

MORBIDITY PROFILE OF UNDER FIVE CHILDREN RESIDING IN BARBOTE VILLAGE DEVELOPMENT COMMITTEE OF ILAM DISTRICT OF EASTERN NEPAL

Sharma KR^{1*}, Dawadi S², Upadhaya P³, Khanal VK⁴, Singh SB⁵

ABSTRACT

Introduction

In 2017, the under-five mortality rate in low-income countries was 69 deaths per 1000 live births—around 14 times the average rate in high-income countries. Children constitute a vulnerable group and the first five years can be considered as a transition phase from the mother's womb to a social platform. Morbidity status of very young children is considered to be an important index of the health status of the community.

However, studies done to assess the morbidity profile of Children in rural Nepal are few, and the children's health status is largely unknown. The information collected through Health Management Information System (HMIS) of Nepal Government mainly represent the population that accessed the services but do not represent the population that utilized private clinics/hospitals or did not access it at all.

Objective

This study was conducted to assess the morbidity status of under-five children and its associated factors in Barbote Village Development Committee (VDC) of Ilam district of eastern Nepal.

Methodology

A community based cross-sectional study was conducted among all the eligible under five children of Barbote VDC of Ilam District for two weeks from 16-30 March, 2016. Face-to-face interviews were conducted with the legal guardian/ caretaker of the children with pre-tested, semi-structured questionnaire. Calibrated & validated equipment were used for simple biophysical measurements. Odds Ratio (OR) with confidence limit was calculated to examine the strength of association between the variables with the probability of significance set at 95% of Confidence interval (CI). Ethical permission was taken from the Institutional Review Committee (IRC) of BP Koirala Institute of Health Sciences, Dharan.

Results

Of the total 406 under-five children studied, 35.5% complained of illness such as acute respiratory infection, diarrhea and fever within the past two weeks. Regression analysis by the backward conditional method disclosed the fact that children of households with low socioeconomic status and those using biomass fuel for cooking were significantly associated with presence of illness.

Conclusion

More than one-third of the under-five children in Barbote VDC of eastern Nepal were found to be ill mostly due to preventable causes. Factors significantly associated with the presence of illness included the use of biomass fuel and low socio-economic status.

KEY WORDS

Child, Disease, Morbidity

Affiliation

1. Assistant Professor, school of Public Health & Community Medicine, B. P. Koirala Institute of Health Sciences, Dharan
2. Intern, B. P. Koirala Institute of Health Sciences, Dharan
3. Junior Resident, school of Public Health & Community Medicine, B. P. Koirala Institute of Health Sciences, Dharan
4. Associate Professor, School of Public Health & Community Medicine, B. P. Koirala Institute of Health Sciences, Dharan
5. Additional Professor, School of Public Health & Community Medicine, B. P. Koirala Institute of Health Sciences, Dharan

ARTICLE INFO

Article History

Received : 7 September, 2018

Accepted : 16 December, 2018

Published : 31 December, 2018

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ORA 89

DOI: [10.3126/bjhs.v3i3.22189](https://doi.org/10.3126/bjhs.v3i3.22189)

* Corresponding Author

Dr. Khem Raj Sharma
Assistant Professor

School of Public Health & Community Medicine
B. P. Koirala Institute of Health Sciences, Dharan
Email: khem.sharma@bpkihs.edu
ORCID ID: <https://orcid.org/0000-0001-6979-1742>

Citation

Sharma KR, Dawadi S, Upadhaya P, Khanal VK, Singh SB. Morbidity Profile of Under Five Children Residing in Barbote Village Development Committee of Ilam District of Eastern Nepal. BJHS 2018;3(3)7: 554-559



INTRODUCTION

In 2017, the under-five mortality rate in low-income countries was 69 deaths per 1000 live births—around 14 times the average rate in high-income countries.¹ Children constitute a vulnerable group and are the leaders of the future. So it becomes important for each nation to safeguard and promote the health of its children. Morbidity status of children under five is an important index of the health status of a community.

