

A Study of the Availability of Health Care Facilities with the Outcome of the Admitted Severe Acute Malnourished (SAM) Children, in the Nutrition Rehabilitation Center (NRC)

Priyanka Tripathi¹, Prof. Hari Shankar², Prof. Suneel Kumar Rao³,
Dr. Arun Kumar Dubey⁴

¹ Research Scholar (Home Science), Department of Community Medicine, Institute of Medical Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

² Professor, Department of Community Medicine Institute of Medical Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

³ Professor, Department of Pediatrics, Institute of Medical Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

⁴ Assistant Professor, Department of Community Medicine Institute of Medical Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

Email- ¹ tripathipriyanka137@gmail.com, ² hshankar.cmims@gmail.com,
⁴ arun.dubey@bhu.ac.in

ABSTRACT:

The aim and objective of this research study was to study of the association of availability of health care facilities with the outcome of the admitted Severe Acute Malnourished (SAM) children, in in Nutrition Rehabilitation Center (NRC). The exploratory as well as descriptive research design was used. The sample size of this study was 211. The normality test was performed using One-Sample Kolmogorov-Smirnov Test. Since the data was not normal, hence non-parametric test (Chi Square Test) was used for the association of availability of health care facilities with the outcome of the admitted Severe Acute Malnourished (SAM) children, The findings concluded that there was a significant association between working hand washing facilities, nails clean, mothers have a place to bathe, toys washable with discharge condition of SAM children in NRC.

Keywords: Nutritional Status; Severe Acute Malnourished (SAM); Nutrition Rehabilitation Center (NRC); One-Sample Kolmogorov-Smirnov Test; Chi Square Test.

INTRODUCTION:

Malnutrition continues to be a primary contributor to the morbidity and mortality of children all over the world. It is estimated that over 150 million children around the world suffer from malnutrition, which is a factor in 45% of all fatalities among infants. Infection or dehydration are typically the leading causes of death in malnutrition-related situations, and there are frequently no other recognized reasons of death in these scenarios. Some researchers have hypothesized that heart dysfunction, either directly or indirectly decompensating after

aggressive fluid resuscitation, might be associated with these deaths for which the cause has not been determined. Despite the widespread consensus that the heart size of malnourished children diminishes in direct proportion to their body mass, the findings on the cardiac function of these children have been inconsistent. Poor quality of care (QOC), in particular in countries with low and intermediate incomes, has been associated to an increase in mortality rates across all conditions. It is projected that underutilization of health services is responsible for an additional 3.6 million deaths over the world, while poor care quality is directly responsible for an additional 5.0 million deaths in low- and middle-income countries. In situations requiring humanitarian assistance, such as that which is present in the West Nile Region of Uganda, it may be very challenging to achieve a high QOC. According to a recent study from the United Nations High Commissioner for Refugees, Uganda is now the third-largest refugee-hosting nation in the world with a total population of 1.36 million refugees. This is because more than a million refugees fled to Uganda in 2017. In order to provide a more comprehensive evaluation of the level of care that is offered to malnourished children in the West Nile Region, the current research was designed to include a larger and more geographically representative sample of facilities. These were to include facilities of varying levels that offered both inpatient and outpatient care, as well as facilities that were dedicated to both refugees and the local community. The purpose of the study was to investigate each organization's case management, data quality, overall service competence to deliver high-quality care, and health outcomes. In addition to that, it intended to study health facility-level characteristics that are connected to greater rates of recovery. The evidence that is previously known on the QOC for children in LMICs (low- and middle-income countries), particularly those who are refugees, who are suffering from severe acute malnutrition has been strengthened by this study. Acute diarrhoea is one of the primary causes of morbidity and mortality in children, particularly in countries that are still developing. The enterotoxigenic escherichia coli bacteria and the rotavirus are two of the most common causes of this condition. Children in undeveloped nations have epidemics of acute diarrhoea on average 2.2 times each year, resulting in the deaths of 1.4 million individuals. Inadequate water sources, poor sanitation, crowded living situations, and malnutrition are some of the primary factors that contribute to the spread of diarrheal diseases and the severity of their symptoms. The International Centre for Diarrhoeal Disease Research in Bangladesh is in charge of running the Dhaka Hospital, which provides treatment for more than 110,000 patients suffering from diarrheal illness each year. Children in underdeveloped countries still face substantial health challenges, like diarrhea and starvation, on a regular basis. It is imperative that diarrhoea be avoided at all costs, particularly in regions where economic challenges and restricted access to medical care make prompt treatment difficult. Acute diarrhea causes a reduction in nutrition absorption that is around thirty percent lower than normal. The excessive loss of nutrients from the digestive tract through feces is the primary contributor to malnutrition. These nutrients include nitrogen, fat, and carbs. Constipation can cause symptoms such as nausea, vomiting, anorexia, and stomach pain, all of which contribute to a decrease in the

