



International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 6 Number 1 (January-2018)

Journal homepage: <http://www.ijcrar.com>



doi: <https://doi.org/10.20546/ijcrar.2018.601.005>

Comparing the Effectiveness of Glycine Max Fortified Mixture (GMFM) and Hyderabad Mixture (HM) on Nutritional Status of Malnourished Children in Rural Area

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Abstract

Malnutrition is one of the most devastating problems worldwide and is inextricably linked with poverty. Each individual requires a minimum amount of nutritious food to keep himself/herself healthy. When this minimum requirement is not met the human body becomes weak and susceptible to infection. Therefore, to recover from this problem it is very important to supplement the diet with protein and energy rich food supplement. The aim of the study was to compare the effectiveness of glycine max fortified mixture and Hyderabad mixture on nutritional status of malnourished children. Single blinded randomized block design. Anganawadi No.1, Muchakandi village, Bagalkot. 20 children between 2 to 5 years of age with weight for age Z Score between >-2 to <-3 . The children were screened using WHO anthro v 3.2.2 software. HM and GMFM. Body weight, height, mid arm circumference. The data was collected by structured interview schedule and Bio physiological method. There was no significant difference between the effectiveness of GMFM and HM on nutritional status of malnourished children (p value= 0.3512). Both HM (p value <0.000271) and GMFM (pvalue=0.000125) were significantly effective in improving the nutritional status of the malnourished children.

Article Info

Accepted: 31 December 2017

Available Online: 20 January 2018

Keywords

Glycine max,
Hyderabad mix,
Malnutrition,
Under five,
Z score.

Introduction

In India 44% of children under the age of 5 are underweight. The World Bank estimates that India is one of the highest ranking countries in the world for the number of children suffering from malnutrition. The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub Saharan Africa with dire consequences for mobility,

mortality, productivity and economic growth. (World Bank Report, 2009) The 2017 Global Hunger Index (GHI) Report ranked India 97th out of 118 countries with a serious hunger situation. Amongst South Asian nations. (Bank Report on Malnutrition in India, 2015) On the Global Hunger Index India is on place 67 among the 80 nations having the worst hunger situation. (Subodh Varma, 2012)

Each individual requires a minimum amount of nutritious food to be healthy. When this minimum requirement is not met the human body becomes weak and susceptible to infection. Therefore, to recover from this problem it is very important to supplement the diet with protein and energy rich content. Soybean contains all the three essential macro-nutrients required for good nutrition which serves as an excellent complement to lysine-limited cereal protein. It is the cheapest legume having nutraceutical properties. The amino acid pattern of the soybean is similar to cow milk. Tempeh, a soy based product is another excellent example which can provide beneficial effects by combating malnutrition. Moreover, soy fortified foods can fill the gap between poverty and adequate nutrition. Hence soy products can be used to prevent malnutrition among vulnerable group of community (Garg Sheenam, 2014).

Objectives of the study

To determine the effectiveness of Glycine max fortified mixture on health status of under five children with Malnutrition.

To determine the effectiveness of Hyderabad mixture on health status of under five children with Malnutrition.

To compare the effectiveness of Glycine max fortified mixture versus Hyderabad mixture on health status of under five children with Malnutrition.

Materials and Methods

The research design used for the study was randomized block design. The children were randomly assigned to either receive the Hyderabad mixture or Glycine max fortified mixture.

Setting of the study: Anganawadi No.1, Muchakandi village, Bagalkot. The anganawadi was selected randomly from 13 anganawadi's selected villages.

Study population and sample

The population for the study were the malnourished children between 2 to 5 years of age and whose weight for the age Z score is between >-2 to <-3 . The sample was selected by screening all the children between 2 to 5 years of age.

The sample included 20 participants out of which 10 were randomly assigned to receive Hyderabad mixture

and remaining 10 to receive Glycine max fortified mixture.

57 children between the ages of 2 to 5 years were screened in Anganawadi 1 of Muchakandi village. The study was explained to the parents of selected children and a written consent was obtained from them. Block randomization was done based on age by the statistician. 3 blocks were prepared (2-3 years, 3-4 years and 4-5 years) and the children were allocated to either group by the investigator.

Investigation tool

Screening of the children:

The screening was done by WHO anthro 3.2.2 software. The children with weight for the age Z score between >-2 to <-3 were selected.

The selected children were again screened by checking vital signs and nutritional assessment to exclude the presence of any other anomalies.

Baseline data, data regarding past illness and data regarding hygienic practices of the child was obtained from the parents of the finally selected children.