The health status of children in Nepal has improved over the last decade with the attainment of MDG targets.² However, developing countries like Nepal still have a long hurdle to cross to promote the health status of its future generations. With the incorporation of child health programs in the national health system, the under-five mortality has been reduced to 33.7/1000 live births, which is still very much high.³

First five years of life is a transition phase for the child from the mother's womb to the social platform. It is a very crucial phase as physical, psychological and social growth and development are intensively ongoing in this period. This requires adequate amounts of quality nutrition and various other resources. Lack in any one resource could result in grave consequences with irreversible damage that could compromise their potential in later life.⁴

Nepal Government routinely collects data on Under-five children attending the Government Health Facilities through the Health Management Information System and publishes it in the form of Annual Report.⁵ However, this report is incomplete as it misses those children attending the private sector or in the community and does not give a complete picture of the situation. In the present day world, accurate data is required for the implementation of measures for management of health conditions. Studies done in the community give a clear picture of the real situation to aid in prioritizing the application of methods for prevention & control. So, this study was conducted to assess the morbidity status of under-five children and its associated factors in Barbote Village Development Committee (VDC) of Ilam district of eastern Nepal.

METHODOLOGY

A community based cross-sectional study was conducted for two weeks duration, from 16 to 30 March 2016, among under five year old children in all the nine wards of Barbote VDC of Ilam district with an under-five population of 416.⁶ This was a census study where a total of 406 children were enrolled from all wards covering 97.6% of the under-five population of Barbote VDC.⁶ The remaining children were either unavailable even after 3 visits, or did not give consent for the study.

In each eligible household, the nature and purpose of study was clearly explained and an informed written consent was obtained. Face-to-face interviews were conducted with the adult legal guardian/caretaker of the child from the eligible households with a pre-tested semi-structured questionnaire. The data collection tool consisted of socio-demographic section, birthing and feeding practices of the child, housing environment and clinical profile. Calibrated and validated equipment were used for simple biophysical measurements

like height and weight and other parameters were assessed using standardized protocols. All children below 60 months were included except those who did not provide consent.

Operational definitions

Illness was defined as a period of sickness affecting the body at the time of visit or within 2 weeks prior to it, based on the Community Based Integrated Management of Neonatal and Childhood Illness (IMNCI) guidelines of Nepal.⁷ IMNCI primarily includes Acute Respiratory Infection (ARI), Diarrhoea, Fever and Nutritional status assessment. Overcrowding was defined as less than 70 square feet of floor space area per person in the household. Floor space area refers to total floor space area of all the sleeping room in house divided by the number of family members.⁸ Pucca houses are made from high quality materials, i.e. bricks, cement, concrete, including roof, walls and floor while katcha houses are made from mud and thatch or other low quality materials. Semi-pucca houses are made from a combination of the above types.⁹ This study considered family size, overcrowding, cross ventilation, type of house, natural lighting, and type of cooking fuel as proxy measures for housing conditions. Those households with per-capita/day less than 1.90\$ was considered as being below poverty line.¹⁰

Bivariate analysis with chi-square tests were done to find the statistical significance between two or more categorical variables. Odds Ratio (OR) with confidence limit was calculated to examine strength of association between the variables. Logistic regression analysis by the backward conditional method was performed for all independent variables whose probability was less than 20% in the bivariate analysis. This was done to identify associated factors for morbidity in under five children with the probability of significance set at 95% of confidence interval (CI). Ethical permission was taken from the Institutional Review Committee (IRC) of B. P. Koirala Institute of Health Sciences. Permission was also taken from the local authority of Barbote VDC. The children found to be ill during the study were managed at the local health centre.

RESULTS

The distribution of 406 under five children in the various wards of Barbote VDC is depicted in figure 1.

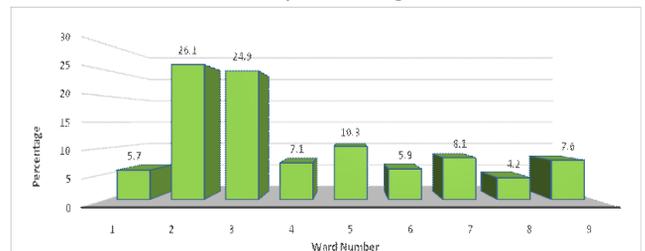


Figure 1: Ward wise distribution of participants of Barbote VDC, Ilam (n=406)

Majority (81%) of the participants were mothers of the eligible children. Infants constituted 14% of the study population and sex distribution was almost equal. They were mostly of Janajati (48.5%) and Brahmin/Chettri (43.1%) ethnicity and 54.2% lived in a nuclear family. Almost 78% of the families of under-five children were living above poverty line in Barbote VDC with 46.8% in the lower middle class category of the modified kuppuswamy socioeconomic scale (Table 1).