amount of nutrients that are absorbed by the body. Children regularly lose body weight as a result of passing stools that include nutrients, electrolytes, and water. This contributes to the condition known as diarrhea. Additionally, growth comes to a halt during bouts of diarrhoea as a direct result of anorexia, which leads to a decreased intake of food. The objectives of this study are as follows:

- To find the association between the working hand washing facilities and discharge condition of SAM children in NRC.
- To find the association between the nails clean and discharge condition of SAM children in NRC.
- To find the association between mothers have a place to bathe and discharge condition of SAM children in NRC.
- To find the association between toys washable and discharge condition of SAM children in NRC.

The hypotheses of this study are as follows:

- H₀₁: There is no significant association between the working hand washing facilities and discharge condition of SAM children in NRC.
- H₀₂: There is no significant association between the nails clean and discharge condition of SAM children in NRC.
- H₀₃: There is no significant association between mothers have a place to bathe and discharge condition of SAM children in NRC.
- H₀₄: There is no significant association between toys washable and discharge condition of SAM children in NRC.

LITERATURE REVIEW:

Previous authors worked on the availability of health care facilities, and some of them have found the following results: Breastfeeding is a significant source of many nutrients, but it must be supplemented with foods from animals and foods that have been fortified. Even while we are aware of the nutrients that are necessary, the foods that should ideally be used, and the antinutrient contents that should be reduced, it might be difficult to select foods that are efficient, accessible, acceptable, and economical. (Pee and Bloem, 2009)¹ To address VA (Vitamin A) deficiency and related health consequences in the treatment of children with SAM, we advise investigating additional low-dose protocols and techniques outside of VAS,

¹ Pee, S. De, & Bloem, M. W. (2009). Current and potential role of specially formulated foods and food supplements for preventing malnutrition among 6-23 months old and treating moderate malnutrition among 6-59 months old children. *Food and Nutrition Bulletin*, 30(3), S434–S463.

