International Journal of Community Medicine and Public Health
Bhatt DP et al. Int J Community Med Public Health. 2023 Aug;10(8):2878-2883
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20232382

Original Research Article

A compliance study of baal vita supplement to children in Sindhupalchowk District, Nepal

Deependra Prasad Bhatt[1], Amrit Bist[2]*, Krishna Prasad Lamsal[3], Prakash Chandra Joshi[4]

[1]Nepali Technical Assistance Group, Kathmandu, Nepal
[2]School of Public Health, Patan Academy of Health Sciences, Lalitpur, Nepal
[3]Nutritionist, Nepali Technical Assistance Group, Kathmandu, Nepal
[4]James P. Grant School of Public Health, BRAC University, Dhaka, Bangladesh

Received: 24 May 2023
Revised: 04 July 2023
Accepted: 05 July 2023

***Correspondence:**
Amrit Bist,
E-mail: amritbist122@gmail.com

ABSTRACT

Background: Micronutrient deficiencies are widespread and have serious health implications, particularly for women and children globally. In Nepal, the government is tackling this issue by providing MNP/Baal Vita supplements to children aged 6-23 months, alongside promoting community-based infant and young child feeding (IYCF). This strategy aims to combat anaemia and micronutrient deficiencies in children under 2 years old. The government's protocol indicates that each child in this age group should consume a total of 180 sachets, 80% consumption of total sachets was taken reference for compliance in this study.
Methods: A community-based cross-sectional study using a structured questionnaire was carried out among 198 participants. Simple random sampling was used for selecting a sample. Excel and SPSS were being used for data coding, decoding, and statistical analysis.
Results: Assessment of knowledge revealed that the majority (60.1%) of the participants had adequate knowledge regarding Baal Vita. The findings showed 51% of the respondents had Baal Vita compliance, as they had consumed at least 80% of the total sachets as per protocol. Sex of children and occupation of mothers are not associated with the compliance of Baal Vita, but education of mothers and ethnic groups are associated with its compliance.
Conclusions: The level of knowledge and compliance rate of Baal Vita in Sindhupalchowk district were not satisfactory. It is suggested that improving knowledge level with counselling, accessibility, availability, and change the perception towards the taste of powder is essential to improving compliance with Baal Vita.

Keywords: Baal vita, Children, Compliance, Knowledge, MNP, Supplement

INTRODUCTION

Good nutrition is the solid rock of child survival, health and well development. Well-nourished children are enhanced able to grow and learn, to participate in and contribute to their communities. But, until now millions of children worldwide suffering from malnutrition, reality is blunt. All the developing countries including Nepal are facing the problem of high infant and child mortality, making utmost effort to decline the infant and child mortality rate. The under-five mortality rate of Nepal is 39, infant mortality rate is 32 and the neonatal mortality rate is 21 per thousand live births (NDHS, 2016). Malnutrition among young children is becoming a major public health concern in low-income countries like Nepal where under nutrition remains one of the primary causes of ill health. In Nepal, the nutritional status of mothers and children under five is very poor. Nepal Demographic and Health Survey (NDHS 2016) shows that young children are suffering from high rates of chronic malnutrition; 37% of children less than 5 years of age were stunted (height-for-age <-2

standard deviations (SD), 27% were underweight (weight-for-age <-2 SD), and 10% were wasted (weight-for-height <-2 SD).[1]

Micronutrient deficiencies are common worldwide and many individuals, especially women and children, suffer from the serious and widespread negative health consequences. Decreases in learning capacity and work productivity may severely lower income for the individual, family and country. Vitamin A and zinc deficiencies come second as underlying causes of the disease burden. Iron and iodine deficiencies appear to carry a small disease burden for children but they impair cognitive development. Anemia is a condition that is marked by low levels of hemoglobin in the blood. Iron is a key component of hemoglobin, and iron deficiency is estimated to be responsible for half of all anaemia globally. According to NDHS 2016, In Nepal 41% of women are anemic, with 34% mildly anemic, 7% moderately anemic, and less than 1% severely anemic. Among Children from 6 to 59 months, NDHS 2016 shows that 53% are anemic. To overcome micronutrient deficiencies Micronutrient Supplementation plays a crucial role for developing countries which is a home-based fortification intervention by Government of Nepal. The government has also made strategy to overcome micronutrient deficiency and implemented many nutritional intervention programs. One of them is Micronutrient Powder (MNP) or "Baal Vita" program supplementation because micronutrient deficiency is a major contributor to childhood morbidity and mortality.

