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Original Research Article

The Impact of a Combined Intervention Including Nutritional Education and Nutritional Supplements on Alterations in the Nutritional Status of Soon-to-be Married Individuals, with the Objective of Mitigating the Occurrence of Stunting in Neonates: A Comparative Study

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Abstract

Aim: The purpose of this study was to determine the effect of a combination of nutritional education and nutritional supplementation on changes in the nutritional status of the prospective bride and groom to prevent stunting in newborns.

Methods: The present study included subjects from the three intervention groups was 150 people. The intervention group is group 1: nutrition education intervention (stunting material) +multi micronutrien, group 2: nutrition education (stunting material) IFA (iron folic acid) and group 3: nutrition education (reproductive health material) +IFA.

Results: The average BMI value of the three groups on the subject of the bride and groom before the interventions were 21.64±3.16 kg/m2. The mean BMI after intervention was 22.08±3.12 kg/m2 with a difference change of 0.45±0.36 kg/m2. The results of the Wilcoxon test showed that there was a difference in the mean BMI before and after the intervention in all groups ($p<0.05$), meaning that there was a significant difference in the mean before and after the intervention. The statistical test showed that there was a significant difference in the mean BMI between the three groups ($p<0.05$). The provision of education and nutritional supplementation since the bride and groom (premarital) until delivery, based on the distribution of outcome variables, showed that of 150 newborns, 19 babies had a body length of <48 cm, namely stunting. And 18 had low birth weight (<2,500 grams). For the variable head circumference, 16 infants had abnormal head circumferences, i.e. <32 cm for male infants and <31 cm for female infants. The distribution of the number of cases at risk of stunting was highest in group 3 and the lowest cases in the group that received intervention in group 1. The average body length of the babies in the three groups was 49.21±1.36 cm.

Conclusion: The intervention can change the parameters of the nutritional status of the subject and there is a relationship between weight gain during pregnancy and infant anthropometry.

Keywords: Education, Nutrition supplementation, Nutritional status, Prospective bride, Stunting.

Introduction

Women of childbearing age as prospective mothers are a vulnerable group whose health status must be considered, especially their nutritional status. The quality of the next generation will be determined by the condition of the mother before pregnancy and during pregnancy. Preconception health is very important to consider including nutritional status, especially in an effort to prepare for pregnancy because it will be closely related to pregnancy outcomes[1]. Mothers who have poor nutritional status, suffer from complications during pregnancy are a predisposing factor for the low health of babies born[2]. Efforts to create a quality generation through healthy families, by preparing starting from the bride and groom are expected to have good health status, especially for female catin who will later become pregnant and give birth. The fertile period in women is the most important period so that the need for nutritional intake before pregnancy must be balanced in order to achieve optimal nutritional and health status to prepare for a healthy pregnancy[3]. Women of childbearing age (WUS) are vulnerable to the problem of lack of macro and micro nutrients so that they experience nutritional problems[4]. Pre-pregnancy Body Mass Index (BMI) is the most influential factor on birth weight[5]. WUS who experience chronic energy deficiency (KEK) during pre-pregnancy and pregnancy will have low body weight so that they are at risk of giving birth to stunting babies[6].

The fulfilment of nutrients during pregnancy has an impact on the health of the mother and fetus. During pregnancy, the mother's nutritional needs will increase for metabolism in the body and the addition of body tissues to support the growth and development of the fetus in the womb, and maintain the condition of the placenta so that the mother can carry out a healthy pregnancy. In women who are not yet pregnant, lack of micronutrients can cause difficulties in getting pregnant, while for pregnant women it can cause pregnancy complications, fetuses, anemia, low birth weight, premature birth and babies[7,8].

Nutritional problems are a problem experienced by every country, be it developed countries, developing countries, or poor countries. Nutritional problems that often receive attention from the state are underwing, stunting, wasting, and micronutrient deficiency. Stunting is caused by multimedia factors and not only caused by poor nutrition experienced by pregnant women and children under five. The most decisive intervention to reduce the prevalence of stunting, therefore it needs to be carried out on 1000 days of HPK from children under five. Some of the factors that cause stunting can be described from the lack of knowledge of mothers regarding health and nutrition before and during pregnancy and after the mother gives birth. Another factor is the case of still limited health services for children and mothers during pregnancy.

The purpose of this study was to determine the effect of a combination of nutritional education and nutritional supplementation on changes in the nutritional status of the prospective bride and groom to prevent stunting in newborns.

