1). Moreover, 95.0% diluted porridges in feeding bottles to facilitate the flow through the teat. At the end of the study, the knowledge on breastfeeding practices, complement feeding were ameliorated (table 3). These changes were noticeable in the group followed-up at home; however the difference was not significant

($p=0.053$). However, eggs (44.4%), milk and dairy products (52.6%) were still under consumed in group A. In group B, the consumption of meat (26.3%), of fruits and vegetables (26.3%), of milk and dairy products (50.0%) as well as eggs (42.1%) remained low. Furthermore, the preparation of porridges of high nutritional density was better at the end of the intervention (figure 2). Changes were more marked in the group followed-up at home ($p=0.029$). The average number of food groups used changed from 2.9 to 6.6 between the start and the end of the observation with a maximum of 4 at the start and 7 at the end of the study. At the end of the study, IDDS was equally higher in the group followed-up at home ($p=0.038$) when compared with that of the group which received routine appointment visits (figure 2). The mean IDDS went from 4.2 in both groups at the start of the study to 6.3 for the group followed-up at home against 5.4 for group B ($p=0.053$); (table 4).

DISCUSSION

The authors report the usual feeding habits of a group of children hospitalized for severe acute malnutrition and the change in mothers' knowledge and practices after nutritional education. Nutritional education was commenced during the hospitalization period and continued in homes of one group of the study population. The aim of the study was to evaluate the impact of the implementation of personalized counseling on the varied diet of patients. Through home based immersions, census on available foods was taken in order to ameliorate the knowledge of mothers and their use in nutritional rehabilitation in a context where ready-to-use therapeutic foods are rare.

This study showed an inadequacy between the knowledge of mothers and feeding practices. In fact, 78.9% realized the importance of exclusive breastfeeding, 94.7% had initiated breastfeeding, meanwhile, only 7.0% had done this exclusively up to 6months; this incongruity was reported elsewhere [16]. Not only was food given prematurely to the infant, equally complement feeding was not done in respect with the norms according to age [1]. These are mostly deficit in macro or micro nutrients [17]. Moreover, our results show that before nutritional education, food diversity of children was barely average. Food diversity would be predictive of micronutrient density given to children [18, 19]. It has been shown that the relationship between dietary diversity and micronutrient density is influenced by socio-economic strength of households [20]. The household dietary diversity score (HDDS) was high in 76.7% of families we visited. In principle, it is proportional to the quintile of total expenditures [13]. We are led to think that poverty would not justify for nutritional deficit in the children we are

presenting. This situation justifies the importance of evaluating the other determinants of malnutrition in a context where food is usually available [21]. Thus, nutritional education is crucial for changes in family practices [2]. It would enable the amelioration of IDDS. IDDS was evaluated during home immersion visits and it was ameliorated at the end of the study. Other authors have noticed that IDDS increased with number of home visits [22]. In Brazil, after the training doctors in infant nutrition, counseling given to mothers ameliorated their knowledge and feeding practices as well as weight gain in children [23]. In areas where nutritional social actions were implemented, there was a change in practices, feeding frequency as well as varieties of food groups given to children [10]. Fathers and grandmothers were called upon would appropriately support the feeding of young children [10]. A similar intervention was experimented in South Africa [8]. In Ethiopia mothers who listened to the media were more inclined to offering different food varieties to their children [24]. The use of low cost local porridges would considerably reduce mortality and therapeutic failure [25]. Such interventions with institutional support would optimize their efficacy [26]. These nutritional actions would be essential under community directives [27]. Where community agents efficiently intervene, there would be an amelioration of breastfeeding rate and normal growth of infants [28]. With optimal community participation, such actions would be remedial in our context.

Limitation of the study

The small size of the fish is an important limitation of this study. Despite the bias of this limit, the results nevertheless represent the benefits of immersion in improving the health status of malnourished children.

CONCLUSION

Home based immersion ameliorated the optimal use of local foodstuffs. A longer observation period and more visits would have had a considerable impact on the feeding practices of mothers.

Conflict of interest: None

Contributions of authors: FN elaborated the draft, AC, RNN, TNN, DR reread the document. All authors approved the final version of the document

Acknowledgements: Mr. Frederic Tchuine for statistical analysis.

