



# INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by IJRPS Journal

Home Page: <https://ijrps.com/>

## Effectiveness of soya milk in the nutritional rehabilitation of malnourished children aged 1-5 years

Dr Srinivasan Ramamoorthy

Department of Paediatrics, Sri Venkateshwaraa Medical College Hospital and Research Institute, Tamil Nadu, India.

### Article History

Received on: 04 Sep 2024  
Revised on: 02 Nov 2024  
Accepted on: 05 Nov 2024

### Keywords

Malnutrition,  
Soya Milk,  
Nutritional Rehabilitation,  
Children.

### Abstract



Malnutrition is a presentation of poor nutritional use, an imbalance of essential nutrients, or a deficiency or excess of nutrients are all considered forms of malnutrition. Undernutrition, overweight a mentally and physically. Undernutrition, overweight and obesity, and noncommunicable illnesses linked to food are all consequences of malnutrition. During the early stages of life, the effects of malnutrition are more severe. Malnutrition in childhood causes growth retardation. Undernourished children do not develop to their full capacity, both mentally and physically. To assess the study strategy, a pre-experimental design (one group pre-test versus post-test) was used. A non-randomized purposive selection approach was used to choose the study's sample. Fifty preschoolers (ages 1–5) made up the study sample. The study's context refers to the location where it was conducted. The distribution of birth orders in the experimental and control groups in the current study showed that the second child had the highest percentage, and the fourth child had the lowest percentage. Malnutrition may be prevented, maintained, and recovered from with great effectiveness thanks to soy milk, which is the least expensive source of protein and other nutrients. Supplementing with soy milk has also been shown to improve children's overall development. Giving malnourished children soy milk caused them to gain weight, which decreased malnutrition and raised normal weights.

### \*Corresponding Author

Name: Dr Srinivasan Ramamoorthy  
Phone: +91 9159191939  
Email: [srinivasanramamoorthy@gmail.com](mailto:srinivasanramamoorthy@gmail.com)

eISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v15i4.4724>

Production and hosted by

IJRPS | [www.ijrps.com](http://www.ijrps.com)

© 2024 | All rights reserved

### 1. Introduction

Malnutrition is defined as a lack or excess of nutrients, an imbalance of critical nutrients, or poor nutrient use. Malnutrition carries a double burden, including undernutrition, overweight and obesity, and diet-related noncommunicable diseases. The consequences of starvation are more severe during the developmental stages of life [1]. Childhood malnutrition results in growth retardation. Undernourished youngsters fail to reach their full physical and mental potential. The prevalent nutritional conditions include protein-

energy malnutrition, vitamin A deficiency, nutritional anaemia, and iodine insufficiency, among others [2]. These and other nutritional abnormalities may predispose individuals to various chronic and debilitating diet-related non-communicable diseases, including diabetes mellitus, cardiovascular diseases, and malignancies, in later life [3].

**MATERIALS AND METHODS:**

Objectives of the study was to

To evaluate the extent of malnutrition in children aged 1 to 5 years within experimental and control groups.

To evaluate the efficacy of soya milk in addressing malnutrition in children aged 1 to 5 years within the experimental group.

To investigate the correlation between post-test scores of malnutrition levels in children aged 1 to 5 years and their demographic factors in both the experimental and control groups.

A pre-experimental design (one group pre-test versus post-test) was utilized to evaluate the research approach. The study's sample was selected using a non-randomized purposive sampling technique. The study sample consisted of 50 preschool children (ages 1-5). The study was carried out in an urban neighbourhood of Chennai.

The chosen urban area setup for the study was Anakaputhur, which is 5 km away from Sri Venkateshwaraa Medical College Hospital and Research Institute. Written assent & informed consent were obtained from the children as well as the parents maintaining the confidentiality.

