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The Risks and Impacts of Portering on the Well-Being of Children in Nepal

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Summary

A variety of underlying conditions increase the likelihood of children entering the labor force. Nearly half of Nepal's population between 5 and 14 years of age is economically active, many in conditions classified by the International Labor Organization as 'the worst forms of child labor'. In order to assess the relationship between portering and well-being outcomes, including diet, nutrition status, injury and social and behavioral risks, a cross-sectional study was conducted among long distance child porters in Eastern Nepal. Porters were consistently less well off than their non-portering peers according to a variety of indicators. Porters were 2.2 (95% CI: 1.4–3.4) times as likely not to have attended school in the past month and frequency of attendance was significantly lower among porters. Porters had worse diets and significantly lower Body mass indexes than controls; prevalence of anemia was 30% and the risk of anemia was 1.9 (95% CI: 1.1–3.1) times greater for porters as compared with controls. Injury rates within the past year were similar between the two groups, with 88% of participants reporting being injured. Prevalence of alcohol use among porters was 38% and porters were 2.9 (95 CI: 1.7–4.9) times more likely to consume alcohol than controls. Risk of sexual assault was 10.1 (95 CI: 2.3–43.9) times greater among porters as compared with their non-portering peers, and 91% indicated they felt portering negatively impacted their general well-being. Findings indicate that despite the Nepalese government's legislative efforts to regulate to the portering industry, portering children experience a substantially increased risk of negative physical, emotional and educational outcomes due to their involvement in exploitive and dangerous work. The long-term ramifications of portering are harmful to the well-being of children, and in the long run, lack of education may reduce employment options and the chance to escape from a life of continued poverty.

Introduction

The exploitative employment of children is a staggering problem worldwide. Despite ongoing international attempts to end this practice, child labor remains common in many parts of the world, and is particularly frequent in developing settings where the survival of households often depends on the ability of children to provide supplementary income. In a move towards eliminating child labor, the International Labor Organization (ILO) convened in 1999 and agreed upon a definition for the 'worst forms of child labor' which encompasses slavery, debt bondage, trafficking, sexual exploitation, hazardous work and the use of children in the drug trade and armed conflict [1].

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Endemic poverty and underdevelopment in Nepal increase the likelihood of children being economically active: Nepal ranked 136th out of 177 countries on UNDP's 2005 Human Development Index and over half of the population subsists on less than 1 dollar per day [2]. There is limited information regarding the extent of the worst forms of child labor, either globally or in Nepal. In 2002 there were an estimated 6.2 million Nepalese children between the ages of 5 and 14, and of these children, 2.6 million or 41% were economically active [3]. Many working children in Nepal do not receive wages and work under hazardous and exploitive conditions. Despite multiple legislative attempts at protecting children from child labor, including the Labor and Children's Acts, the Child Labor (Prohibition and Regulation) Act, and a National Master Plan on Child Labor, the problem remains pervasive.

In the Himilayan regions of Nepal, porters provide the most common means of transportation of goods. There are an estimated 46 000 child porters in Nepal, most of which begin working between

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10 and 14 years of age [4, 5]. The majority of child porters work in commercial sector, which has lower remuneration and is more hazardous than portering for tourist trekkers. Within the commercial porter industry, long-distance porters who overnight on route are the most vulnerable because they are exposed to greater physical hazards and carry heavier loads. The average load weight of a long distance porter is 35 kg or 77 lb. An estimated 40% of child porters are injured or ill while portering, and many child porters have diets that are insufficient for healthy development [5].

Johns Hopkins Bloomberg School of Public Health and Porter's Progress, a non-governmental organization in Nepal, conducted a cross-sectional comparative study to assess the relationship between portering and nutrition and injury outcomes among long distance child porters in Eastern Nepal.

