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A study on nutritional benefits of soya milk in malnourished children aged 1- 5 years

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Article History	Abstract
Received on: 22 Sep 2024 Revised on: 07 Nov 2024 Accepted on: 11 Nov 2024	 <p>Poor nutritional usage, an imbalance of vital nutrients, or an excess or shortage of nutrients are all manifestations of malnutrition. emotionally and physically undernourished and overweight. Malnutrition leads to undernutrition, overweight and obesity, and food-related noncommunicable diseases. The consequences of malnutrition are particularly severe in the early years of life. Growth retardation is the result of childhood malnutrition. Children who are undernourished do not reach their full potential in terms of their mental and physical development. This study used a quasi-experimental research approach. Although it manipulates an independent variable to see how it affects a dependent variable, it is devoid of at least one of the two elements of a real experimental design: a control group or randomisation. The data collected were summarised with differences between pre and post scores of the degree of malnutrition was statistically analysed. It has also been demonstrated that soy milk supplements enhance children's general growth. Malnourished youngsters gained weight when given soy milk, which reduced malnutrition and increased normal weights.</p>
<p><i>Keywords</i></p> <p>Malnutrition, Soya Milk, Children aged 1 to 5 years.</p>	

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Introduction

A lack of protein and calories is the root cause of malnutrition, which is one of the most significant problems in the world today. A poor diet, mobility issues, digestive diseases, food shortages, food pricing, and food distribution, as well as a lack of breast feeding, are the primary causes of this condition. Loss of fat, difficulty breathing, sadness, an increased risk of hypothermia, slower healing times for wounds, longer recovery times from illnesses, and exhaustion are some of the prevalent indications and symptoms [1][5][6]. When the condition is severe, the skin becomes parched, dry, and inelastic; the cheeks appear hollow; the eyes appear sunken; and the hair becomes dry and sparse. A healthy diet that contains the appropriate

proportions of nutrients from the major food groups can help prevent malnutrition. A few examples of these are carbohydrates, fruits, vegetables, and proteins. Dairy-free vegans are able to obtain many nutrients from sources that do not come from animals, including lipids [7] , [8].

Around 870 million people worldwide are still undernourished, and child malnutrition is still a significant issue in developing nations. The most frequent cause of paediatric hospitalization is severe malnutrition. Based on a deficit of more than two standard deviations below the WHO/US National Centre For Health Statistics (NFHS) reference values for weight for age, height for age, and weight for height, respectively, about 27% of children under the age of five in the developing world are underweight, 32% are stunted, and 10% are wasted [2] ,[3] , [4].

Soyabean is an excellent source of plant protein, with around 40% protein (dry basis), the highest protein level among legumes and grains. Soy proteins exhibit good digestibility with appropriate thermal processing, and their amino acid composition is nearly balanced, with the exception of methionine, to satisfy human nutritional needs. Soya can significantly enhance the nutritional quality of weaning diets. Processed soy products (defatted soy flour, textured soy protein, soy protein concentrate, and soy protein isolate) exhibit a significantly elevated protein content and an exceptionally high protein digestibility corrected amino acid score (PDCAAS) in comparison to conventional diets. This study aims to evaluate the effectiveness of soya milk on malnourished children aged 1-5 years [10].

MATERIALS AND METHODS:

Objectives of the study was to find out the association between the pre and post test scores on degree of malnutrition among children of 1 – 5 years with their demographic variables in experimental group and control group.

In this study Quasi experimental research design is used. It involves the manipulation of independent variable to observe the effect on dependent variable, but it lacks at least one of the two characteristics of the true experimental design: randomization or a control group.

The chosen urban area setup for the study was Anakaputhur, which is 5 km away from Sri

Venkateshwaraa Medical College Hospital and Research Institute.

