

# THE INFLUENCE OF PRENATAL HEALTH EDUCATION ON INFANT NUTRITIONAL STATUS AT MBAGATHI DISTRICT HOSPITAL, NAIROBI.

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## Abstract

**Background:** Prenatal Health Education (PHE) is expected to result in improved maternal, neonatal and child health (MNCH). Its effect should be catapulted into infancy, with resultant reduction in malnutrition during this life period.

**Objective:** To determine whether maternal prenatal health education as currently provided influences infant nutritional status.

**Design:** Retrospective unmatched case control study.

**Subjects:** Mothers of infants with malnutrition aged 6 to 12 months as cases and mothers of infants without malnutrition in the same age group as controls.

**Results:** There were 58.3% of cases and 51.0% of controls who reported receiving health education during each visit ( $p=0.72$ ), while 53.0% of cases and 64.0% of controls reporting having received information on infant nutrition ( $p=2.2$ ). Infant nutrition was reported by 60.0% of cases and 70.0% of controls ( $p=0.25$ , OR 0.64, 95%CI 0.30-1.37) and breastfeeding by 58.3% and 60.0% respectively ( $p=0.85$ , OR 0.93, 95%CI-0.45-1.93). Discussion on carbohydrates was reported by 60.0% of cases compared to 51.7% of controls ( $p=0.35$ , OR 1.4, 95%CI 0.68-2.89), and fats by 18.3% vs 8.3% respectively ( $p=0.11$ , OR 2.47, 95%CI 0.80-7.61). There were 81.7% of cases and 87.0% of controls ( $p=0.82$ ) who were taught on breast feeding on demand with as many as 20.0% of cases and 18.3% of controls not having been taught at all on frequency of breastfeeding. However, 91.7% and 86.7% respectively were informed about exclusive breastfeeding ( $p=0.38$ ). On techniques of breastfeeding, positioning the baby was taught to 83.3% of cases and 80.0% of controls ( $p=0.64$ , OR 1.23, 95%CI 0.49-3.16). The details of the specific techniques were deficient, expressing of breast milk being reported by only 1.7% of both cases and controls ( $p=1.00$ , OR 1.00, 95%CI 0.06-16.37).

**Conclusion and Recommendation:** The mode of Health education does not appear to confer benefit on reduction of infant malnutrition. This depicts a need for more structured, objective effect-oriented approach to health education. Further studies are needed to strengthen this area.

## INTRODUCTION

Malnutrition is a major global health problem, particularly in Sub Saharan Africa (SSA) and South East Asia (SEA). It is an important underlying cause of infant morbidity and mortality in about 50% of cases<sup>1,2,3</sup>. Prenatal health education (PHE) is expected to culminate in good infant feeding

practices and health<sup>1, 3</sup>. Although 92% of mothers in Kenya make at least one antenatal visit and 56% at least 4 or more visits<sup>4, 5</sup>, the exposure time for health education may not be adequate to enable effective passage of this information. In addition, there is no structured process of providing PHE. This makes it imperative to establish baseline data on the impact of PHE on infant nutritional health.

Malnutrition, compounded by poverty, cultural influences, biological vulnerabilities and unfavourable environmental factors, contribute to the global burden of disease in children with the highest prevalence of malnutrition being experienced in SEA and SSA<sup>6,7,8</sup>. It has been observed that malnutrition often starts at about 6 months of age<sup>7</sup>, and that 75% of all under five deaths occur within the first year of life globally<sup>9</sup>. Failure to combat malnutrition effectively may be an important unearthed factor in the failure to achieve MDGs in Kenya<sup>10</sup> and many other countries<sup>11</sup>. This is in spite of the reported general global reduction in under five mortality<sup>12</sup>. Despite the enumerated specific infectious causes of infant mortality<sup>13</sup>, malnutrition remains an important underlying factor in about 45% of all child deaths<sup>2, 7</sup>. Therefore, targeting reduction in prevalence of malnutrition may be pivotal in combating the overall under-five mortality.