**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

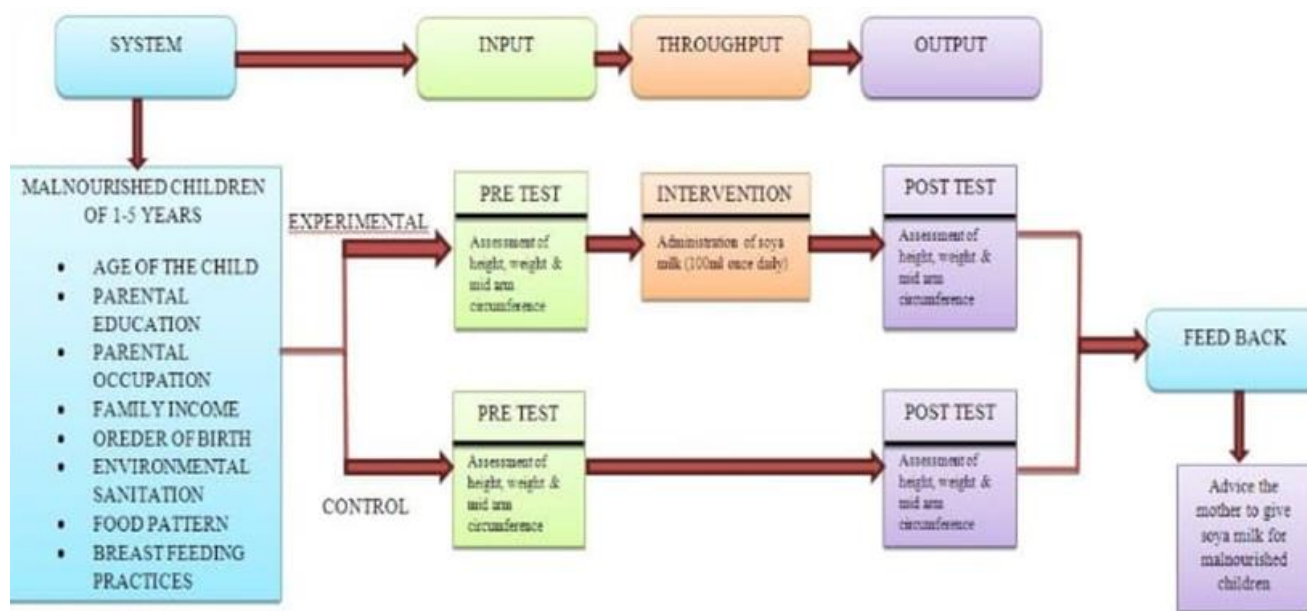
Mid arm circumference between 13.5 and 16 cm- Mild malnutrition

Mid arm circumference between 12.5 and 13.5 cm- Moderate malnutrition

Mid arm circumference of <12.4 cm-Severe malnutrition

**Soya Milk Preparation**

Soya milk is liquid diet, which is prepared daily by Soak 315gms of Soya beans in 2,500ml of water for overnight. Grind the soaked soya beans into paste. Add the soya beans paste into 2,500 ml of soaked water and stir it well. Heat the soya milk till boiling point. Take 100 ml of soya milk and add 15 gm of jiggery.100 ml of soya milk administered to the



**Figure 1 Schematic Representation of Conceptual Framework**

malnourished children once a day for 25 days which provides a calorie of 110, fat 1.8 gm, carbohydrate 6 gm, protein 4.6 gm, sodium 51 mg, potassium 118 mg and iron 1.8 mg. If 100 ml of soya milk is consumed regularly by the children, it will significantly improve [7].

**Inclusion Criteria**

The study includes

Children in the age group of 1-5 years.

Children with the degree of mild, moderate and severe malnutrition.

Parents and children who are willing to participate in the study.

**Exclusion Criteria**

The study excludes

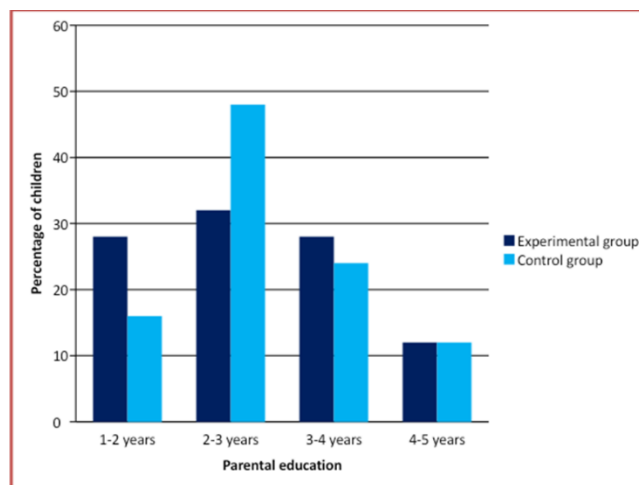
Children who are having chronic diseases.