Methods

Solukhumbu District, which includes Sagarmatha National Park and Mount Everest, is a center of portering activity and was identified as the study site. The large volume of commercial portering activity draws children from surrounding areas to work as porters. Long distance commercial porters aged 10–16 years were identified as the study population because of the increased occupational risks they face (heavy loads, long trip lengths, poor remuneration, inadequate diet and lack of familial care and protection) as compared with short distance porters and children not engaged in portering. The primary objectives of the study were to characterize nutrition status and the nature of injuries among porters and compare findings with non-portering children; the study also explored educational implications and abusive psychosocial aspects of portering.

Because no information was available on injury patterns in child porters, sample size calculations were based on nutritional parameters of body mass index (BMI) and anemia among Nepalese adolescents [6, 7]. A sample of 374 was required to allow for the detection of a 15% difference in prevalence of both low BMI and anemia with 80% power and $\alpha = 0.05$. A final sample of 500 individuals (250 individuals in each the porter and comparison groups) was chosen to allow for non-response and to increase the ability to detect differences in injury outcomes.

It is difficult to design a random sample and evaluate the representativeness of sample as compared to the entire child porter population because porters are highly mobile and unquantified. A sample design was developed to incorporate porters passing through a variety of locations along principal long distance porter routes in Solukhumbu District. Porters were sampled near markets, along trails, or in villages where they sleep overnight. Sampling was conducted by unannounced visits when groups of porters were invited to a nearby survey station. The control group was selected to have similar characteristics in terms of socioeconomic status, caste/ethnicity, and location of residence. Controls were sampled from the communities which child porters identified as their 'home village' using the segmentation method outlined by FANTA (1997) [8]. Once a residence within the selected community was identified, the head of household was informed of the study, and if there were members 10–16 years of age, consent for the child to participate in the study was requested from a guardian. If a household had multiple children in the specified age range, one child was randomly selected to participate; if a child was absent, a time was scheduled for a return visit.

Interviewers had a portering background and at least some secondary education; they received 2 weeks of training in sampling, data collection, interviewing techniques and anthropometric measuring. The questionnaire was developed in English and translated to Nepali; after pilot testing, back translation was performed. After obtaining verbal consent, the surveyor conducted the interview which focused on demographic and socioeconomic information; education; income generation; food consumption; and injury. Anthropometric data was collected according to standard procedures [9] and anemia prevalence (hemoglobin levels) were determined using the finger stick method with a Hemopoint H2 (Stanbio, Boerne, TX, USA). Children with hemoglobin <10 g/dl were counselled and referred to a local health clinic. The total interaction time with children, including the interview and anthropometry, was <30 min.

Low height for age (stunting) was defined as a *z*-score <-2 on age and sex-specific distributions from the National Health and Nutrition Examination Survey (NHANES) reference population. Low BMI was defined as BMI below the 5th centile when compared with age and sex specific distributions from the NHANES population [10]. Anemia was defined by hemoglobin or hematocrit below the age- and sex-specific cutoffs from the NHANES reference population. Data analysis was performed using STATA Version 8 and SPSS Version 14. The best-fit multivariate models were selected based on significance of predictor variables ($P < 0.05$), maximization of the R^2 value, and minimization of the *F*-statistic or maximization of the -2 log likelihood. Permission to conduct the survey was received from the Nepalese Ministry of Health and the Johns Hopkins Bloomberg School of Public Health Committee on Human Research.

Results

A total of 249 porters and 262 non-porters were interviewed. Porters and non-porters differed on a

TABLE 1
Sociodemographic characteristics of porter and non-porter participants

Characteristics	Porters ($n=249$)	Non-porters ($n=263$)	P-value
Gender			
Male	234 (94%)	152 (58%)	<0.001
Female	15 (6%)	111 (42%)	
Age (years)			
≤14	22 (9%)	168 (64%)	<0.001
15–16	227 (91%)	95 (36%)	
Caste			
Sherpa	42 (17%)	104 (40%)	<0.001
Rai	98 (39%)	61 (23%)	
Tamang	47 (19%)	48 (18%)	
Brahmin/Chhetri	35 (14%)	22 (8%)	
Other	27 (11%)	22 (10%)	
Highest education grade level			
Never attended	40 (17%)	18 (7%)	0.003
1–5 years	105 (44%)	135 (52%)	
6 years or more	95 (40%)	105 (41%)	