The indicators of malnutrition (wasting, stunting and underweight) remain highly prevalent<sup>4,14,15</sup>, necessitating a need for more innovative and effective approaches in combating malnutrition effectively. In this context, prenatal nutritional health education should set the stage for a continuum of offspring care during peripartum and post-natal care, through the neonatal period, infancy and childhood as opposed to the segmental approach currently being used. However, there is paucity of data in this respect in support of this approach with only few studies focusing on long term outcomes of PHE<sup>16,17</sup>. In addition, the prevalent shift towards focused antenatal care, which emphasizes on few visits, may not be beneficial on provision of PHE<sup>18</sup>.

Among the strategies of combating malnutrition that can be passed during the PHE would be appropriate infant feeding practices and overcoming peer and cultural influences that are major deterrents in combating infant malnutrition<sup>19, 20, 21</sup>. In addition, health education on immunization improves the health of infants, given the complex relationship of immune status, infections and malnutrition in infants<sup>22, 23</sup>.

This study was designed to determine whether PHE as provided today influences infant nutritional status through examining the context of the health education elements translatable into actions that would in

turn result in better neonatal and infant feeding practices - and hence reduction of malnutrition. Of interest was the level of exposure to appropriate content, acquisition of requisite core knowledge and breastfeeding practice and methodology.

## **METHODOLOGY**

This is an unmatched case-control study that was conducted at Mbagathi District Hospital between 31st July and 1st December 2016. The hospital serves mainly the lower socio-economic stratum from the surrounding population. A structured questionnaire was administered by trained research assistants. The study population constituted mothers of infants who had malnutrition as cases and mothers of infants without malnutrition as controls. The study sites were the paediatric outpatient and the nutrition clinics. The choice of infancy was preferred because the mothers were less likely to have forgotten the contents of PHE and malnutrition is best manifested after 6 months. The criteria for malnutrition were based on Mid Upper Arm Circumference (MUAC) and weight chart, with exclusion of any underlying disease. The core areas of interest were: the extent of provision of PHE taught; aspects of PHE taught; spontaneous knowledge of types of food and their nutritional benefits; aspects of breastfeeding taught and specific techniques of breastfeeding. Using Fleiss's formula with a  $\alpha$  of 1.96, a  $\beta$  of 0.84 for 80% power, 95% significance, a 1:1 case/control ratio and assuming that 56% of antenatal mothers attend 4 ANC visits based on the KDHS statistics<sup>4</sup>, the sample size was calculated to be 58 cases and 58 controls. Ethical approval was obtained from the Kenyatta National Hospital/ University of Nairobi ethical research committee. The total population was studied sequentially, using the inclusion criteria for both cases and controls until the desired sample size was reached. All answers to open ended questions were coded and data were analyzed using Statistical Package for Social Sciences (SPSS) version 21. Appropriate tests of significance were applied and a p value of <0.05 considered statistically significant.

## **RESULTS**

This study had 60 cases and 60 controls. The modal age group for both cases and controls was 25 to 29 years, while 46.7% of both cases and controls had

secondary education. There were 93.3% and 95.5% of cases and controls respectively who were urban residents ( $p=0.697$ ). On the whole, there were no statistically significant differences in the general characteristics of cases and controls.