Materials and Methods

The present observational study was conducted at Department of Community Medicine Government Medical College and Hospital, Miraj, Maharashtra, India for six months, and the number of subjects from the three intervention groups was 150 people. The intervention group is group 1: nutrition education intervention (stunting material) +multi micronutrien, group 2: nutrition education (stunting material) IFA (iron folic acid) and group 3: nutrition education (reproductive health material) +IFA.

Inclusion and exclusion criteria

The inclusion criteria in this study inclusion criteria as follows:

Married female in the age group of 20-30 years, subjects were willing to participate in the whole series of studies. Subject exclusion criteria are: pregnant, suffer from severe anemia (Hb level <8 g/dl), smoke, suffer from chronic disease, abnormal menstrual cycle and do a diet program.

Data collection

The characteristics of the subject (age, education, occupation, income), health status includes data on Hb levels, nutritional intake. Nutritional status of subjects by measuring antropometri (body weight, body high and MUAC). Compliance with nutritional supplement consumption with a dose of 1 tablet per week from catin until before pregnancy and during pregnancy a dose of 1 tablet daily during pregnancy until before pregnancy. give birth to. Anthropometry of newborns (body weight, body length and head circumference).

Statistical analysis

Data were analyzed using Microsoft Excel 2016 and SPSS (V.26) programs. The analysis was performed using the mean (SD) and number (percentage). Kolmogorov-Smirnov test with a cut of point significance of normal distribution (p values >0.05) with a 95% confidence level. Analysis of the data for the test of differences between groups using the Paired t-test, Wilcoxon, ANOVA and Kruskal Wallis.

Results

Table 1: Nutritional status of subjects before and after intervention

Nutritional status variable Intervention	Groups			P value
	Group I N=50	Group II N=50	Group III N=50	
BMI prospective brides				
Before	23.27±2.68	22.38±3.14	21.38±3.48	0.032
After	23.76±2.86	22.70±3.26	21.66±3.88	0.000
Δ	0.49±0.18	0.32±0.22	0.28±0.40	0.010
P Value	0.00	0.00	0.00	
Weight gain for pregnant women				
Before	52.47±6.13	52.79±6.36	49.46±8.41	0.027
After	65.34±4.99	64.27±5.68	59.46±8.25	0.000
Δ	12.86±2.45	11.48±2.53	10.00±2.65	0.000
P Value	0.00	0.00	0.00	

The average BMI value of the three groups on the subject of the bride and groom before the interventions were 21.64±3.16 kg/m2. The mean BMI after intervention was 22.08±3.12 kg/m2 with a difference change of 0.45±0.36 kg/m2. The results of the Wilcoxon test showed that there was a difference in the mean BMI before and after the intervention in all groups ($p<0.05$), meaning that there was a significant difference in the mean before and after the intervention. The statistical test showed that there was a significant difference in the mean BMI between the three groups ($p<0.05$).

The difference test between groups (ANOVA) showed that there was a significant difference in the mean increase in gestational weight gain in the three groups ($p=0.000$). The results of the ANCOVA test by adjusting the independent variables, showed significant results ($p<0.05$), namely the variable weight before pregnancy and nutrition practices before pregnancy as confounding variables for weight gain after pregnancy. The effect of the intervention remained significant as seen from the corrected model value ($p=0.000$).

Table 2: Effect of intervention on newborn anthropometric variables

Antropometric newborn variable	Groups Mean±SD			P value
	Group I N=50	Group II N=50	Group III N=50	
Body Length	49.41±1.29	49.32±1.50	48.67±1.22	0.02
Stunting <48 cm	3	7	9	
Stunting >48 cm	47	43	41	
Body weight	3013.83±299.79	2916.10±312.56	2823.03±294.06	0.04
LBW <2500 gram	2	6	10	
Normal>2500 gram	48	44	40	
Head circumference	33.11±1.72	33.01±1.86	32.32±1.08	0.06
Abnormal (P<31 cm; L<32 cm)	2	6	8	
Normal (P≥31; L≥32 cm)	48	44	42	

The provision of education and nutritional supplementation since the bride and groom (premarital) until delivery, based on the distribution of outcome variables, showed that of 150 newborns, 19 babies had a body length of <48 cm, namely stunting. And 18 had low birth weight (<2,500 grams). For the variable head circumference, 16 infants had abnormal head circumferences, i.e. <32 cm for male infants and <31 cm for female infants. The distribution of the number of cases at risk of stunting was highest in group 3 and the lowest cases in the group that received intervention in group 1. The average body length of the babies in the three groups was 49.21±1.36 cm. The results of the Kruskall Wallis statistical test showed that there was a significant difference in the mean body length of infants between groups ($p=0.02$). For the variable mean baby weight in the three groups that is equal to 2920.921±309.7 grams.