Government of Nepal is supplementing MNP/Baal Vita to children aged 6-23 months by linking it with the community-based promotion of Infant and Young Child Feeding (IYCF) as one of the strategies to address anemia among children under 2 years of age. In 2007, the National Nutrition Priority Workshop endorsed the piloting of sprinkle supplementation as a preventive measure. In June 2009, MoH piloted the home fortification of complementary food with micronutrient powder (MNP) Baal vita in six districts integrated with the Community IYCF Programme. The promotion of MNP is linked with improving complementary feeding.[2] Micronutrient powder (MNP) is sachets of 15 different vitamins and minerals that are mixed into semi-solid food right before eating. The World Health Organization recommends home fortification with MNP for children 6-23 months of age to improve anaemia and iron status (WHO, 2011). As of 2013, more than 40 countries were implementing preventive MNP interventions to improve anaemia and micronutrient status (UNICEF 2017). The composition of Baal vita is Vitamin A (400 mcg), Thiamine (0.5 mg), Riboflavin (0.5 mg), Pyridoxin (0.5 mg), Cynacobalmin (0.9 mcg), Vitamin C (30 mg), Vitamin D3 (5 mcg), Vitamin E (5 mg), Folic acid (150 mcg), Niacin (6 mg), Copper- Cupric gluconate (0.56 mg), Iodine, Potassium iodide (90 mcg), Iron-Ferrous Fumarate (1010 mg), Zinc (4.1 mg), Selenium (17 mcg). It is started from 6 months of age; one sachet is given daily for 60 days. When the child reaches 8 months then there is the gap of 4 months, similarly it is started again after 12 months of age for 60 days, then again there is 4 months gap, when the child reaches 18 months of age then again 60 packets are provided. The main objective of this study is to assess the compliance of Baal vita supplements to the children aged 6-23 months in Sindhupalchowk district of Nepal.

METHODS

This is a community based cross-sectional study conducted in Sindhupalchowk district of Nepal using a structured questionnaire and measurement of weight, height and MUAC among mothers and caregivers whose children aged from 6-23 Months were taken as study population. Simple random sampling was used for selecting a sample. The sample size was 198 which was calculated using the formula

$$n = z2pq/d2$$

Where prevalence is taken as 50% at 95% confidence interval. The study was conducted from September 2021 to June 2022. The mothers or caregivers of children aged 6-23 months were included in the study whereas those unwilling to respond were excluded.

The information collected from the subjects was consolidated systematically and then transferred scientifically into master sheets and analyzed by using different statistical tools. Prior to analysis the data was screened and errors, if any, corrected. Excel and SPSS were being used to data coding, decoding and analysis of data. Descriptive statistics and chi-square test were used.

RESULTS

The age distribution of the children was divided into 3 categories: 6-11 months, 12-17 months, and 18-23 months. 60.6% of mothers were aged 20-29 with primary education and an agriculture profession. 54.5% of children were from Janajati backgrounds, and 85.4% were from nuclear families. Forty-two respondents (42%) are pregnant mothers, and 60 (58%) are postnatal. There was no more difference between males and females; 52% of children were male and 48% were female. Most mothers, about 42.4%, have primary education, and only 13.6% are not formally educated (Table 1).

In this study, the wasting rate was 8.1%, the stunting rate was 31.8%, the overweight rate was 3.0%, and the obesity rate was 1.0%. Based on MUAC, 7.1% of children with moderate acute malnutrition and 1.5% with severe acute malnutrition. None of the children were presented with oedema. Children among those surveyed were found to be overweight and obese, with 3.0% being overweight and 1.0% being obese (Table 2). The level of knowledge is classified in two parts as adequate and inadequate by Liker's scale.

Table 1: Socio-demographic characteristics of the respondents.