Intervention

Intervention 1: Preparation of dietary interventions

Hyderabad mixture

It includes four ingredients in the following proportions Bengal gram: 16 gm, wheat: 40 gm, ground nut: 10 gm, Jaggery 20 gm

Roasting of wheat, Bengal gram, and ground nuts and grinding them once they attain room temperature. Grinded flours are roasted and mixed with jaggery thoroughly. Ladoos are prepared from the mixture; each ladoo is made of 50 gm of the mixture. Each child is given 4 ladoos a week. The nutritive value of 200 gm of mixture provides 768 kcal of energy and 27.2 gm of protein

Glycine max fortified mixture includes four ingredients in the following proportions

Soybean: 16 gm, wheat: 40gm, ground nut: 10gm, Jaggery 20gm

Roasting of wheat, soybean and ground nuts and grinding them once they attain room temperature. Grinded flours are roasted and mixed with jaggery thoroughly. Ladoos are prepared from the mixture; each ladoo is made of 50 gm of the mixture. Each child is given 4 ladoos a week. The nutritive value of 200 gm of the mixture provides 798 kcal of energy and 32.77 gm of protein.

The dietary interventions were prepared weekly, under supervision of nutritionist, at nutrition lab of Sajjalashree institute of nursing and packed into new polythene bags (200 gm per bag), sealed and distributed to the second level investigators, who fed the ladoos to individual child. All children additionally continued to receive their normal diets, including the meal provided by the anganawadi.

The interventions were given for one month from 21-08-2017 to 20-09-2017. The diet was given on Monday, Tuesday, Thursday and Wednesday (4 days a week). The intervention was started soon after recruitment of the children. Before administration of the interventions written consent was obtained from the parents of the participants.

Anthropometric indices were calculated using WHO Anthro (v 2.0.2; Department of Nutrition, World Health Organization). To compare the differences between the two groups, the chi square test was performed for dichotomous outcomes and t-test for continuous outcomes.

Results and Discussion

Baseline data of all the study participants

Table no. 1 depicts the mean and standard of weight, height and mid arm circumference among the children, before and after administration of the dietary interventions. Among the children who received Hyderabad mixture the mean (and SD) weight was 11 kg (SD= 0.59 kg) in pretest whereas it increased to 11.53 kg (SD= 0.74 kg) in posttest (mean difference= 0.53kg), mean height was 82.5 cms (SD= 7.08) in pretest and 85.7 cms (SD= 6.19) in posttest (difference = 3.2 cms) and mean MAC in pretest was 13.01 (SD= 0.45) pretest and 13.12 (SD= 0.43) in posttest (difference= 0.11 cms). The differences in the post test to pretest shows that Hyderabad mixture was effective in improving the nutritional status of malnourished children.

Among the children who received Glycine max fortified mixture the mean (and SD) weight was 11.55 kg (SD= 0.89 kg) in pretest whereas it increased to 12.10 kg (SD= 0.92 kg) in posttest (mean difference= 0.55kg), mean height was 88 cms (SD= 6.64) in pretest and 89.9 cms (SD= 7.04) in posttest (difference = 1.9 cms) and mean MAC in pretest was 13.20 (SD= 0.36) in pretest and 13.25 (SD= 0.34) in posttest (difference= 0.05 cms).

The differences in the post test to pretest shows that Glycine max fortified mixture was effective in improving the nutritional status of malnourished children.

Table.1 Mean, and Standard deviation of weight, height and mid arm circumference before and after dietary intervention

N=20

Anthropometric measures	Group 1: Hyderabad mixture				Group 2: Glycine max fortified mixture			
	Pretest		Post test		Pretest		Post test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Weight in Kg	11	0.59	11.53	0.74	11.55	0.89	12.1	0.92
Height in cms	82.5	7.08	85.7	6.19	88	6.64	89.9	7.04
MAC in cms	13.01	0.45	13.12	0.43	13.20	0.36	13.25	0.34

Table.2 Assessment of effectiveness of Glycine max fortified mixture on body weight

N=20

Assessment	Mean weight	Std. Dev.	Mean Diff.	SD Diff.	P value
Pre test	11.55	0.89	0.55	0.27	0.000125
Post test	12.1	0.92			

P value <0.05

Table.3 Assessment of effectiveness of Hyderabad mixture on body weight gain

N=20

Assessment	Mean weight	Std. Dev.	Mean Diff.	SD Diff.	P value
Pre test	11.09	0.683862	0.44	0.24	0.000271
Post test	11.53	0.740945			