such as the use of carotenoids or RUTF (ready-to-use therapeutic food) therapies. (Iannotti, Trehan and Manary, 2013)² In the context of SAM, the brief discusses antimicrobials, antipyretics, tuberculosis, HIV (human immunodeficiency virus), malaria, pneumonia, diarrhoea, sepsis, measles, urinary tract infection, nosocomial infections, soil-transmitted helminths, skin infections, and pharmacology. The brief is organised into clinical question sets, which we think will maximise its relevance to current practise. (Jones and Berkley, 2014)³ The management of MAM (moderate acute malnutrition) would benefit from a better understanding of the mechanisms limiting the effectiveness of RUTF to promote growth in children with SAM; the physiology of SAM and MAM children is not fundamentally different, so findings from children with SAM are also applicable to children with MAM. (Briend *et al.*, 2015)⁴ If bacteraemia is not recognised, patients may not respond well to routine penicillin/ampicillin and gentamicin regimens. In order to effectively treat SAM children who, have pneumonia, it is crucial to identify the clinical traits and common bacteria producing bacteraemia as well as their resistance to various antibiotics. The clinical hazards of bacteraemia in SAM children with pneumonia are also poorly understood. (Chisti *et al.*, 2015)⁵ Interviews with 35 caregivers and 20 informants chosen through deliberate sampling, as well as an examination of trial financial papers, were used to obtain data. The total treatment cost for 399 children per arm was \$36,550 with the conventional dose and \$30,411 with the lower dose, resulting in a \$6,140 (16.8 %) cost savings (\$15.43 saved per child treated). (N'Diaye *et al.*, 2021)⁶ Interviews with 35 caregivers and 20 informants chosen through deliberate sampling, as well as an examination of trial financial papers, were used to obtain data. The total treatment cost for 399 children per arm was \$36,550 with the conventional dose and \$30,411 with the lower dose, resulting in a \$6,140 (16.8 %) cost savings (\$15.43 saved per child treated). (N'Diaye *et al.*, 2021)⁷ Rethinking the SAM care protocol and the discharge criteria is necessary given that SAM children with oedema and those who were not treated during release from the initial stay had a high risk of relapsing. It

² Iannotti, L. L., Trehan, I., & Manary, M. J. (2013). Review of the safety and efficacy of vitamin A supplementation in the treatment of children with severe acute malnutrition. *Nutrition Journal*, 12(125). <https://doi.org/10.1186/1475-2891-12-125>

³ Jones, K. D. J., & Berkley, J. A. (2014). Severe acute malnutrition and infection. *Paediatrics and International Child Health*, 34(1), S1–S29. <https://doi.org/10.1179/2046904714Z.000000000218>

⁴ Briend, A., Akomo, P., Bahwere, P., De Pee, S., Dibari, F., Golden, M. H., Manary, M., & Ryan, K. (2015). Developing food supplements for moderately malnourished children: Lessons learned from ready-to-use therapeutic foods. *Food and Nutrition Bulletin*, 36(1), S53–S58. <https://doi.org/10.1177/15648265150361S109>

⁵ Chisti, M. J., Salam, M. A., Ahmed, T., Shahid, A. S. M. S. B., SHAHUNJA, K. ., FARUQUE, A. S. ., BARDHAN, P. ., HOSSAIN, M. ., ISLAM, M. ., DAS, S. ., HUQ, S., SHARIN, L., HUQ, E., CHOUDHURY, F., & ASHRAF, H. (2015). SHORT REPORT Lack of BCG vaccination and other risk factors for bacteraemia in severely malnourished children with pneumonia. *Cambridge University Press* 2014, 143, 799–803. <https://doi.org/10.1017/S0950268814001368>

⁶ N'Diaye, D. S., Wassonguema, B., Nikièma, V., Kangas, S. T., & Salpéteur, C. (2021). Economic evaluation of a reduced dosage of ready-to-use therapeutic foods to treat uncomplicated severe acute malnourished children aged 6–59 months in Burkina Faso. *Maternal and Child Nutrition*, 17(3), 1–12. <https://doi.org/10.1111/mcn.13118>

⁷ N'Diaye, D. S., Wassonguema, B., Nikièma, V., Kangas, S. T., & Salpéteur, C. (2021). Economic evaluation of a reduced dosage of ready-to-use therapeutic foods to treat uncomplicated severe acute malnourished children aged 6–59 months in Burkina Faso. *Maternal and Child Nutrition*, 17(3), 1–12. <https://doi.org/10.1111/mcn.13118>

also indicates the requirement for rigorous oedema monitoring prior to discharge and follow-up of SAM cases in order to prevent defaulters and individuals that have only received partial treatment. (Lambebo, Tamiru and Belachew, 2021)⁸ In another study, the critically undernourished infants who passed away required a change in antibiotics more frequently, necessitating the administration of the fourth-line antibiotics, such as imipenem or meropenem, then a corticosteroid, reduced serum calcium is positively associated with deaths in septic shock, and there is no difference between early, or within 3 hours of diagnosing septic shock, and late, or after 3 hours, in severely malnourished under-five children having septic shock. When the septic shock could not be managed with dopamine alone, their chance of mortality increased significantly. (Chowdhury *et al.*, 2022)⁹

METHODOLOGIES:

3.1 Data gathering process

The primary data was collected from the District Hospital Balrampur, Lucknow, Uttar Pradesh. 211 SAM children were examined in this study.