Characteristics	N	%
Age of mothers		
15-19	43	21.7
20-24	71	35.9
25-29	49	24.7
30-34	26	13.1
35 & above	9	4.5
Educational status of mothers		
No formal education/signed only	47	23.7
Primary	84	42.4
Secondary	56	28.3
Intermediate or above	11	5.6
Ethnic group		
Brahman	22	11.1
Chettri	27	13.6
Dalit	41	20.7
Janjati	108	54.5
Occupation of mothers		
Housewife	71	35.9
Service	6	3.0
Agriculture	102	51.5
Business	11	5.5
Foreign	8	4.0
Type of family		
Joint	29	14.6
Nuclear	169	85.4
Age of children		
6-11	77	38.9
12-17	65	32.8
18-23	56	28.3
Sex of child		
Male	103	52.0
Female	95	48.0
Birth order of child		
1st	79	39.9
2nd	86	43.4
3rd or more	33	16.7

The mean value is calculated, and those who gave the right answer with a mean value greater than or equal to 7 are categorized as respondents having adequate knowledge, and those who gave the right answer below that 7 are categorized as respondents having inadequate knowledge (Table 3). This study found that knowledge about Baal Vita, its doses, and its advantages is above 50%. The table illustrates the knowledge of mothers and caregivers regarding Baal Vita. The above table also illustrates that the major source of information about Baal Vita is FCHV (48.0%), and 28.8% are health workers. Most children got Baal Vita from FCHV, and only 25.0% received Baal Vita from health workers. Locks et al.'s study found that counselling by health workers and FCHVs and hearing MNP radio messages were independently associated with MNP coverage, and it also showed that counselling from FCHVs had the strongest association with maternal MNP knowledge.

Table 2: Nutritional status of children (n=198).

Indicators	N (%)
Nutritional status of children (height for age)	
Normal	135 (68.2)
Moderately stunted	43 (21.7)
Severely stunted	20 (10.1)
Nutritional status of children (weight for height)	
Normal	174 (87.9)
Moderately wasted	13 (6.6)
Severely wasted	3 (1.5)
Overweight	6 (3.0)
Obesity	2 (1.0)
Nutritional status of children on basis of MUAC	
Normal	181 (90.4)
Moderate acute malnutrition	14 (7.1)
Severe acute malnutrition	3 (1.5)
Bilateral pitting odema	
Absence	198 (100)
Presence	0 (0)

Table 3: Knowledge about Baal Vita.

Characteristics	N	%
Knowledge about baal vita		
Adequate	119	60.1
Inadequate	79	39.9
Knowledge about dose of baal vita		
Right	107	54.0
Wrong	91	45.9
Knowledge about the advantages of baal vita		
Adequate	103	52.0
Inadequate	96	48.0
Knowledge about composition of baal vita		
Adequate	102	51.5
Inadequate	96	48.5
Source of information about baal vita		
Mass Media	25	12.6
Health Worker	57	28.8
FCHV	95	48.0
Friends & Relatives	21	10.6
Motivator for feeding baal vita		
Health Worker	37	18.7
FCHV	103	52.0
Family members	42	21.2
Friends & relatives	16	8.1
Sources of receiving baal vita		
Health worker	47	25.0
FCHV	141	75.0

Also, this study found that the FCHV and health workers played a major role in the compliance of Baal Vita.

This research showed that there is only 51% compliance with Baal Vita, whereas 49.0% of the total population of children is non-compliance with Baal Vita feeding (Table 4).

Table 4: Compliance of Baal Vita (n=198).

Compliance of Baal Vita (based on observation of no. of sachet)		N (%)
Indicator	**Level**	
Yes	80% & Above 80%	101 (51)
No	Below 80 %	97 (49)

This study about Baal Vita compliance in Sindhupalchok district showed that most respondents answered that compliance is due to free availability and proper counselling by FCHV. This study showed that the majority of 33.0% of respondents answered that the reason for non-compliance is due to preconceptions towards the taste of Baal vita, which is not liked by children; 17.5% answered due to fear of side effects; 26.8% answered due to a lack of proper knowledge; and 11.3% also answered due to a lack of proper availability. Only 6.1% and 5.2% answered due to forgetfulness and the child being healthy without Baal Vita, respectively (Table 5).

Table 5: Reason for compliance and non-compliance of Baal Vita (n=1010).