Children with congenital anomalies.

**RESULT:**

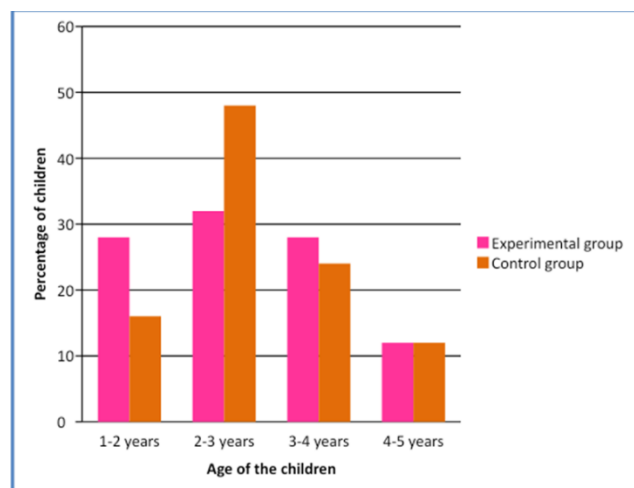
The result shows that demographic factors contribute to the prevalence of childhood malnutrition. Results showed a significant improvement in height, weight, and mid-arm circumference after the test compared to before. Hence, it was determined that giving malnourished youngsters soy milk helped them improve their nutritional condition and avoid future malnutrition.

percentage of 32 and lowest in the age of 4-5 years with percentage of 12 whereas in control group highest in the age of 2-3 years with the percentage of 48 and lowest in the age of 4-5 years with percentage of 12.



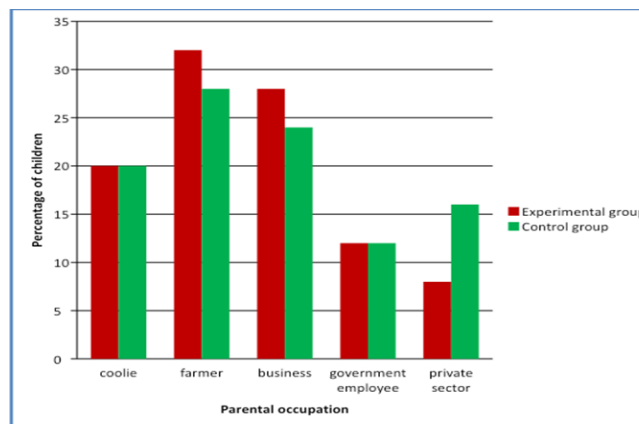
**Figure 3 Distribution Of the Children According to Parental Education**

The above **Figure 3** shows the distribution of parental education in the experimental group where the highest percentage of 36 had primary education and the lowest percentage of 8 were graduates whereas in the control group the highest percentage of 32 were illiterate and lowest percentage of 16 were graduates.



**Figure 2 Distribution of the Children According to Age**

The above **Figure 2** shows the distribution of children according to age in experimental group where highest in the age of 2-3 years with the

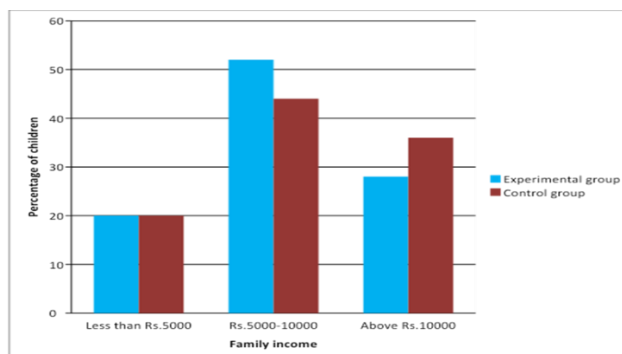


**Figure 4 Distribution of the Children According to Parental Occupation**

The above **Figure 4** shows the distribution of parental occupation in experimental group where highest percentage of 32 were farmer and lowest percentage of 8 were working in private sector whereas in control group highest percentage of 28 were farmer and lowest percentage of were government employee.

