Prevalence of Intestinal Parasitic Infections and Malnutrition among Children in a Rural Community of Sarlahi, Nepal

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Abstract

Introduction The malnutrition and intestinal parasitosis are common child health problem in Nepal mostly in rural community.

Objectives Find out the point prevalence of malnutrition and parasitosis in a rural community of Sarlahi.

Methods The cross-sectional descriptive study was conducted in the period of February to August 2004.The nutritional status and parasitosis was studied in 225 (male 104 and female 121) children aged 0 to 36 months. The nutritional status was measured by Shakir's tape. The collected stool samples were mixed with 10 percent Formalin solution and transported to Research Laboratory, Tribhuvan University Teaching Hospital (TUTH), Kathmandu. Direct smears were prepared with normal saline and Iodine for microscopic observation.

Results Measurement of Mid-upper Arm Circumference (MUAC) revealed that the percentages of severely and moderately malnourished children were 35.11 and 36.88 respectively. It was found that 41.77 percent children were infected with some kind of parasitosis. Altogether, 6 species of Geohelminths or protozoan parasites were detected. The prevalence of roundworm (*Ascaris lumbricoides*) infection was found highest (14.22%), whereas *Giardia lamblia* topped the list of protozoa by showing positively of 9.33 percent. No Geohelminth or protozoal parasites were detected in children aged less than 7 months. Of the total positive cases, 1.33 percent showed multiple infections with a maximum of two species.

Conclusion The study confirmed that malnutrition and parasitosis were important child health problem and the prevalence of 41.77 percent of parasitic infection showed an endemic situation. Therefore, it is recommended that the local health sectors should make provision for regular examination of parasitosis.

Keywords Malnutrition, Parasitosis, Children, Rural community, Nepal.

Introduction

Malnutrition and intestinal parasitic infections are common among children in rural community of Nepal. Nutritional status is a key indicator of health assessment[1,2]. The cause behind the childhood malnutrition has multiple reasons. Some causes are household or family level, childcare, poor diet, basic health services and various infections. Malnutrition results in poor physical development, impaired resistance to infections. An estimated global infection rate for some parasites has primarily been attributed to the appalling unhygienic and environmental condition, poverty and over dispersion of parasites within the human communities[3,4]. The most common mode of spread of roundworm from the contamination of food item e.g. uncooked vegetables, fruits and meat. Parasitic infections in children fewer than 5 years of age are especially problematic because they have negative life long health consequences. These infections can contribute to malnutrition, which in turn can result in delayed growth and malnutrition as well as impaired cognitive growth[5]. Hookworm infection is generally as one of the more serious of helminthes infections because of its debilitating association with anaemia due to blood loss from the intestines[6].

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Methodology

Sarlahi is a rural, plain district in Janakpur Zone in the Central Terai of Nepal. It shares and contributes to the general ecology, culture and socio-economic status of the east-central Terai. It is agriculturally focused area with majority of people depending in agriculture. The total household number is 111,076. The total population of Sarlahi is 635,701[8]. Families live in simple, sparse quarters, and farm their small plots of land or labour on other's lands. It is poor environment in which nearly three quarters of the population may be considered to live below the poverty line established by the government of Nepal[9]. In the villages most of the people resort to open fields for defecations. So far, the community is poor and children are malnourished with high morbidity and mortality due to child diseases so Sarlahi was chosen as study site for this study.

The Mid Upper Arm Circumference (MUAC) was measured using Shakir's tape during questionnaire administration. The parents were instructed to collect early morning stool from their child defecated on plastic provided along with screw capped plastic container. The 10 gm (approx) stool was mixed with 10 percent formalin solution during collection. The samples were then transport to Research Laboratory, Tribhuvan University Teaching Hospital, Kathmandu.

An observation was made on surrounding sanitation, defecation practices of child. After providing written informed consent, a questionnaire on their age, sex, maternal education, occupation, source of drinking water, treatment of water and type of housing were noted.

Direct smears were prepared with normal saline and Iodine for microscopic observation.

Results

MUAC of children were measured half way between the shoulder and elbow joint. The result (Table 1) shows that female (20.88%) dominated male (14.22%) in case of severe malnutrition. Examination of all the 225 stool samples revealed that 94 (41.77%) cases were positive for intestinal parasites (Table 2). Altogether 6 species of parasites (two protozoa and four helminthes) were detected. Among the protozoan parasites, *Giardia lamblia* was the most common (9.33%). In case of helminth infestations, *Ascaris lumbricoides* was detected as most common (14.22%). Of the total positive samples, 3/225 had multiple infestations with a maximum of two species.