Table 1: Socio-demographic characteristics (n=406)

Characteristics	Categories	Frequency	Percentage
Age of child	Below 1 year	57	14.0
	12 to 23 months	75	18.5
	2 years or above	274	67.5
Sex	Female	204	50.2
	Male	202	49.8
Ethnicity	Janajati	197	48.5
	Brahmin/Chettri	175	43.1
	Others(Madhese, Dalit)	34	8.4
Religion	Hindu	296	72.9
	Kirat	85	20.9
	Others(Buddhist,Christian &Muslim)	25	6.2
Type of Family	Nuclear	220	54.2
	Joint	186	45.8
Poverty Status	Below Poverty line (<1.9\$/day)	90	22.2
	Above Poverty line (≥1.9\$/day)	316	77.8
Kuppuswamy Socio-economic Status Scale	Lower Class	5	1.3
	Upper Lower Class	76	18.7
	Lower Middle Class	190	46.8
	Upper Middle Class	132	32.5
	Upper Class	3	0.7

Nearly 81.5% of the mothers of under-five children were 20-30 years of age, almost 40% had completed secondary level education and only 5.4% were illiterate (Table 2) of the total 406 children, 88.4% delivered in Hospital, 80% had undergone normal delivery and 4.7% were pre-term deliveries. Only 4.4% of the children had low birth weight, while 4.7% were overweight at birth. Over 95% of the mothers had fed colostrum to the child while only 53.4% had undertaken exclusive breast feeding practices. Regarding immunisation status, 99.8% and 88.2% had received BCG and Measles respectively. Of the total 274 children of 2-5 years age group, all (100%) had been fully immunized.

Table 2: Birthing Characteristics and Immunisation Status (n=406)

Characteristics	Categories	Frequency	Percentage
Age of mother	Below 20 years	26	6.4
	20 to 30 years	331	81.5
	Above 30 years	49	12.1
Mothers education	Illiterate	22	5.4
	Primary	24	5.9
	Lower Secondary	71	17.5
	Secondary	162	39.9
	Higher Secondary	102	25.1
	Bachelors and above	25	6.2
Gestational age	Term	370	91.1
	Pre-term	19	4.7
	Post-term	17	4.2
Delivery institution	Hospital	359	88.4
	Home	47	11.6
Mode of delivery	Normal	325	80.0
	Cesarean section	81	20.0
Birth weight	Low birth weight	18	4.4
	Normal	369	90.9
	Overweight (>4kg)	19	4.7
Child fed colostrum	Yes	387	95.3
	No	19	4.7
Exclusive breast feeding	Yes	217	53.4
	No	189	46.6
Immunization	Fully Immunized	358	88.2
	Not fully immunized	48	11.8
BCG vaccination	Yes	405	99.8
	No	1	0.2

A good proportion of the study subjects lived in a Katcha type of house (44.6%) and overcrowding was present in around 20% of the households (Table 3). Almost all (>98%) households boiled water for consumption and around 54% still used Biomass fuel for cooking. Distance of latrine from the water-source was less than 15 meters in 62.3% of the households, while majority of the households (88.9%) had a water-seal type of latrine. At least one cigarette smoker was present in 13.5% of the households visited.

Table 3: Housing and Environmental Characteristics (n=406)

Characteristics	Categories	Frequency	Percentage
Type of house	Katcha	181	44.6
	Semi-Pucca	159	39.2
	Pucca	66	16.2
Overcrowding	No	323	79.6
	Yes	83	20.4
Boiling water for drinking	Yes	397	97.8
	No	9	2.2
Cooking fuel	Biomass	220	54.2
	Others	186	45.8
Type of latrine	Water seal	361	88.9
	Pit	43	10.6
	Absent	2	0.5
Distance of latrine from water source	Less than 15 meters	253	62.3
	15 meters or more	153	37.7
Cigarette smoker in the house	Yes	55	13.5
	No	351	86.5

A total of 35.5% of the under-five children gave a history of illness within the past two weeks with 23.7% complaining of ARI and 5.2% had diarrhoea. (Table 4)