Table 1: Socio-demographic and economic characteristics of parents

Characteristics		Number	Group A	Group B
Marital status of the mother	Married	14 (32.6)	6 (30.0)	8 (34.8)
	unmarried	14 (32.6)	8 (40.0)	6 (26.1)
	Living in common-law	15 (34.9)	6 (30.0)	9 (39.1)
Mother's level of education	uneducated	10 (23.3)	3 (15.0)	7 (30.4)
	Primary	13 (30.2)	8 (40.0)	5 (21.7)
	Secondary	20 (46.5)	9 (45.0)	11 (47.8)
Mother's profession	housewife	25 (58.1)	11 (55.0)	14 (60.9)
	Farmer or breeder	6 (14.0)	4 (20.0)	2 (8.7)
	Civil servant	1 (2.3)	0 (0.0)	1 (4.3)
	Liberal	11 (25.6)	5 (25.0)	6 (26.1)
Age of mother	< 24	16 (37.2)	9 (45.0)	7 (30.4)
	25-39	27 (62.9)	11 (55.0)	16 (67.6)
Father's level of education	Uneducated	2 (4.7)	2 (10.0)	1 (4.3)
	Primary	8 (18.6)	7 (35.0)	5 (21.7)

	Secondary	7 (16.3)	4 (20.0)	3 (13.0)
	University	4 (9.3)	3 (15.0)	1 (4.3)
	Unknown	22 (51.2)	4 (20.0)	13 (56.5)
Father's profession	Farmer or breeder	5 (11.6)	2 (10.0)	3 (13.0)
	Civil servant	2 (4.7)	1 (5.0)	1 (4.3)
	Liberal	21 (48.8)	10 (50.0)	11 (47.8)
	Private worker	3 (7.0)	2 (10.0)	1 (4.3)
	Unemployed	12 (27.9)	5 (25.0)	7 (30.4)
Area of residence	Urban	35 (81.4)	15 (75.0)	20 (87.0)
	Rural	8 (18.6)	5 (25.0)	3 (13.0)
Family residence	Owner	17 (39.5)	15 (75.0)	20 (87.0)
	Tenant	26 (60.5)	5 (25.0)	3 (13.0)
Socio-economic level	Low	1 (2.3)	0 (0.0)	1 (4.3)
	Low-upper	1 (2.3)	1 (5.0)	0 (0.0)
	Average	3 (7.0)	1 (5.0)	2 (8.7)
	High-low	11 (25.6)	5 (25.0)	6 (26.1)
	High	27 (62.9)	13 (65.0)	14 (60.8)
Household diversity score (HHDS)	Low	2 (4.7)	2 (100.0)	0 (0.0)
	Average	12 (27.9)	3 (25.0)	9 (75.0)
	High	29 (67.4)	15 (51.7)	14 (48.3)

HHDS: Household nutritional diversity score

Table 2: Feeding practices of patients from birth

Variables	Modalities	Total (%)	Group A	Group B
Child at least breastfed (N=40)	Yes	38 (88.4)	18 (90.0)	20 (87.0)
	No	5 (11.6)	2 (10.0)	3 (13.0)
Colostrum given at birth (N=38)	Yes	33 (86.8)	15 (83.3)	18 (90.0)
	No	5 (13.2)	3 (16.7)	2 (10.0)
Other prelacteal foods (N=38)	Yes	14(35.0)	5 (26.3)	9 (42.9)
	No	26(65.0)	3 (16.7)	2 (10.0)
Mode of feeding during the first 6 months (N=43)	Exclusive breastfeeding	3 (7.0)	2 (10.0)	1 (4.3)
	Principal*	3 (7.0)	1 (5.0)	2 (8.7)
	Mixed	2 (4.7)	2 (10.0)	0 (0.0)
	Baby milk only	5 (11.6)	2 (10.0)	3 (13.0)
	Partial**	30 (69.8)	13 (65.0)	17 (73.9)
Age of dietary diversification (N= 40)	0 – 3 months	12 (27.9)	7 (35.0)	5 (23.8)
	3 - 6 months	24 (55.8)	10 (50.0)	14 (66.6)
	> 6 months	7 (16.3)	3 (15.0)	4 (19.0)
Food types for diversification (N= 43)	Artificial milk	16 (37.2)	5 (25.0)	11 (47.8)
	Enriched porridges	30 (69.8)	12 (60.0)	18 (78.3)
	Fruits or fruit juice	14 (32.6)	7 (35.0)	7 (30.4)
	Family meal	33 (76.7)	15 (75.0)	18 (78.3)
	Water	40 (93.0)	18 (90.0)	22 (95.7)
Reason for premature weaning	Problem with breast	2 (4.7)	1 (5.0)	1 (4.3)
	Refusal of breast by the child	3 (7.0)	1 (5.0)	2 (8.7)
	Mother's decision	23 (53.5)	11(55.0)	12 (52.2)
	Mother's disease	7 (16.3)	2 (10.0)	5 (21.7)
	Child's disease	3 (7.0)	2 (10.0)	1 (4.3)
	Insufficient breast milk	22 (51.2)	11 (55.0)	11 (47.8)
Currently breastfeeding	Yes	6 (14.0)	2 (10.0)	4 (17.4)
	No	37 (86.0)	18 (90.0)	19 (82.6)