Seventy five (75%) of cases and controls reported having received antenatal health education sessions, with 66.7% of cases and 75.0% of controls having received health education in groups ( $p=0.318$ , OR 0.7, 95%CI 0.3-1.6) as opposed to individual sessions (13.3% and 18.3% respectively,  $p=0.453$ , OR 0.7, 95% CI 0.20-2.0). Opportunity to ask questions was reported by 71.7% of both cases and controls but, only 43.4% of both cases and controls ever asked any questions ( $p=1.000$ , OR 1.0, 95%CI 0.4-2.5). Only 48.3% of cases and 51.7% of controls received PHE during every prenatal visit ( $p=0.715$ , OR 0.6, 95% CI 0.26-1.3). (Table 1)

**Table 1: Extent of provision of Prenatal Health Education**

Aspect of health education provided	Cases (N=60)		Controls (N=60)	
	No. (%)	No. (%)	No. (%)	No. (%)
Received ANC health education sessions	45 (75.0)	45 (75.0)	45 (75.0)	45 (75.0)
OR(95%CI) Pvalue	1.0(0.4-2.5)	1.000		
Received ANC health education during each visit	29 (48.3)	37 (51.7)	29 (48.3)	37 (51.7)
OR(95%CI) Pvalue	0.6(0.26-1.3)	0.715		
Received information on infant health care	32 (53.3)	38 (64.4)	32 (53.3)	38 (64.4)
OR(95%CI) Pvalue	0.7(0.3-1.5)	0.226		
Perceives enough time was given during ANC visit	34 (56.7)	33 (55.0)	34 (56.7)	33 (55.0)
OR(95%CI) Pvalue	1.1(0.5-2.3)	0.854		
Given group talks	40 (66.7)	45 (75.0)	40 (66.7)	45 (75.0)
OR(95%CI) Pvalue	0.7(0.3-1.6)	0.318		
Received individual health education sessions	8 (13.3)	11 (18.3)	8 (13.3)	11 (18.3)
OR(95%CI) Pvalue	0.7(0.2-2.0)	0.453		
Given opportunity to ask questions	43 (71.7)	43 (71.7)	43 (71.7)	43 (71.7)
OR(95%CI) Pvalue	1.0(0.4-2.5)	1.000		
Ever asked any question in relation to infant health care	26 (43.3)	36 (43.3)	26 (43.3)	36 (43.3)
OR(95%CI) Pvalue	2.0(0.9-4.3)			

Table 2 shows aspects of prenatal health education taught. Nutrition was reported by 60% of cases and 70% of controls ( $p=0.251$ , OR 0.64, 95%CI 0.30-1.37) and breastfeeding by 58.3% and 60.0% respectively ( $p=0.853$ , OR 0.93, 95%CI 0.45-1.93). Information on infection prophylaxis was provided to only 15.0% of cases and 13.3% of controls ( $p=0.793$ , OR 1.15, 95%CI 0.41-3.21) while prevention of anaemia

specifically was reported only by 3.3% of cases and 6.7% of controls ( $p=0.402$ , OR 0.48, 95%CI 0.09-2.74).

Table 3 shows specific types of food and the benefits mentioned spontaneously. Carbohydrates were mentioned by 60.0% of cases and 51.7% of controls ( $p=0.358$ , OR 1.40, 95%CI 0.68-2.89), proteins by 58.3% of cases and 46.7% of controls ( $p=0.201$ , OR 1.60, 95%CI 0.78-3.29), fat by 18.3% in cases and 8.3% by controls ( $p=0.107$ , OR 2.47, 95%CI 0.80-7.61), and vitamins by 58.3% of cases and 50.0% of controls ( $p=0.360$ , OR 1.40, 95%CI 0.68-2.88). On the specific benefits of the various foods, carbohydrates as energy-providing foods were mentioned by 31.7% of cases and 35.0% of controls ( $p=0.699$ , OR 0.86, 95%CI 0.40-1.84). The value of proteins as body-building foods, fat as energy storage and vitamins for protection were mentioned by even

fewer cases and controls and showed no statistically significant differences.