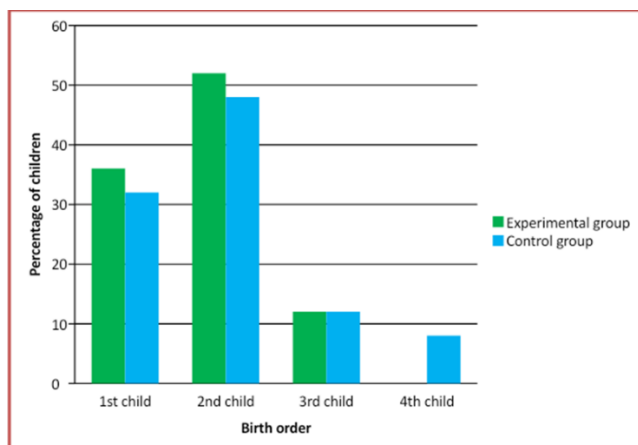
**Table 1 Distribution of Democratic Variable of the Children**

S.No	Demographic Variables	Experimental Group		Control Group	
		Frequency	Percentage	Frequency	Percentage
1	Age of the child (in years)				
	1-2	7	28	4	16
	2-3	8	32	12	48
	3-4	7	28	6	24
	4-5	3	12	3	12
2	Parental education				
	Illiterate	8	32	8	32
	Primary education	9	36	7	28
	Secondary education	6	24	6	24
3	Parental occupation				
	Coolie	5	20	5	20
	Farmer	8	32	7	28
	Business	7	28	6	24
	Government employee	3	12	3	12
4	Family income				
	Less than Rs.5000	5	20	5	20
	Rs.5000-Rs 10,000	13	52	11	44
	AboveRs.10,000	7	28	9	36
5	Order of birth				
	1 <sup>st</sup> child	9	36	8	32
	2 <sup>nd</sup> child	13	52	12	48
	3 <sup>rd</sup> child	3	12	3	12
	4 <sup>th</sup> child	0	0	2	8
6	Environmental sanitation				
	Proper	20	80	20	80
7	Type of food				
	Vegetarian	6	24	9	36
8	Breast feeding practices				
	Upto 6 months	7	28	12	48
	6 months-2 years	15	60	9	36
	Non-breast feeding	3	12	4	16

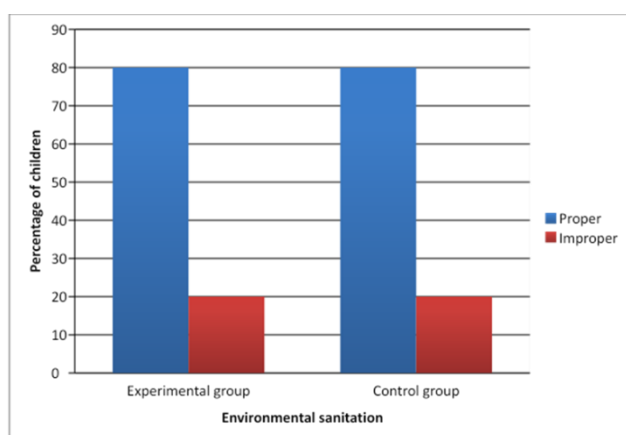
**Figure 5 Distribution of the Children According to Family income**

The above **Figure 5** shows the distribution of family income in experimental and control groups where the highest percentage of 52 and 44 had income between Rs.5000-10000 and lowest percentage of 20 in both groups had income less than Rs.5000.

The below **Figure 6** shows the distribution of birth order in experimental and control groups where the highest percentage of 52 and 48 were second child and lowest percentage of 0 and 8 were fourth child.