3.2 Measures

Four nominal variables as working hand washing facilities in the ward, nails clean, Mothers have a place to bathe and Toys washable were used in this study. The association other nominal variable was outcome (discharge condition) of SAM children in NRC.

3.3 Analysis Models

In this research study, the chi-square test was used to check the association between nominal scale variables as, working hand washing facilities in the ward, nails clean, Mothers have a place to bathe and toys washable. Before applying the chi square test, the normality condition was checked using One-Sample Kolmogorov-Smirnov Test.

⁸ Lambebo, A., Tamiru, D., & Belachew, T. (2021). Time to relapse of severe acute malnutrition and risk factors among under-five children treated in the health posts of Hadiya Zone, Southern Ethiopia. *Journal of Nutritional Science*, 10, 1–6. <https://doi.org/10.1017/jns.2021.99>

⁹ Chowdhury, V. P., Sarmin, M., Kamal, M., Islam, S., Siddik, M. A., Afroze, F., Rahman, M. W., Ahmed, T., & Chisti, M. J. (2022). Factors associated with mortality in severely malnourished hospitalized children who developed septic shock. *Journal of Infection in Developing Countries*, 16(2), 339–345. <https://doi.org/10.3855/jidc.15135>

RESULTS:

Table 1: Chi-Square Tests- Working hand washing facilities in the ward * Outcome (Discharge Condition)

	Value	df	Asymptotic Significance (2-sided)	Hypothesis Result
Pearson Chi-Square	60.563 ^a	12	.000	H ₀ Rejected
Likelihood Ratio	14.854	12	.250	
N of Valid Cases	221			

a. 16 cells (76.2%) have expected count less than 5. The minimum expected count is .00.

Source: SPSS23.0

According to the Chi-Square Tests table 1, it is clear that the sig value is (0.000) which is less than 0.05, hence it is safe to reject first null hypothesis, therefore it can be concluded that there was a significant association between working hand washing facilities in the ward and outcome.