number of characteristics including age, sex, caste and educational attainment as shown in Table 1. Differences in age and sex composition of the groups were controlled for in all outcomes presented. Descriptive statistics unique to porters included load weight which averaged 47.7 kg (95 CI: 46–49); those paid on the basis of weight reported carrying loads that averaged 6.9 kg (95 CI: 3.7–9.6) heavier than those receiving a daily rate. The median number of days portering per year was 90, and the average daily wage was 114 rupee (95 CI: 108–120) or $US 1.58 (95 CI: 1.50–1.67).

Among porters, 41% attended school within the past month compared with 78% of non-porters ($P<0.001$). After adjusting for age and sex, porters were 2.2 (95% CI: 1.4–3.4) times as likely not to have attended school in the past month. Among children enrolled in school, the frequency of attendance was significantly lower in porters: 68% of porters attended school most days or always compared with 94% of non-porters. Despite being significantly younger than porters, non-porters completed a mean of 4.9 years of education while child porters had completed an average of 4.5 years of education. After controlling for age and sex, portering was a significant predictor of lower educational attainment. Porters were more likely to have never attended school than non-porters; 16% of porters had never attended school as compared with 9% of non-portering children ($P<0.001$).

Food security and nutrition measures indicated that porters suffer greater levels of food insecurity and poorer nutrition status than controls. Selected dietary and food security indicators are presented in Table 2. Diet diversity, as measured by an index score based on consumption of food groups/categories, was significantly greater among controls than porters. Protein consumption on the day preceding the survey was reported by 92% of controls and 81% of porters, respectively, ($P=0.005$) and remained significant after adjusting for age and sex, where porters were 2.1 (95 CI: 1.3–3.6) times more likely than controls to have consumed no protein on the preceding day. Adjusting for age and sex, porters were 2.6 (95 CI: 1.6–4.3) times as likely to reduce the size/frequency of meals and 2.9 (95 CI: 1.9–4.5) as likely to have days without eating as compared with controls.

Prevalence of stunting was 75% among porters and 67% among controls ($P=0.057$) however, this difference was not statistically significant after controlling for age and sex ($P=0.652$). Prevalence of low BMI was statistically similar between the groups at 7% ($P=0.532$). Linear and logistic regression outcomes for nutrition indicators are presented in Table 3. Linear regression models for BMI found that porters had a BMI that averaged 0.75 BMI units (95 CI: 0.19–1.31) lower than non-porters, after controlling for age and sex. Anemia prevalence was 30% among porters and 26% among controls, respectively, ($P=0.380$) however, after adjusting for age and sex, risk of anemia was 1.9 (95% CI: 1.1–3.1) times greater in porters as compared with controls.

Period prevalence of portering accidents in the past year was 27% (95 CI: 21–33). Within the past year 20% ($n=50$) and 12% ($n=29$) of porters reported witnessing serious injury or death, respectively, to other child porters. Injuries within the past year were reported by 92% of porters and 84% of controls ($P=0.007$) however, differences were not significant once age and sex were considered ($P=0.730$). Non-porters sought medical care an average of 2.0 times in the past year as compared

TABLE 2
Diet and food consumption among porters

	Porters ($n = 249$)	Non-porters ($n = 263$)	*P*-value
Mean meals consumed—previous day	4.0	4.2	0.023
Mean dietary diversity score[a]	5.3	6.5	<0.001
Consumption of protein rich foods—previous day[b] (%)			
Milk/milk products	6%	15%	<0.001
Eggs	17%	21%	0.347
Meat or poultry	44%	51%	0.136
Pulses/legumes (includes dahl)	63%	78%	<0.001
Any protein rich food	82%	92%	0.005
Reduced size of meals or skipped meals because there was not enough food—past year	61%	23%	<0.001
Did not eat for a full day because there was not enough food—past year	58%	21%	<0.001

[a]The dietary diversity score was calculated based on reported consumption of eleven categories of food on the day preceding the survey and is intended as a marker of dietary quality.
[b]Protein consumption is defined as a dichotomous variable and is based on the reported consumption of milk products, eggs, meat, poultry, seafood and pulses/legumes on the day preceding the survey.