Table 4: Clinical Characteristics of under five children (n=406)

Characteristics	Categories	Frequency	Percentage
Illness present	Yes	144	35.5
	No	262	64.5
Type of Illness	Acute respiratory illness	96	23.7
	Diarrhoea	21	5.2
	Fever	22	5.4
	Others	5	1.2
	No illness	262	64.5
	Mid Upper Arm Circumference (MUAC)(cm)	<12.5	10
	12.5-13.5	48	11.8
	13.5 and above	348	85.7

Bivariate analysis disclosed that under five children aged less than 3 years, belonging to Janajati ethnicity, low socioeconomic status and use of Biomass fuel for cooking were significantly associated with presence of illness (Table 5). However, after adjusting for other variables, Low socioeconomic status [aOR=2.1: 95%CI (1.32-3.34); p=0.002] and use of Biomass fuel for cooking [aOR=1.6: 95%CI (1.03-2.37); p=0.036] were found to be significantly associated with the presence of illness in the under-five children (Table 6).



Table 5: Bivariate Analysis

Characteristic	Category	Illness (%)		Total (n= 406)	OR	95% CI		Significance
		Present	Absent			Lower	Upper	
Age Groups	3years & above	30.2	69.8	189				
	<3 years	40.1	59.9	217	1.55	1.03	2.34	0.037
Sex	Male	38.1	61.9	202				
	Female	32.8	67.2	204	1.26	0.84	1.89	0.267
Ethnicity	Others	40.2	59.8	209				
	Janajati	30.5	69.5	197	1.53	1.02	2.3	0.04
Kuppuswamy SES Scale	Middle/Upper	24.4	75.6	135				
	Lower	41.0	59	271	2.1	1.35	3.4	0.001
Cooking Fuel	Others	41.4	58.6	186				
	Biomass	30.5	69.5	220	1.61	1.07	2.43	0.022
Overcrowding	Absent	35.6	64.4	323				
	Present	34.9	65.1	83	0.97	0.59	1.61	0.9
Cigarette smokerathome	Absent	34.8	65.2	351				
	Present	40.0	60.0	55	1.25	0.69	2.24	0.45
Mothers education	Illiterate	22.7	77.3	22				
	Literate	36.2	63.8	384	0.52	0.187	1.4	0.19

Table 6: Logistic Regression Analysis

Characteristics	Category	Adjusted OR (aOR)	95% CI		Significance (p-value)
			Lower	Upper	
Kuppuswamy Socioeconomic status	Middle/Upper				
	Lower	2.1	1.32	3.34	0.002
Cooking Fuel	Others				
	Biomass	1.6	1.03	2.37	0.036

Goodness of fit: Chi-square = 1.262, df = 6, p = 0.974

Variable(s) entered on step 1: Age, Ethnicity, Kuppuswamy Socio-economic status, Cooking fuel and Mothers Education Level.

DISCUSSION

This study found illness prevalent in 35.5% of the under-five children in Barbote Village Development Committee (VDC) of Ilam District with 23.7% suffering from ARI. This is similar to the findings of a study done in Gorkha which showed a prevalence of acute respiratory infection (ARI) in 21.5%.¹¹ Annual Report 2015/16 of Department of Health Services, also reported ARI among 23% of under-5 year children in Nepal.⁵ Similarly, a study done in Ethiopia also found similar prevalence of ARI.¹² This brings us to an inference that morbidity and mortality in under five children has decreased significantly in the recent years. However, the reported prevalence is still high, as these are preventable conditions that impart a large burden on the already overstretched health system of a developing country like Nepal.

On bivariate analysis, children less than 3 years were 1.5 times more likely to fall ill than older children [OR: 1.55; CI

(1.03-2.34)]. Similar findings have been seen from studies around the world, as younger children are more susceptible to various pathogens.¹³⁻¹⁵ However, a hospital based study done in Kathmandu, Nepal has reported that older children are more prone to ARI than younger ones.¹⁶ One possible reason for this could be the fact that older children voice their signs and symptoms more clearly than young ones and thus have more chances of visiting hospitals, resulting in higher use of hospital indoor/outdoor services. However, this finding did not remain significant after adjusting for other variables in the present study.

Lower levels of education of the mother has also been implicated in morbidity of under-five children in various studies.^{14,15} However this study did not find any significant association.