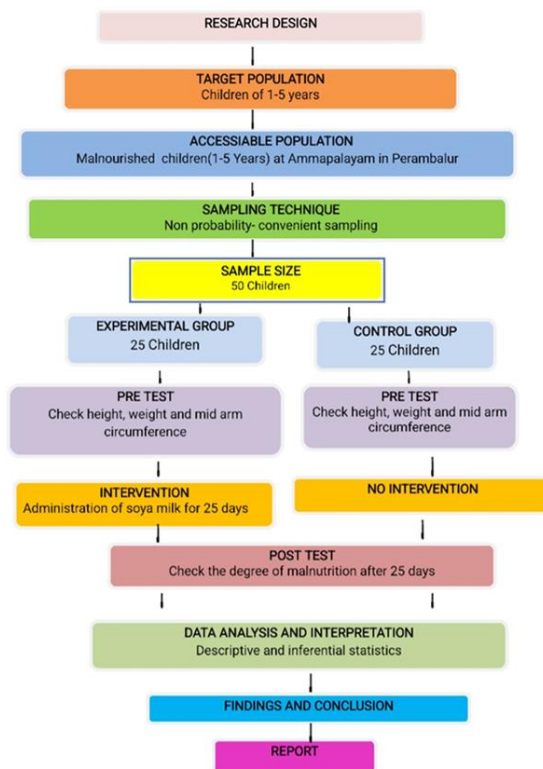


Figure 1 Schematic Representation of Research Design

Table 1 Study Group in the Research Design

Group	Pretest	Intervention	Post-test
E	O ₁	X	O ₃
C	O ₂	-	O ₄

X - Administration of soya milk

- - No intervention

E - Experimental group

C - Control group

O1-Pretest degree of malnutrition of children in experimental group

O2 - Pretest degree of malnutrition of children in control group

O3- Post-test degree of malnutrition of children in experimental group

O4- Post-test degree of malnutrition of children in control group

Sampling Technique

In this study non-probability convenient sampling is used. It is a technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The subjects are selected just because they are easiest to recruit for

the study and the researcher did not consider selecting subjects that are representative of the entire population.

Sample Size

There are about 50 Children are taken in this study. It is divided into two groups:

25 Children belongs to experimental group and 25 Children belongs to control group.

Demographic Variables

This section consists of demographic variables of subjects which include age of the child, parental education, parental occupation, income of the family, order of birth, environmental sanitation, food pattern, and breast-feeding practices.

Assessment Tool

Weighing machine: A device used to check weight

Inch tape: Used to measure height and mid arm circumference

Scoring

Mid arm circumference of 16 cm- Normal

Mid arm circumference between 13.5 and 16 cm- Mild malnutrition

Mid arm circumference between 12.5 and 13.5 cm- Moderate malnutrition

Mid arm circumference of <12.4 cm- Severe malnutrition.

Description Of the Intervention

Soya milk was administered for the Children of experimental group.

Soya milk was prepared by soaking soya beans, then grind it and add water, then filtering and finally add jaggery was given for experimental group for about 25 days.

Pretest

50 children aged between 1-5 years were divided into 2 groups as experimental and control group. Informed consent was obtained from the mothers of the children.

The demographic variables data were collected from the mothers of the children of both the experimental and control group.

Height, weight and mid arm circumference was checked for both groups and recorded the values.

Implementation

100 ml of soya milk was given daily for about 25 days for experimental group alone.

Post-test

Height, weight and mid arm circumference were checked for both groups again and the values were recorded.

Statistical analysis was performed with SPSS.

Table 2 Statistical Analysis Parameters Used in the Study

Descriptive statistics	Frequency distribution, Mean, Standard deviation, Paired 't' test
Inferential statistics	Chi square test

Results

Pretest level in experimental group where highest percentage of 52 had severe malnutrition and lowest parentage of 24 were mild and moderate malnutrition where as in control group highest percentage of 36 were mild malnutrition and lowest of 32 percentage were moderate and severe malnutrition.