TABLE 3
Results of linear and logistic regression analyses of nutrition in porters vs. non-porters

Outcome variable[a]	Constant	β coefficient	95% CI	*P*-value
Linear regression				
Body mass index (BMI)	7.97	−0.72	(−1.26, −0.17)	0.01
Mid-upper arm circumference (cm)	5.29	−0.38	(−0.84, 0.08)	0.10
Hemoglobin (g/dl)	9.93	−0.46	(−0.89, −0.03)	0.04
Hematocrit	74.77	6.08	(0.98, 11.18)	0.02
Dietary Diversity Score—previous day	7.69	−1.07	(−1.44, −0.70)	0.00
Logistic Regression				
Low BMI[a]	3.82	0.92	(−0.20, 2.04)	0.11
Low height for age[a]	−0.04	0.05	(−0.46, 0.56)	0.84
Anemia	1.77	0.56	(0.02, 1.09)	0.04
Days without eating—past year	−7.04	0.94	(0.45, 1.44)	0.00

[a]Controlling for age and gender.

with 1.7 medical visits among porters ($P = 0.067$). Half of porters reported not seeking care for illness or injury within the past year because of economic reasons as compared with 27% of controls; this difference remained significant in age and sex adjusted models where porters were 2.0 (95 CI: 1.3–3.0) times as likely as non-porters to have not sought care due to economic reasons.

The use of alcohol and tobacco were significantly higher among porters than controls: 38 and 15% of porters drank alcohol and smoked tobacco, respectively, compared with the 12 and 3% of controls ($P < 0.001$ for both comparisons). Adjusting for age and sex, porters were 2.9 (95 CI: 1.7–4.9) times more likely to consume alcohol and smoking rates were rendered statistically similar. Drug use was infrequent and reported by a total of 1.4% of respondents; no significant difference was observed by group with drug use rates ($P = 0.227$).

Social and behavioral risk factors associated with portering are summarized in Table 4. Overall 91% of child porters indicated portering negatively impacted their general well-being. Feelings of inadequate emotional support or aloneness were reported by 66% of porters and 37% of non-porters ($P < 0.001$). The age- and sex-adjusted risk for this outcome was 2.0 (95 CI: 1.3–3.1) times higher among porters than non-porters. Feelings of stress and/or mental torment were reported by 86% and 67% of porters and controls, respectively ($P < 0.001$); after controlling for age and sex, porters were 1.9 (95 CI: 1.1–3.3) times more likely to report feeling stressed or mentally tormented than controls. Physical assault within the past year was reported by 34% of porters

TABLE 4
Social and behavior risk factors in porters vs. non porters, controlling for age and gender

Outcome variable	Adjusted odds ratio	95% CI	*P*-value
Smokes	1.95	(0.79, 4.84)	0.15
Drug use	7.08	(0.64, 78.23)	0.11
Alcohol consumption	2.42	(1.37, 4.27)	<0.01
Felt alone in past year *(no emotional support)*	1.89	(1.19, 3.03)	<0.01
Mentally stressed or tormented in past year	2.29	(1.32, 3.99)	<0.01
Physically assaulted in the past year	1.39	(0.83, 2.33)	0.21
Sexually assaulted in the past year	3.07	(1.00, 9.37)	0.05

and 20% of controls ($P < 0.001$) however, after adjusting for age and sex the finding was insignificant. Sexual assault within the past year was reported by 7% of porters and 1% of non-porters; after adjusting for age and sex, risk of sexual assault was 10.1 (95 CI: 2.3–43.9) times greater among porters as compared with their non-portering peers.