Table 1: A profile of nutritional status of children under study

MUAC(cm)/category	Male (104)	Female (121)	Total (225)
>13.5/normal	34 (15.11%)	29 (12.88%)	63 (28%)
12.5-13.5 /mild to moderate malnutrition	38 (16.88%)	45 (20%)	83 (36.88%)
<12.5/severe malnutrition	32 (14.22%)	47 (20.88%)	79 (35.11%)

Table 2: Sex wise distribution of parasiticprevalence in children aged 0 to 36 months

Sex	No. of Sample Examined	Total no. of Individual infected (%)
Male	104	41(39.42%)
Female	121	53 (43.80%)
Total	**225**	**94 (41.77%)**

Table3: Parasites detected from 94 positive stool samples

Parasite (Ova/Cyst)	Prevalence (%)
Protozoan	
Giardia lamblia	21[#](9.33%)
Entamoeba histolytica	14 (6.22%)
Helminthes:	
Ascaris lumbricoides	32[#](14.22%)
Trichuris trichiura	19 (8.44%)
Hookworm	10 (4.44%)
Hymenolepis nana	1 (0.44%)

Note: # indicates number of multiple infections.

Discussion and Conclusion

Measurement of MUAC is an easy method of assessing nutritional status of children in a community where microbiology laboratory facility is not available. Study was in line with the National District Health Survey report, which explained that 43 percent of children from eastern terai is underweight and 10 percent were severely underweight[9].

The prevalence of underweight is particularly high in South Asian countries. Stunting prevalence among children under 5 years old in Nepal is 47 percent[3]. The immediate causes of malnutrition that impact most directly at household/family level were poor diet and infections, particularly of diarrhoeal diseases that lead to poor appetite and metabolic and clinical disturbances. Synergism between malnutrition and infection like parasitic infections had long been known to be

responsible for much of the excess mortality among infants and preschool children in less developed counties[5,10]. Poverty is perhaps the most insidious basic determinant of malnutrition[3].

Intestinal parasites are highly prevalent (78%) in Nepal[11]. The present study however showed a relatively low prevalence of parasitosis (41.77%). This could be due to high prevalence of helminthiasis among subjects compared with protozoan parasitosis [12-15].

In Pakistan, it was found that slightly more than 35 percent had parasitosis, which is in agreement with the prevalence of present study (41.77%). In contrast, a survey from Southern India on pre-school children below 5 years of age gave a parasite prevalence of 73.80 percent[16].

Males and females have infection rates of 39.42 percent and 43.80 percent respectively but without significant difference ($p>0.05$), which suggested that parasitic diseases were independent of sex in Nepal. Similar findings were reported in general population of Nepal[1, 17].

Agriculture was the major occupation of almost all of the study population. Those having infestation had agriculture as their main occupation. Although the number of non-agriculture occupation was few, and it might not be appropriate to conclude that agriculture was a factor affecting the prevalence of helminthiasis, it had, however, a potential justification. Agricultural activities in Nepal carried a lot of exposures to the parasites, as people did not wear shoes while working in the field. As these people usually had low-income level, and thus did not afford to have toilet facility, they usually defecate in the open field, normally near to their working places. Children also have habit of playing on ground, field.

Hymenolepis nana occurs worldwide, reportedly with highest prevalence rates under condition of poor sanitation and overcrowding. *Hymenolepis sp* is significantly more common in children with abdominal discomfort (ADC) with 2.50 percent of prevalence[18], but this study showed only 0.44 percent. In this study, *Ascaris lumbricoides* topped the list (14.22%) followed by *Giardia lamblia* (9.33%), which was in line with other findings reported earlier from Nepal[19].

It was reported that 29 to 44.20 percent of patients attending TUTH during 1985-1994 had intestinal parasitic infestations[19]. Helminthes were detected more frequently than protozoan. The prevalences of mixed infection among healthy children and children with abdominal discomfort were 2.1 percent and 13.3 percent respectively[18]. The reported prevalence of polyparasitism elsewhere varies from 4.30 percent to as high as 72.70 percent[14]. In Dhanusa, 28.90 percent of infestation included two or more intestinal parasites[20].

Therefore, an anti-helminthes programme should be introduced carefully because community members had unusual perceptions about infections. These include a lack of scientific knowledge about the causes, prevention and treatment of helminth infection.

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