Indicato	N (%)
Reason for compliance of baal vita	
Knowing advantages of baal vita	17 (16.8)
Free availability	33 (32.7)
Family member support	11 (10.9)
Proper counselling by fchv	31 (30.7)
Proper counselling by health worker	9 (8.9)
Reason for non-compliance of baal vita	
Lack of knowledge	26 (26.8)
Fear of negative consequences	17 (17.5)
Perception of dislike of taste by children	32 (33.0)
Availability	11 (11.3)
Forgetfulness	6 (6.1)
Healthy without baal vita	5 (5.2)

The education of respondents and compliance with Baal vita are found to be significantly associated. This study also showed that in the Brahaman family, there is high (81.8%) compliance, and only 36.1% of the Janajati family has compliance with Baal Vita. In context of sex, male users were slightly higher than female and no significant with occupation of mother (Table 6).

DISCUSSION

The main aim of this study was to assess the knowledge and compliance of Baal vita in Sindhupalchowk district. The study observed that most of the respondents were Janajati by ethnicity. These findings are concise in terms of the ethnicity-wise distribution of the population of Sindhupalchok. More than three-quarters of respondents were in the 20-29 age group. The present study showed that many children (68.2%) were normal in height for their age, but around one third (31.8%) had less height than their normal height. In respect of weight for height, most of the children (87.9%) were normal, 6.6% were moderately impaired, and 1.5% were severely impaired. Similarly, 3.0% of children were overweight, and 1.0% were obese. Almost similar findings were observed in the NDHS (2016): 36.0% of children under 5 are stunted and 10.0% are wasting in Nepal.[1] The present study showed a high prevalence of wasting and stunting compared to a few studies; this may be due to the Himalayan district as well as hard-to-reach areas. One third of the total (33.0%) reported children do not like the taste; 26.80 percent reported a problem with proper knowledge of Baal Vita; and 17.5 percent reported that they fear the side effects of Baal Vita. Availability is another problem; in this study, 11.3% reported no availability of Baal Vita. The present study showed that only 49% were exclusively breastfed, which was found to be less than the NDHS (2016), and it may be due to 16% not answering clearly. Also, only 87.9% have knowledge regarding Sarbottam Pitho, and 50.5% answered correctly about the method of Sarbottam Pitho preparation. The study also found that consumption of milk and milk products, green leafy vegetables, and fruits among children is lower, whereas consumption of cereals is 100%.

The present study found that 60.1 percent of mothers had adequate knowledge, and only 54.0% had answered "right dose of Baal Vita. A similar finding reported by Karki D. (2018) showed that only 45.38% were fully aware of the dose of Baal Vita.[3] The majority of the respondents (75.0%) had taken Baal Vita from FCHV, and the rest (25%) had taken it from a health worker.

Nearly half of the mothers or caregivers got information about Baal Vita from FCHV, and only 10.6% from friends and relatives. The current study showed that there is 51.0% compliance with Baal Vita among 6-to-23-month aged children and 49.0% non-compliance. A similar study by Angdembe et al found that the mean adherence to micronutrient powder was 72% among children aged 6-23 months.[4] Thus, this study showed less compliance than others. A study by Hyder et al showed that there was a high (98.2%) general awareness of the program, and mothers and caregivers showed excellent compliance and knowledge of appropriate dosages and use of MNP.[5]

One third of the total (33.0%) reported that their children do not like the taste, even though Baal Vita has no taste; 26.80 percent reported the problem of proper knowledge of Baal Vita; and 17.5% reported that they fear any negative consequences of Baal Vita.

Availability is another problem; in this study, 11.3% reported no availability of Baal Vita.[6] A study showed that Approximately half of mothers in Kapilvastu and three-quarters in Achham received MNPs for the eligible child at least once during the project period, >80% of whom received MNPs from their FCHV.[7] Another study showed that FCHV counselling had the strongest association with knowledge, coverage, and high intake.[8]

Table 6: Association between demographics and compliance of Baal Vita.