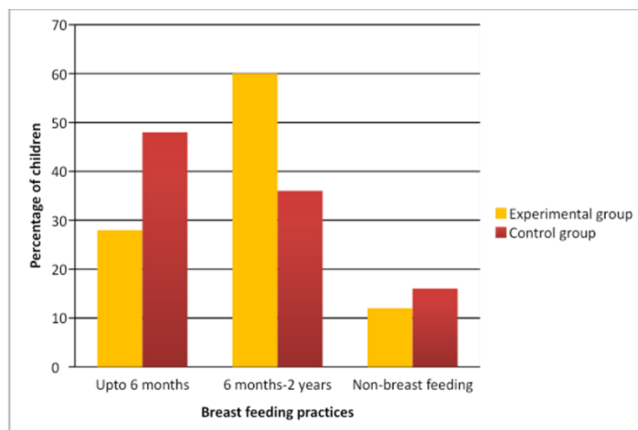


**Figure 6 Distribution of the Children According to Birth order**



**Figure 7 Distribution of the children According to Environmental Sanitation**

The above **Figure 7** shows the distribution of environmental sanitation in experimental and control groups where the highest of 80 percentage have proper facilities and lowest of 20 percent have improper facilities in both the groups.



**Figure 8 Distribution of the Children According to Breast Feeding Practices**

The above **Figure 8** shows the distribution of breast-feeding practises in experimental group where highest percentage of 60 had breast feeding between 6 months to 2 years and lowest percentage of 12 had undergone non -breast feeding whereas in control group highest percentage of 48 had breast feeding up to 6 months and lowest of 16 percentage had non-breast feeding

**DISCUSSION**

According to Bhatia ,V.,Puri ,S,,Swami. H.M study on the prevalence of PEM and some of the associated factors among children under the age of 6 year [4]. The overall prevalence of PEM was observed as 62.02% which was higher among boys (65.87%) as compared to girls (58.90%). The peak prevalence was found in the age group of 6-12 months. significant association between acute ailments (ARI,diarrhea) and PEM was observed (P<0.001)

The results of study done by Goel, N.K et al., Conducted a study on nutritional status of preschool children had similar results [10]. The overall prevalence of protein energy malnutrition was found to be 81.8%, while 31.8, 44.1, 5.7 and 0.2% of children had grades I, II, III and IV PEM, respectively. Age, sex and education had a significant association with PEM. In our present study the results showed that, at the p<0.01 level, there was no significant correlation with the demographic characteristics.

Othoo DA et al., study shows the supplementation of soya milk had significant improvements in growth and cognitive development in addition to reduction in clinical symptoms, morbidity & nutritional anaemia [12].

Similarly, study conducted by Bhutta Z A had estimated that 32% (178 million) of children who were under five years of aged were stunted. The corresponding global estimate of wasting was 10% (55 million children), of which 3.5% (19 million) were severely wasted [5].

According to the study done by Kurup P.J and Khandekar R et al., had identified in their study that the children with high risk of PEM using information on birth weight, birth order and history of PEM in sibling, this non-anthropometric method can be used as an additional tool for monitoring growth of children and formulates preventive interventions [11].

In the present study the distribution of birth order in experimental and control groups where the highest percentage of 52 and 48 were second child and lowest percentage of 0 and 8 were fourth child [8].

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 [16].

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].

According to UNICEF statistical data, 47% of all under five children in India are underweight (moderate to severe) and 16% show moderate to severe wasting whereas another 46% are moderate to severely stunted [15].

## CONCLUSION

According to the study's findings, undernourishment is still a major issue for children under the age of five. Stunting and underweight are more common forms of undernutrition than wasting in both urban slums and rural areas. Some factors that can affect a kid's nutritional condition include the mother's level of education, the child's sex, the order of birth, whether the infant is exclusively breastfed, the family's economic position, the kind of family, and the presence or absence of severe diarrhoea. The child's nutritional status will improve as a result of better maternal education. To raise the community's economic standing, measures are required.

Since soy milk is the least expensive source of protein and other nutrients, it is very efficient in preventing, maintaining, and healing malnutrition.