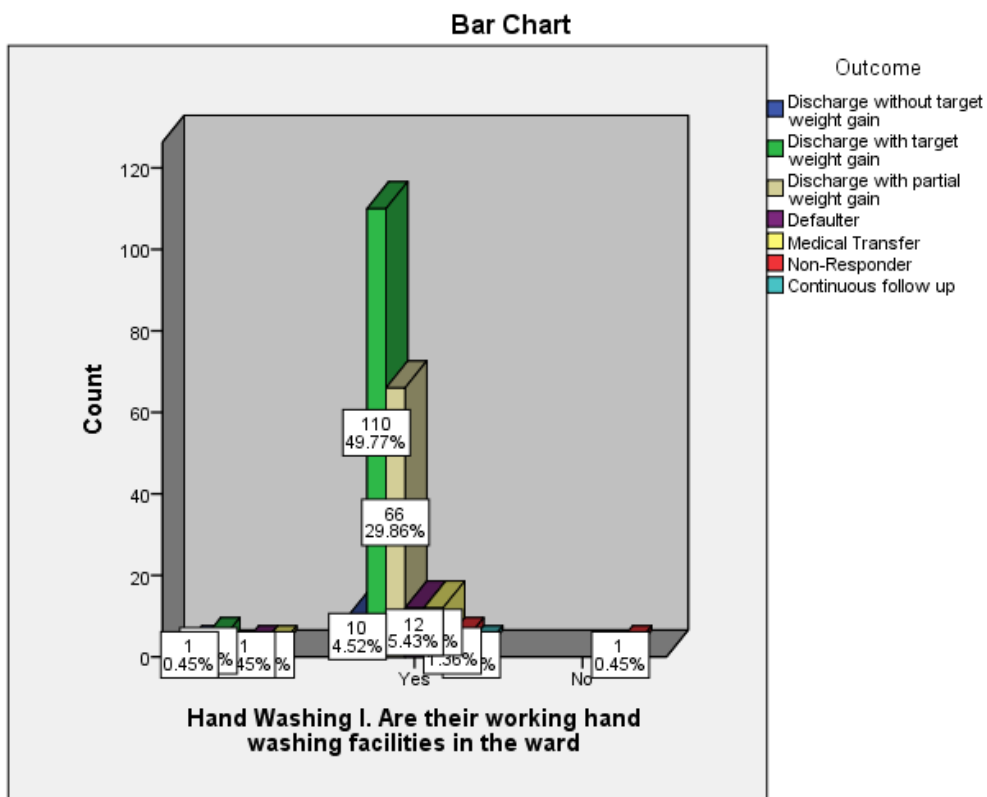


Figure 1: Working hand washing facilities in the ward * Outcome (Discharge Condition)

Source: SPSS23.0

According to the cluster bar chart 1, it is clear that maximum 49.77% SAM children were discharged with target weight gain whose family were concerned about the working hand washing facilities in the ward.

Table 2: Chi-Square Tests- Nails clean * Outcome (Discharge Condition)

	Value	df	Asymptotic Significance (2-sided)	Hypothesis Result
Pearson Chi-Square	44.149 ^a	12	.000	H ₀ Rejected
Likelihood Ratio	27.148	12	.007	
N of Valid Cases	221			
a. 16 cells (76.2%) have expected count less than 5. The minimum expected count is .03.				

Source: SPSS23.0

According to the Chi-Square Tests table 2, it is clear that the sig value is (0.000) which is less than 0.05, hence it is safe to reject second null hypothesis, therefore it can be concluded that there was a significant association between their nails clean and outcome.