Characteristics	Compliance of Baal Vita N (%)		Total N (%)
	Yes	No	
Education of mother			
No Formal Education	15 (32.0)	32 (68.0)	47 (100.0)
Primary	59 (70.2)	25 (29.8)	84 (100.0)
Secondary	22 (39.3)	34 (60.7)	56 (100.0)
Intermediate and above	5 (45.5)	6 (54.5)	11 (100.0)
χ^2=22.5016, p value<0.001 (Significant)			
Occupation of mother			
Housewife	43 (60.6)	28 (39.4)	71 (100.0)
Service	4 (66.6)	2 (33.3)	6 (100.0)
Agriculture	45 (44.1)	57 (55.88)	102 (100.0)
Business	6 (54.5)	5 (45.5)	11 (100.0)
Foreign	3 (37.5)	5 (62.5)	8 (100.0)
χ^2=5.759, p value=0.217 (Insignificant)			
Types of family			
Joint	21 (72.4)	8 (27.6)	29 (100.0)
Nuclear	80 (47.3)	89 (52.6)	169 (100.0)
χ^2=6.2286, p value=0.012 (Significant)			
Sex of children			
Male	53 (51.5)	48 (48.5)	103 (100.0)
Female	48 (50.5)	47 (49.5)	95 (100.0)
χ^2=0.0171, p value=0.895 (Insignificant)			
Ethnic group			
Brahman	18 (81.8)	4 (18.1)	22 (100.0)
Chhetri	19 (70.3)	8 (29.6)	27 (100.0)
Dalit	25 (61.0)	16 (39.0)	41 (100.0)
Janajati	39 (36.1)	69 (63.8)	108 (100.0)
χ^2=23.6284, p value<0.001 (Significant)			

Community-based counselling may play a vital role in improving coverage and intake in MNP programmes.[8] This study could not be generalized as it was conducted in small area.

CONCLUSION

The status of both compliance and knowledge of Baal Vita level concludes that it is not satisfactory in Sindhupalchowk district. Many factors are associated with compliance and non-compliance with Baal Vita. We concluded that being aware of the advantages and changing the perception of the taste of Baal Vita, proper counselling on its doses, its use and perception towards negative consequences is very important, and availability, access, and family support are other main factors affecting compliance with Baal Vita.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Nepal Demographic and Health Survey 2016: Key Indicators Ministry of Health, Nepal. Available at: https://microdata.worldbank.org/index.php/catalog/2929/study-description. Accessed on 20 February 2023.
2. Nepal Multiple Indicator Cluster Survey 2014, Key Findings. Kathmandu, Nepal: Central Bureau of Statistics, Nepal and UNICEF; 2014. Available at: https://www.unicef.org/nepal/reports/multiple-indicator-cluster-survey-final-report-2014. Accessed on 20 February 2023.
3. Karki DK. Study on nutritional status of children under 5 years in Palpa district, Nepal. JLMC. 2013;1(2):99-101.
4. Angdembe MR, Choudhary N, Haque MR, Ahmed T.Adherence to multiple micronutrient powder among young children in rural Bangladesh; a cross-sectional study. BMC Public Health. 2015;15:440.
5. Hyder I, Hyder S, Haseen F, Rahman M, Zlotkin SH. Improved adherence to andanaemia cure rates with flexible administration of micronutrient Sprinkles: a new public health approach to anaemia control. Eur J Clin Nutr. 2009;63:165-72.
6. Mirkovic KR, Perrine CG, Subedi GR, Mebrahtu S, Dahal P, Staatz C, et al. Predictors of micronutrient powder intake adherence in a pilot programme in Nepal. Public Health Nutr. 2016;19(10):1768-76.
7. Locks LM, Dahal P, Pokharel R, Joshi N, Paudyal N, Whitehead RD, et al. Infant and young child feeding

(IYCF) practices improved in 2 districts in Nepal during the scale-up of an integrated IYCF and micronutrient powder program. Curr Dev Nutr. 2018;2(6):1-14.
8. Locks LM, Dahal P, Pokharel R, Joshi N, Paudyal N, Whitehead RD, et al. Predictors of micronutrient powder (MNP) knowledge, coverage, and consumption during the scale-up of an integrated infant and young child feeding (IYCF-MNP) programme in Nepal. Matern Child Nutr. 2019;15(2018):1-17.

Cite this article as: Bhatt DP, Bist A, Lamsal KP, Joshi PC. A compliance study of baal vita supplement to children in Sindhupalchowk District, Nepal. Int J Community Med Public Health 2023;10:2878-83.