Furthermore, research has demonstrated that soya milk supplements enhance kids' general growth. Giving soya milk to malnourished youngsters resulted in weight gain, reducing malnutrition and increasing normal weights. Malnutrition severity was directly proportional to the amount per kilogram body weight.

## 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.

## Funding Support

The authors declare that they have no funding for this study.

## REFERENCES

- [1] Alasfoor D, Elsayed MK, Al Qasmi AM, Malankar P, Sheth M, Prakash N. Protein-energy malnutrition among preschool children in Oman: results of a national survey. *EMHJ-Eastern Mediterranean Health Journal*, 13 (5), 1022-1030, 2007. 2007.
- [2] Al-Hashem FH. The prevalence of malnutrition among high and low altitude preschool children of southwestern Saudi Arabia. *Saudi medical journal*. 2008 Jan 1;29(1):116-21.
- [3] Ayaya SO, Esamai FO, Rotich J, Olwambula AR. Socio-economic factors predisposing under five-year-old children to severe protein energy malnutrition at the Moi Teaching and Referral Hospital, Eldoret, Kenya. *East African Medical Journal*. 2004 Nov 2;81(8):415-21.
- [4] Bhatia V, Puri S, Swami HM, Gupta M, Singh G. Malnutrition among under-six children in Chandigarh: Scarcity in

- plenty. Journal of Clinical and Diagnostic Research. 2007 Dec 1;1(6):483-7.
- [5] Bhutta ZA. Micronutrient needs of malnourished children. Current Opinion in Clinical Nutrition & Metabolic Care. 2008 May 1;11(3):309-14.
- [6] Basavanthappa BT. Community health nursing. Jaypee Brothers Publishers; 2008 Oct 30.
- [7] de Oliveira JD, Luiz S, de Oliverira Netto N, Duarte GG. The nutritive value of soya milk and cow's milk in malnourished children: a comparative study. The Journal of Pediatrics. 1966 Oct 1;69(4):670-5.
- [8] Faruque AS, Ahmed AS, Ahmed T, Islam MM, Hossain MI, Roy SK, Alam N, Kabir I, Sack DA. Nutrition: basis for healthy children and mothers in Bangladesh. Journal of health, population, and nutrition. 2008 Sep;26(3):325.
- [9] García-Garro AJ, Gernández-Flores MG, Ramos-Ortega G. Management with soya of 1-4 years-old suffering malnutrition. Atencion Primaria. 2007 Feb 1;39(2):69-73.
- [10] Goel MK, Mishra R, Gaur DR, Das A. Nutrition surveillance in 1-6 years old children in urban slums of a city in northern India. Internet J Epidemiol. 2007;5(1):1-3.
- [11] Kurup PJ, Khandekar R. Low birth weight as a determinant of protein energy malnutrition in " 0-5 years" Omani children of South Batinah region, Oman. Saudi medical journal. 2004 Aug 1;25(8):1091-6.
- [12] Othoo DA, Ochola S, Kuria E, Kimiywe J. Impact of Spirulina corn soy blend on Iron deficient children aged 6–23 months in Ndhiwa Sub-County Kenya: a randomized controlled trial. BMC nutrition. 2021 Dec;7:1-2.
- [13] Sandhu BK, Fell JM, Beattie RM, Mitton SG, Wilson DC, Jenkins H. Guidelines for the management of inflammatory bowel disease in children in the United Kingdom. Journal of pediatric gastroenterology and nutrition. 2010 Feb 1;50:S1-3.
- [14] Tyndall JA, Kamai R, Changchangi D. Knowledge, attitudes and practices on exclusive breastfeeding in Adamawa, Nigeria. Am J Public Heal Res. 2016 May 31;4(3):112-9.
- [15] UNICEF.. The state of the world's children 2008: Child survival. Unicef; 2007.
- [16] World Health Organization, United Nations Children's Fund. Levels and trends in child malnutrition: key findings of the 2020 edition. UNICEF/WHO/World Bank Group joint child malnutrition estimates. World Health Organization; 2020 Mar 31.

Copyright: This is an open access article distributed under the terms of the Creative Commons Attribution-Noncommercial- Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

© 2024 IJRPS | [www.ijrps.com](http://www.ijrps.com)