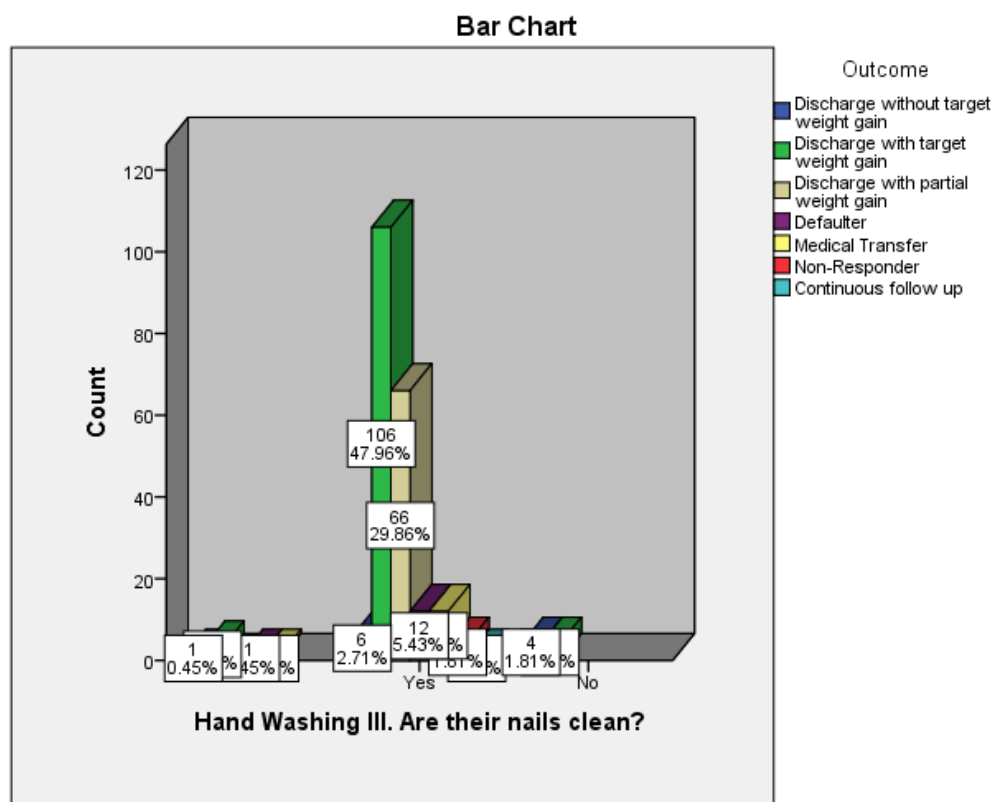


Figure 2: Nails clean * Outcome (Discharge Condition)

Source: SPSS23.0

According to the cluster bar chart 2, it is clear that maximum 42.53% SAM children were discharged with target weight gain whose family were concerned about their nails clean.

Table 3: Chi-Square Tests- Mothers have a place to bathe * Outcome (Discharge Condition)

	Value	df	Asymptotic Significance (2-sided)	Hypothesis Result
Pearson Chi-Square	29.280 ^a	12	.004	H0 ₃ Rejected
Likelihood Ratio	15.814	12	.200	
N of Valid Cases	221			
a. 16 cells (76.2%) have expected count less than 5. The minimum expected count is .01.				

Source: SPSS23.0

According to the Chi-Square Tests table 3, it is clear that the sig value is (0.000) which is less than 0.05, hence it is safe to reject third null hypothesis, therefore it can be concluded that there was a significant association between mothers have a place to bathe and outcome.