P<0.005

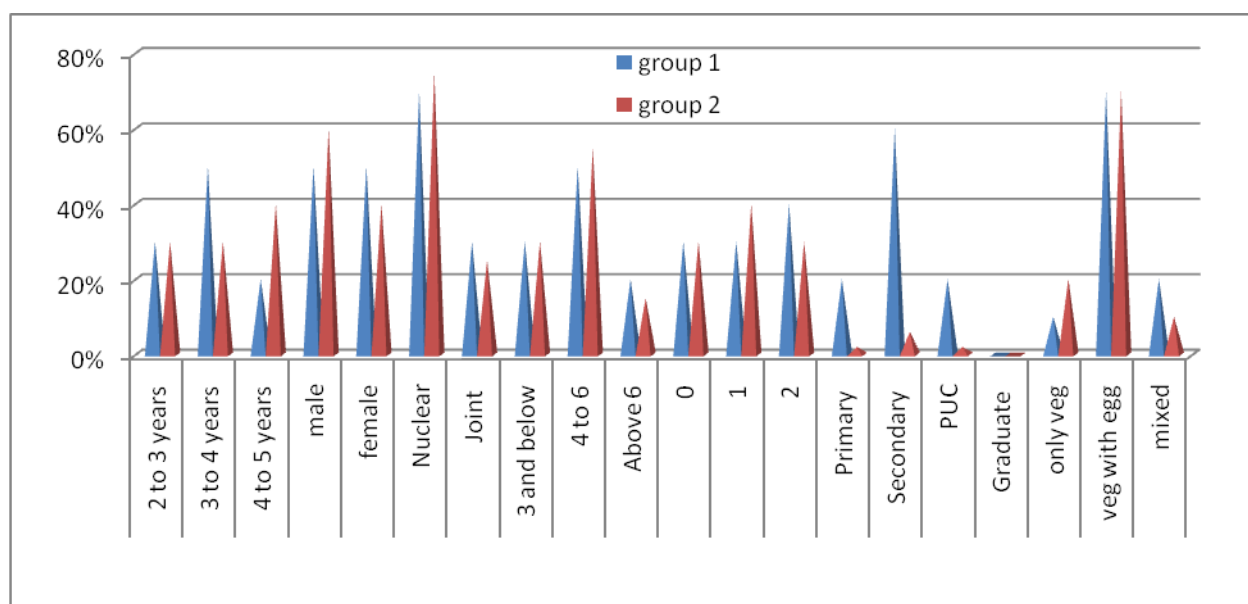
Table.4 Comparison of effectiveness of glycine max fortified mixture and Hyderabad mixture on Body weight of malnourished children

N=20

Intervention	Mean of difference	SD of difference	P value	significance
Hyderabad mixture	0.44	0.24	0.351	Not significant
Glycine max fortified mixture	0.55	0.27		

P value <0.05

Fig.1 Distribution of participants according to baseline data



Pair t test was used to test the hypothesis; H_1 : there is a significant difference between the pretest and posttest mean weight scores among under five malnourished children who received glycine max fortified mixture at 5% level of significance. The mean difference was 0.55 kg and SD difference was 0.27. The p value was 0.000125, which suggest that a significant difference is present between the pretest and posttest mean weight. Hence glycine max fortified mixture was effective in improving the body weight and the hypothesis H_1 was accepted.

Pair t test was used to test the hypothesis; H_2 : there is a significant difference between the pretest and posttest mean weight scores among under five malnourished children who received Hyderabad mixture at 5% level of

significance. The mean difference was 0.44 kg and SD difference was 0.24. The p value was 0.000271, which suggest that a significant difference is present between the pretest and posttest mean weight scores. Hence Hyderabad mixture was effective in improving the body weight and the hypothesis H_2 was accepted.

Independent t test was used to test the hypothesis H_3 : There is a significant difference between the effectiveness of glycine max fortified mixture and Hyderabad mixture on mean body weight scores among under five malnourished children at 5 %level of significance. The p value was 0.351 suggesting the difference between the effectiveness of both the interventions was not significant hence the hypothesis, H_3 was rejected.

Conclusion: glycine max fortified mixture and Hyderabad mixture are equally effective in improving the nutritional status of moderately mal nourished children. There is no significant difference in the effectiveness of both the dietary interventions improving the health status of moderately malnourished under five children.

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How to cite this article:

Utalbasha N. Dhandargi and Padmaja A. 2018. Comparing the Effectiveness of Glycine Max Fortified Mixture (GMFM) and Hyderabad Mixture (HM) on Nutritional Status of Malnourished Children in Rural Area. *Int.J.Curr.Res.Aca.Rev.* 6(1), 30-34. doi: <https://doi.org/10.20546/ijcrar.2018.601.005>