*Beastmilk + water ; *breastmilk + baby milk + porridges or other foods

Table 3: Comparison of nutrition knowledge of mothers at the start and at the end of follow-up in the two groups

Knowledge of mothers	Group A		Group B	
	Start N (%)	End N (%)	Start N (%)	End N (%)
Knows the importance of breastfeeding	15 (78.9)	18 (94.7)	10 (47.6)	19 (90.5)
Recognizes the inconveniences of not breastfeeding	1 (5.0)	11 (55.0)	1 (4.3)	8 (34.8)
Knows the importance of colostrum	5 (31.3)	17 (94.4)	8 (42.1)	12 (57.1)
Recognizes the inappropriateness of prelacteal liquids	5 (26.3)	19 (100.0)	9 (42.9)	21 (100.0)
Knows the time limit for initiating breastfeeding	18 (94.7)	19 (100.0)	20 (95.2)	21 (100.0)
Knows the period of exclusive breastfeeding	6 (31.6)	19 (100.0)	2 (9.5)	13 (61.9)
Knows the minimum age for breastfeeding	0 (0.0)	10 (52.6)	1 (4.8)	2 (9.5)
Knows the moment to initiate complement feeding	7 (36.8)	19 (100.0)	2 (9.5)	15 (71.4)
Bleaching of palm oil for cooking	23 (100.0)	0 (0.0)	12 (57.1)	1 (5.9)

Table 4: Mean individual dietary diversity scores for the two groups at the start and end of the study

Mean IDDS	Minimum	mean \pm SD	Maximum	
Start of observation				
Group A	3	4.2 \pm 0.8	6	P= 0.783
Group B	3	4.2 \pm 1.0	6	
End of observation				
Group A	4	6.3 \pm 1.2	8	P= 0.053
Group B	3	5.4 \pm 1.6	8	

SD= standard deviation, IDDS= mean individual dietary diversity score

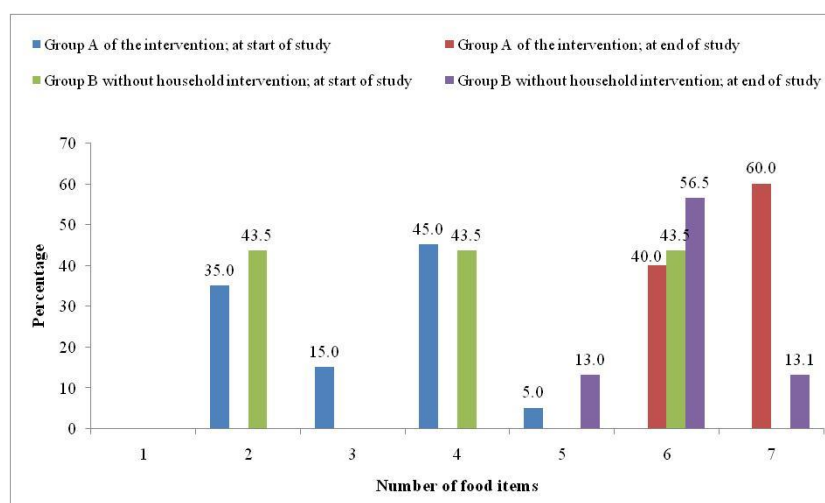


Figure 1: comparison of food groups used to feed patients before hospitalization and at the end of the study

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