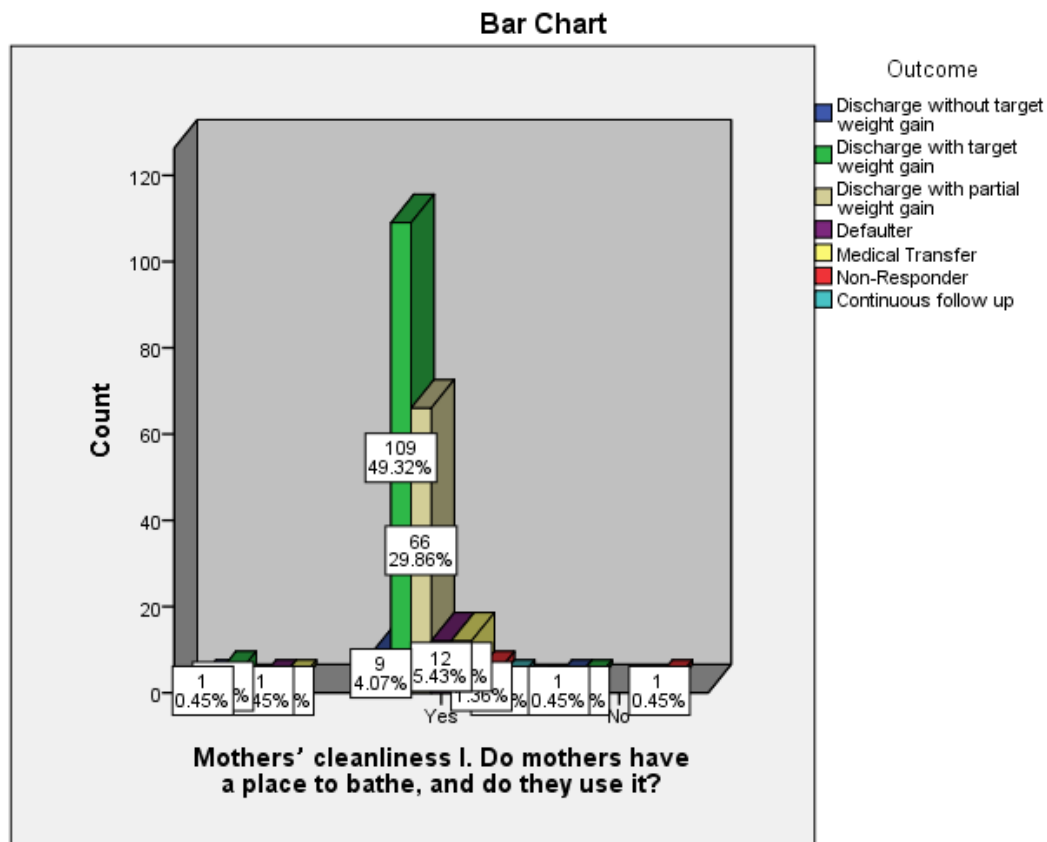


Figure 3: Mothers have a place to bathe * Outcome (Discharge Condition)

Source: SPSS23.0

According to the cluster bar chart 3, it is clear that maximum 49.32% SAM children were discharged with target weight gain whose family were concerned about the mothers have a place to bathe.

Table 4: Chi-Square Tests- Toys washable * Outcome (Discharge Condition)

	Value	df	Asymptotic Significance (2-sided)	Hypothesis Result
Pearson Chi-Square	54.286 ^a	12	.000	H0 ₄ Rejected
Likelihood Ratio	19.042	12	.088	
N of Valid Cases	221			
a. 16 cells (76.2%) have expected count less than 5. The minimum expected count is .02.				

Source: SPSS23.0

According to the Chi-Square Tests table 4, it is clear that the sig value is (0.000) which is less than 0.05, hence it is safe to reject fourth null hypothesis, therefore it can be concluded that there was a significant association between toys washed regularly and outcome.