Post test level in experimental group where highest percentage of 60 had mild malnutrition and lowest parentage of 16 were s moderate malnutrition where as in control group highest percentage of 36 were mild malnutrition and lowest of 32 percentage were moderate and severe malnutrition. The comparison of degree of malnutrition of the children in pretest and post-test for experimental group. The mean and standard deviation value in pretest was 17.258 and 0.7632 respectively. The mean and standard deviation value in post-test was 17.953 and 0.8033 respectively.

The mean difference value was 0.6948. The 't' value was 13.923 which was significant at $p < 0.01$ level which depicted that giving soya milk was effective in treating protein energy malnutrition. The comparison of degree of malnutrition of the children in pretest and post-test for control group. The mean and standard deviation value in pretest was 16.7044 and 1.0952 respectively. The mean and standard deviation value in post-test was 16.721 and 1.1162 respectively. The mean difference value was 0.01720. The 't' value was 0.953 which was not significant at $p < 0.01$ level.

Table 3 Pre-Test Degree of Malnutrition of the Children

Degree of malnutrition	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Mild malnutrition	6	24	9	32
Moderate malnutrition	6	24	8	40
Severe malnutrition	13	52	8	28
Normal	0	0	0	0
TOTAL	25	100	25	100

Table 4 Post Test Degree of Malnutrition of the Children

Degree of malnutrition	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Mild malnutrition	15	60	9	36
Moderate malnutrition	4	16	8	32
Severe malnutrition	0	0	8	32
Normal	6	24	0	0
TOTAL	25	100	25	100

Table 5 Comparison Of Degree of Malnutrition of The Children in Pretest and Post Test for Experimental Group

Test	Mean	Standrad Deviation	Mean Difference	'T' Value	Table Value	Inference
PRE-TEST	17.258	0.76324	0.69480	13.923	2.492	SIGNIFICANT
POST TEST	17.953	0.80332				

Table 6 Comparison Of Degree of Malnutrition of The Children in Pretest and Post Test For Control Group

Test	Mean	Standrad Deviation	Mean Difference	'T' Value	Table Value	Inference
PRE-TEST	16.7044	1.09529	0.01720	0.953	2.492	NOT SIGNIFICANT
POST TEST	16.7210	1.11624				

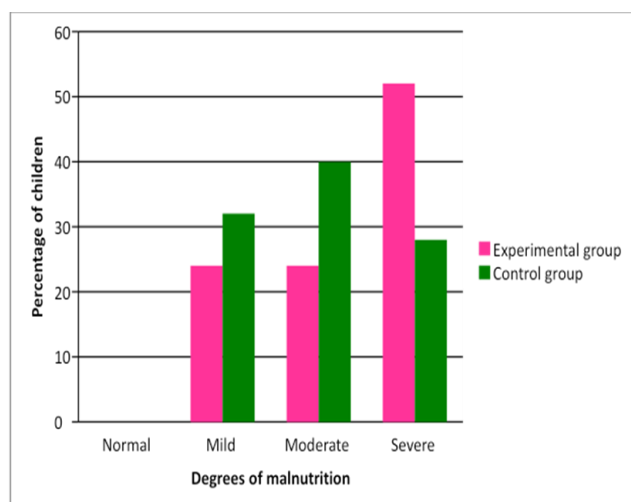


Figure 2 Distribution of Pretest Degrees of Malnutrition in Experimental And Control Groups

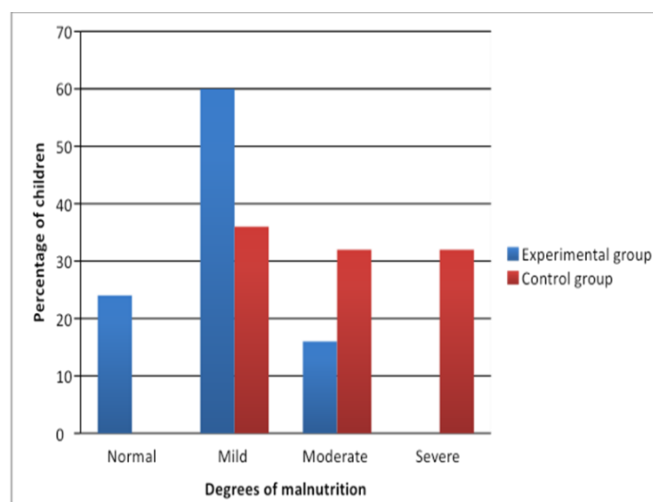


Figure 3 Distribution of Post-Test Degrees of Malnutrition in Experimental and Control Groups