Table 4 shows aspects of health education taught on breastfeeding during antenatal care. The proportion of mothers who reported having been taught on breastfeeding was 81.7% of cases and 80.0% of controls ( $p=0.817$ , OR 1.1, 95% CI 0.4-3.0), and 79.6% of cases compared to 89.6% of controls

**Table 2: Aspects of Prenatal Health Education taught (N=120)**

Aspect taught	Cases (N=60) No.(%)	Controls (N=60) No.(%)	OR(95%CI)	Pvalue
Nutrition 0.251	36(60.0)	42(70.0)		0.64(0.30-1.37)
Breastfeeding 0.853	35(58.3)	36(60.0)		0.93(0.45-1.93)
Infection Prophylaxis 0.793	9(15.0)	8(13.3)		1.15(0.41-3.21)
Prevention of anaemia 0.402	2(3.3)	4(6.7)		0.48(0.09-2.74)
Danger signs 0.315	15(25.0)	20(33.3)		0.67(0.30-1.47)
Individual birth plan 0.509	4(6.7)	6(10.0)		0.64(0.17-2.41)
Family planning 0.697	4(6.7)	3(5.0)		1.36(0.29-6.34)
Use of medication 0.559	1(1.7)	2(3.3)		0.49(0.04-5.57)
Male involvement 0.315	0(0.0)	1(1.7)		-
Talks on various foods 0.853	34(56.7)	35(58.3)		0.93(0.45-1.93)
Talk on the 4 types of food 0.360	35(58.3)	30(50.0)		1.40(0.68-2.88)

**Table 2: Aspects of Prenatal Health Education taught (N=120)**

Type of food mentioned and benefits	Cases (N=60) No.(%)	Controls (N=60) No.(%)	OR(95%CI)	Pvalue
<b>Type of food mentioned</b>				
Carbohydrates 0.358	36(60.0)	31(51.7)		1.40(0.68-2.89)
Protein 0.201	35(58.3)	28(46.7)		1.60(0.78-3.29)
Fat 0.107	11(18.3)	5(8.3)		2.47(0.80-7.61)
Vitamins 0.36	35(58.3)	30(50.0)		1.40(0.68-2.88)
<b>Benefits mentioned</b>				
Energy <0.001	19(31.7)	21(35.0)		0.86(0.40-1.84)
Body building 1.000	15(25.0)	15(25.0)		1.00(0.46-2.28)
Energy/Store 0.559	6(10.0)	4(6.7)		1.56(0.42-5.82)
Protection 0.307	19(31.7)	14(23.3)		1.52(0.68-3.42)

**Table 4: Aspects of Health education on Breastfeeding taught during ANC**

Aspect taught Pvalue	Cases (N=60) No.(%)	Controls (N=60) No.(%)	OR(95%CI)
Taught about breastfeeding 1.1(0.4-3.0) 0.817		49(81.7)	48(80.0)
Perceived information as adequate 0.7(0.3-1.7) 0.174		39(79.6)	43(89.6)
When to start breastfeeding Immediately Same day 2.4(0.7-9.1) 0.433 After more than 1 day Not taught 0.7(0.3-2.0) 0.493		32(53.3)	38(64.4)
Frequency of breastfeeding 1.1(0.5-2.3) 0.854		34(56.7)	33(55.0)
Given group talks 0.7(0.3-1.6) 0.318		40(66.7)	45(75.0)
Received individual health education sessions 0.7(0.2-2.0) 0.453		8(13.3)	11(18.3)
Given opportunity to ask questions 1.0(0.4-2.5) 1.000		43(71.7)	43(71.7)
Ever asked any question in relation to infant health care 26(43.3) 2.0(0.9-4.3)			36(43.3)

( $p=0.174$ , OR 0.7, 95%CI 0.3-1.7) perceived the information provided as being adequate. Only 69.5% of cases and 68.3% of controls reported having been taught about initiation of breastfeeding immediately after birth ( $p=1.000$ , OR 1.0, 95%CI 0.4-2.3), while 63.3% and 56.7% ( $p=0.150$ , OR 1.3, 95%CI 0.6-2.9) respectively reported having been taught on breastfeeding on demand. Information on exclusive breastfeeding was reported by 91.7% of cases and 86.7% of controls ( $p=0.378$ , OR 1.7, 95% CI 0.5-6.4).