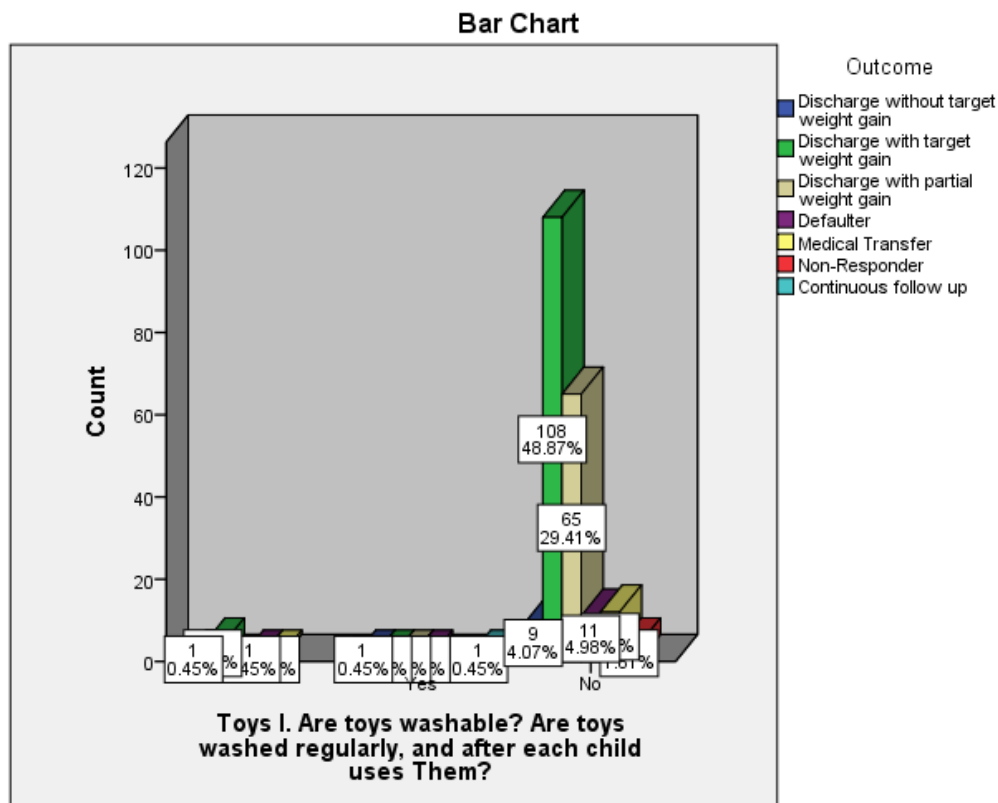


Figure 4: Toys washable * Outcome (Discharge Condition)

Source: SPSS23.0

According to the cross tabs and cluster bar chart 4, it is clear that maximum 48.87% SAM children were discharged with target weight gain whose family were concerned about the toys washed regularly, and after each child uses.

CONCLUSION:

Based on the results, it was finally concluded that 49.77% SAM children were discharged with target weight gain whose family were concerned about the working hand washing facilities in the ward. 42.53% SAM children were discharged with target weight gain whose family were concerned about their nails clean. 49.32% SAM children were discharged with target weight gain whose family were concerned about the mothers have a place to bathe. 48.87% SAM children were discharged with target weight gain whose family were concerned about the toys washed regularly, and after each child uses.

DECLARATION:

Conflict of interest

The authors declare that they have no competing interests.

Acknowledgements

The authors thank all the medical staff of the NRC, Uttar Pradesh, India, who participated in this study voluntarily. The authors are also grateful to District Hospital Balrampur, Lucknow, Uttar Pradesh for providing the infrastructural support & help for this study.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES:

1. Briend, A. *et al.* (2015) 'Developing food supplements for moderately malnourished children: Lessons learned from ready-to-use therapeutic foods', *Food and Nutrition Bulletin*, 36(1), pp. S53–S58. doi: 10.1177/15648265150361S109.
2. Chisti, M. J. *et al.* (2015) 'SHORT REPORT Lack of BCG vaccination and other risk factors for bacteraemia in severely malnourished children with pneumonia', *Cambridge University Press 2014*, 143, pp. 799–803. doi: 10.1017/S0950268814001368.
3. Chowdhury, V. P. *et al.* (2022) 'Factors associated with mortality in severely malnourished hospitalized children who developed septic shock', *Journal of Infection in Developing Countries*, 16(2), pp. 339–345. doi: 10.3855/jidc.15135.

4. Iannotti, L. L., Trehan, I. and Manary, M. J. (2013) 'Review of the safety and efficacy of vitamin A supplementation in the treatment of children with severe acute malnutrition', *Nutrition Journal*, 12(125). doi: 10.1186/1475-2891-12-125.
5. Jones, K. D. J. and Berkley, J. A. (2014) 'Severe acute malnutrition and infection', *Paediatrics and International Child Health*, 34(1), pp. S1–S29. doi: 10.1179/2046904714Z.000000000218.
6. Lambebo, A., Tamiru, D. and Belachew, T. (2021) 'Time to relapse of severe acute malnutrition and risk factors among under-five children treated in the health posts of Hadiya Zone, Southern Ethiopia', *Journal of Nutritional Science*, 10, pp. 1–6. doi: 10.1017/jns.2021.99.
7. N'Diaye, D. S. *et al.* (2021) 'Economic evaluation of a reduced dosage of ready-to-use therapeutic foods to treat uncomplicated severe acute malnourished children aged 6–59 months in Burkina Faso', *Maternal and Child Nutrition*, 17(3), pp. 1–12. doi: 10.1111/mcn.13118.
8. Pee, S. De and Bloem, M. W. (2009) 'Current and potential role of specially formulated foods and food supplements for preventing malnutrition among 6-23 months old and treating moderate malnutrition among 6-59 months old children', *Food and Nutrition Bulletin*, 30(3), pp. S434–S463.