Discussion

Stunting is a condition of failure to thrive in children under five years of age due to chronic malnutrition. [9] Stunting has an impact on the level of intelligence, reduces productivity, vulnerability to disease, thus hampering economic growth and increasing poverty and inequality which has long-term effects, for himself, his family, and the government. Short Toddler or called stunting is where the nutritional status is based on an index of body length or height that does not match where in anthropometric standards, the assessment of the nutritional status of children, the results of these measurements are at the threshold (Z-Score) <-2 SD to -3 SD (short/stunted) and <-3 SD (very short/severely stunted). Stunting is a chronic malnutrition problem caused by inadequate nutritional intake for a long time due to feeding that is not in accordance with nutritional needs. Stunting can occur from the first 1000 days of life (HPK) children can cause growth disorders that are difficult to fix when they are adults, such as cognitive which can affect learning performance in school. [10]

Prospective brides as the target of pre 1000 HPK, namely their nutritional status has major implications for the growth, development, and long-term health of their offspring. Inadequate nutritional intake before and during pregnancy will have an impact on the health of the mother and fetus in the womb. Maternal nutritional needs during pregnancy have increased for optimal health of the mother and fetus in the womb, if the intake is less then they will suffer from nutritional deficiencies both macro and micro. [11-15]

The average BMI value of the three groups on the subject of the bride and groom before the interventions were 21.64±3.16 kg/m2. The mean BMI after intervention was 22.08±3.12 kg/m2 with a difference change of 0.45±0.36 kg/m2. The results of the Wilcoxon test showed that there was a difference in the mean BMI before and after the intervention in all groups ($p<0.05$), meaning that there was a significant difference in the mean before and after the intervention. The statistical test showed that there was a significant difference in

the mean BMI between the three groups ($p<0.05$). The provision of micronutrient supplementation in the preconception period is more important than only given during pregnancy. Intervention during pregnancy will miss the critical preconception period. Giving multi micro nutrients 2-6 months before pregnancy overcomes the problem of low quality of pregnancy outcomes (spontaneous abortion, prematurity and LBW. [14] The results of statistical tests showed that there was a significant difference in the mean weight gain of pregnancy in the three groups ($p=0.000$). And there is an effect of weight gain of pregnant women (nutritional status) on pregnancy outcomes.

The provision of education and nutritional supplementation since the bride and groom (premarital) until delivery, based on the distribution of outcome variables, showed that of 150 newborns, 19 babies had a body length of <48 cm, namely stunting. And 18 had low birth weight (<2,500 grams). For the variable head circumference, 16 infants had abnormal head circumferences, i.e. <32 cm for male infants and <31 cm for female infants. The distribution of the number of cases at risk of stunting was highest in group 3 and the lowest cases in the group that received intervention in group 1. The average body length of the babies in the three groups was 49.21 ± 1.36 cm. The results of the Kruskall Wallis statistical test showed that there was a significant difference in the mean body length of infants between groups ($p=0.02$). For the variable mean baby weight in the three groups that is equal to 2920.921 ± 309.7 grams. The nutritional status of the mother during pregnancy is a determining factor for the growth and development of the fetus in the womb. [16] Malnourished women contribute to the trans-generational cycle of malnutrition. The MMS supplementation intervention gave a larger mean change when compared to IFA. [17] This shows that the MMS intervention is more effective than the IFA supplementation intervention than Fe alone, combining Fe with Folic Acid or Fe with Vitamin C helps to improve the anthropometric quality of newborns, so it is recommended that supplementation should be given early in pregnancy or even before pregnancy in order to reserve nutrients in the newborn. the body is able to meet the increased needs before and during pregnancy. [18] Babies born with low birth weight and height <48 cm (risk of stunting) represent impaired growth in the fetus or fetal period. [12]

Lack of various types of micronutrients causes problems in pregnancy and affects pregnancy outcomes. [13] Meeting the adequacy of micronutrients during the preconception period can contribute to improving the baby's birth length. The mean length of the babies born from the group given the MM supplement was significantly higher than the birth weight of the babies given the control/IFA supplementation group ($p=0.001$). [19] Various research has proven the superiority of MMS in overcoming pregnancy problems and low outcomes when compared to IFA. [20]

Conclusion

Providing educational interventions and effective nutritional supplementation can change the parameters of the nutritional status of the subject and affect the length of the baby's body and weight of the newborn ($p<0.05$) and there is a relationship between weight gain during pregnancy and the length of the baby's body, baby's weight and head circumference ($p<0.005$).

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