In this study, based on the classification of Nepal Demographic and Health Survey 2001,¹⁷ children of hill Janajati ethnicity were found to fall ill 1.5 times more compared to other ethnicities [OR: 1.53; CI (1.02-2.3)]. Social determinants, habits, traditions and customs increase the risk of infection among Janajati children, since these families tend to be larger and live in more crowded conditions. The National Legal Code (Muluki Ain) proclaimed in the period of

autocratic Rana rule in 1854 AD categorized them as non-enslavable matwali (liquor drinkers) based on their fondness for alcohol.¹⁸ Similarly, a study on transmission of tuberculosis infection to under-five children in household contact in Sunsari District reported that hill janajati children under five years of age were 2.5 times more likely to be Mantoux test positive - a proxy measure of transmission of Tuberculosis infection.¹⁹ Data from the NDHS 2001 show that access to and use of a range of health and family planning services is consistently lower among Dalit and most Janajati women.¹⁷ Literature also suggests that variations in individual health service utilization behavior is culturally conditioned.²⁰ These factors could pose additional risks for the hill janajati children in comparison to other ethnicity children. However, this significance was lost in the regression analysis.

The chances of disease and ill health are more in lower socioeconomic status (SES) population. Similarly in this study, using the modified Kuppuswamy socio-economic scale to assess this parameter revealed the fact that being in the low SES predisposed the child 2.1 times more for illness compared to the middle or upper SES [adjusted OR: 2.1; CI (1.35-3.4)]. This was significantly associated even after adjusting for other variables in the regression analysis. Similar results were seen in studies done in India²¹ and Brazil.²² The ability to afford and provide for resources in a household is one of the determinants of the health status of its members. So low SES households cannot afford to provide for quality nutritional food and health care in the required amount for its members that predisposes them to illness. The three delays (seeking care, reaching care and receiving care) are accentuated due to the lack of resources of the low SES population.

This study found 54.2% of the households of Barbote VDC using Biomass fuel for cooking. Under-five children in those households were found to be 1.61 times at more odds of developing illness than children in households that used other forms of fuel. This remained statistically significant even after adjusting for other variables [adjusted OR: 1.61; CI (1.07-2.43)]. A study done in Dhading District of Nepal found 87% of households using solid biomass as a primary source of fuel resulting in a total of 1284 Disability Adjusted Life Years (DALY) lost due to ARI and pneumonia and about 50 percent of it was attributed to indoor air pollution in the household.²³ Indoor air pollution due to biomass fuel is a major risk factor for morbidity as previously shown by various studies.^{12,14,15,16,21} Use of alternative cleaner fuels, education about effects of smoke on children in the household, and procedures to ventilate the room could be

some of the few measures to reduce its health effects on children.

CONCLUSION

Although, morbidity and mortality in under five children has decreased significantly in the recent years, the reported prevalence of 35.5% is still high, as these are preventable conditions that imparts a large burden on the already over stretched health system of a developing country like Nepal. Low Socio-economic status and use of Biomass fuel for cooking were found to be significantly associated with the presence of illness in under five children of Barbote VDC, Ilam.

RECOMMENDATIONS

These preventable conditions, have simple and effective solutions. Behavioral Change Communication (BCC) activities should be employed to reach the population, far and wide, on the alternatives to biomass fuels. Use of cleaner fuels should be advocated at the national level along with adequate counselling of the guardians during the health post visit regarding biomass use and effects of indoor air pollution. Child to parent advocacy, a new concept of inculcating habits and behaviors, should be practiced through schools by inclusion of these subject matters in the curriculum with practical demonstrations.

LIMITATION OF THE STUDY

Additional measures like routine lab investigations of the ill children to supplement the study tools would have provided a more comprehensive picture of the overall health of the children, but was not possible due to limitation of resources.

ACKNOWLEDGEMENTS

The authors would like to thank the participants of Barbote VDC, Ilam for their hospitality and keen participation in this research. The authors are also grateful to School of Public Health & Community Medicine, BPKIHS for providing an opportunity to conduct the research. Last but not the least, the authors are indebted to Barbote VDC office for their support through out the research.

CONFLICT OF INTEREST

The authors would like to declare no conflict of interest.

Financial disclosure

No financial support was obtained for this research.



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