DISCUSSION

According to a study conducted by Abidoeye, R.O., Sikabofori *et al.*, [3] to determine the prevalence rate of protein energy malnutrition. Around 370 preschool children were studied and the prevalence rate found to be 41.6% (154).151(40.8%) of them were found to have weight-for-height below -2 SD indicating level of stunting among the children. The above results are similar to our study findings.

The effectiveness of giving soya milk to undernourished children is being investigated in this study by comparing the post-test levels of malnutrition in the experimental and control groups. The experimental group's post-test mean and standard deviation were 17.9536 and 0.8033, respectively. The control group's mean and standard deviation were 16.721 and 1.11624, respectively. 1.232 was the mean difference value. The "t" value, which was 4.505 and significant at the $p < 0.01$ level, showed that the experimental group's malnutrition could be effectively treated by giving them soya milk [11].

A study done Mathew A, Raut DS [13], [14] mainly focussed on the benefits of Soy Milk in malnourished children. The study's goal is to determine how effective soy milk is. The design was qualitative. Data were collected from 50 samples of children under five, who were then classified according to their BMI level and degree of malnutrition. Following a 21-day period of soy milk administration, the BMI level effectively improved, ranging from 60% to 75%.

Kumari V *et al.*, [12] conducted a study which showed that soya had a bigger influence, and they also saw a better improvement. They developed a weaning meal that was created had a decent nutritional profile and was suitable to nursing moms. According to research conducted by Othoo DA *et al.*, [9] using soy milk supplements compared a soya formula prepared from an aqueous extract of the bean with a cows' milk formula, containing an equal amount of protein, in the treatment of children with acute malnutrition, and they discovered that the soya formula was as effective as the cows' milk formula in the initial treatment.

According to WHO report on the Levels and trends in child malnutrition states that the malnutrition continues to be a major health problem in the world today, particularly in children under 5 years

of age [15]. Lack of food, however, is not always the primary cause for malnutrition. In many developing and underdeveloped nations, diarrhoea is a major factor in malnutrition. Additional factors are bottle-feeding, inadequate knowledge of proper child care practices, parental illiteracy, economic and political factors, climatic conditions, cultural and religious food preferences and simply the lack of adequate food [13].

CONCLUSION

The result reveals that the children are prone to malnutrition and it is influenced by demographic factors. The pretest level of height, weight and mid arm circumference was low compared to the post-test level. Thus, the soya milk administration was found effective to improve the level of nutritional status among malnourished children to prevent malnutrition. The pretest degree of malnutrition of the children in experimental group and control group, where 24%, 24% and 52% respectively had mild, moderate and severe malnutrition. 36%, 32% and 32% respectively had mild, moderate and severe malnutrition.

The post-test degree of malnutrition of the children in experimental group and control group, where 24%, 60% and 16% respectively had normal level, mild and moderate malnutrition. 36%, 32% and 32% respectively had mild, moderate and severe malnutrition. The effectiveness of soya milk was statistically tested by paired 't' test (4.505) and the result was found to be significant at $p < 0.01$.

AUTHOR CONTRIBUTION

All authors made substantial contributions to the conception, design, acquisition, analysis, or interpretation of data for the work. They were involved in drafting the manuscript or revising it critically for important intellectual content. All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring its accuracy and integrity.

ETHICAL APPROVAL:

This research was conducted in line with the principles of the Declaration of Helsinki. All procedures involving study participants were carried out with care and consideration for their welfare, in compliance with ethical standards and regulations

Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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