There were 83.3% of cases and 80% of controls who reported having been taught on breastfeeding procedures (Table 5). On specific techniques, positioning the baby was taught to 73.3% of cases and 75% of controls and support of the baby to 53.3% and 58.3% respectively – both aspects did not show statistically significant difference. Latching was taught to 18.3% of cases and 28.3% of controls only, and making the baby belch to 21.7% and 36.7% respectively. Stimulating the baby to feed, removing the nipple from the mouth and making the baby belch after feeding were hardly taught to any of the two groups.

## DISCUSSION

The objective in this study was to determine whether mothers with infants suffering from malnutrition are less exposed to quality prenatal health education than those whose infants are healthy. This would enable inferences to be made as to whether PHE has the expected impact of enhancing the trajectory of infant health as a specific long term benefit. However, the study reveals that serious deficiencies exist in the provision of quality and effective prenatal health education. As a consequence, PHE as provided today did not have the intended impact. On the whole, exposure is inadequate and deficient in content.

In spite of the reported exposure to PHE by 75% of women in both categories, the overall relevant content coverage is very low. These findings imply that any differences in terms of infant outcome of the nutritional status would not be attributable to the PHE as an interventional strategy. This situation is compounded by lack of clear PHE policies and strategies by Ministry of Health (MOH) in Kenya<sup>5,24</sup>. Similar observations have been made elsewhere. In a Cochrane review by Gagnon<sup>25</sup>, it was observed

that the outcomes of PHE are uncertain. This was attributed to variability of content and population served, depicting a need for population specific standardization<sup>25</sup>. Similarly, Maestas<sup>26</sup> reported that standardization of PHE content is generally lacking, thereby preventing solid results on outcomes. These observations depict a need for development of a standardized country specific approach towards coverage of relevant subject matter in PHE and research to provide evidence of impact. In addition, regular monitoring and evaluation programmes are invaluable<sup>26</sup>.

Effectiveness in nutritional education should be reflected in the retention of information that is taught on types of foods that are anticipated to be given during weaning, infancy and childhood. As expected this should objectively sustain and improve nutritional status of the babies as the desirable outcome. In essence, this information should be provided prenatally as a preparatory and infant malnutrition preventive strategy. This study does not show any differences in this respect between the two populations. In addition, spontaneous knowledge on specific types of food is extremely low. Extensive literature search reveals an overall deficiency in training of the mothers on specific types of foods – clearly depicting an important missed opportunity in preparation of the mother's role of feeding their infants effectively. Thus, this observation constitutes a serious inadequacy in prenatal care provision, which should inevitably incorporate both clinical care and educational strategies. This, in turn, poses a long term risk to the health of the child<sup>16</sup>.

Whereas breastfeeding as a subject was reported as having been taught to at least 80% of cases and controls, knowledge on specifics of techniques of breastfeeding was grossly inadequate among women in both groups. Since statistical differences were not discernible between the two groups, no benefit of PHE could be inferred. This shows a large hiatus on the method of delivery in the subject of breastfeeding which therefore does not confer any benefit as an intervention. This was unlike inferences made by da Silva et al who concluded that breastfeeding is positively influenced by PHE<sup>27</sup>. It can be speculated that the difference may be due to the method and content of information delivery.

On the whole, PHE as provided today does not confer the benefit of education whose impact should be reduction in infant malnutrition through better and objective infant feeding practices. Hence, the intended benefit on prevalence of infant and childhood malnutrition may not be achievable<sup>16, 28</sup>.

Based on these findings, the following recommendations can be made: (1) Restructuring of well formulated and objective policies and strategies of PHE that ensure universal education of prenatal mothers; (2) Structured content with universal exposure of all antenatal mothers; (3) Use of innovative media of communication, including online availability; (4) Adequate back-up research and impact evaluation of PHE.

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