Discussion

Nearly three-quarters of the children in the study became porters voluntarily, and they disproportionally originate from impoverished areas and socially excluded cast and ethnic groups. Although Nepalese law prohibits minors from carrying loads of more than 25 kg (55 lb), limited enforcement and augmented pay have encouraged children to carry heavier and more dangerous loads [11]. Overall, the loads reported in the present study were an average of 47.5 kg (105 lb) which is greater than previously found in the ILO child porter rapid assessment [3, 5].

Education measures, including current enrollment, frequency of attendance, and educational attainment were significantly lower among porters as compared with non-portering peers. In accordance with our results, an ILO assessment found that 50% of long distance child porters were enrolled in school [5]. While portering is significant, other factors contribute to differential educational attainment. Porters were significantly more likely to report never attending school than non-porters, suggesting that children who entered portering faced a disadvantage before reaching an age where they could become economically active. Although education is free, schools often implement fees to offset operating costs and along with geography, may decrease access among the poorest households. In addition, poor education of parents and lack of access to education are considered contributors to ongoing child exploitation in Nepal [3].

In addition to the heavy loads and long hours, porters carry their own food and often do not eat regularly or adequately. Child porters were consistently less well off then non-portering peers of nutrition measures, including food consumption, BMI and anemia. This supports conclusions of the ILO rapid assessment which noted that 'child porters lack sufficient calorie intake and nutrients necessary for healthy development' [3]. Apart from poverty, high energy expenditures associated with manual labor, and lack of familial care while on long distance portering trips may contribute to poor dietary quality and inadequate food consumption.

Adjusted prevalence of injury was statistically similar with 88% of children reporting an injury within the past year. The majority of non-portering controls were economically active, suggesting that working children in Nepal may be especially vulnerable. Injury rates were greater than observed in the ILO rapid assessment where over 40% of the child porters were ill or injured while portering [5]. Another study of porters in Peru found that all health problems faced by the subjects were attributed to their work as porters [12].

Child porters are less well off and suffered greater threats to their well-being than their non-porter peers in respect to many indicators. Risk of inadequate emotional support or aloneness, feelings of stress or mental torment, alcohol use and sexual assault were significantly greater among porters as compared with controls. Time away from family, and the consequent lack of familial support and protection faced by long distance porters, appears to amplify the social, environmental and behavioral risks faced by economically active children from impoverished households.

A major challenge in study design and implementation was identifying and sampling an appropriate comparison group. However, due to political insecurity and time limitations, 'home' porter villages were not always accessible; additional factors, such as time of day and children not being present due to secondary schooling in other villages also complicated the sampling process. Consequently, the control group was comprised of a particularly disadvantaged group which was less likely to attend regional secondary schools and more likely to be economically active than children in the region

overall. Controls are from a similarly low socio-economic status as the porter group since they share a similar underlying cause for early participation in the labor force. In retrospect, comparison of porters to children that are involved in other forms of labor is in some ways ideal and characterizing other child laborer populations is of interest. However, sample issues precluded the original age/sex matched study design and limited comparison of porters and non-porters to regression models that account for differences in age and sex composition of the two groups. Another significant limitation of the study is the cross-sectional design. In attempting to measure injury and other health outcomes retrospectively over the past year, a cross sectional design precludes sampling of porters who were injured severely enough to discontinue employment or that died, allowing for possible underestimation of adverse events; recall bias is also a potential problem, where less severe events occurring early in the recall period could be under reported. Lastly, household economy or parental education data was not collected and would have been ideal for adjusted models as well as assessment of risk factors for entry in portering and other economic activities.

Conclusions

Child labor is the result of a variety underlying conditions that increase the likelihood of a children becoming economically active at a young age. Viewed in the overall context of poverty, social exclusion and vulnerability, child labor can be seen as a coping strategy that enables families to survive. In Nepal, where a significant portion of children are economically active, children face numerous risks associated with poor working conditions and inadequate enforcement of laws created for their protection. Children involved in the worst forms of labor and those who work and live away from their families are the most vulnerable. Child labor, and the underlying conditions of vulnerability which put children at risk for becoming involved in the workforce, result in both short and long-term consequences on well-being and place children at risk for a variety of adverse outcomes.

The extent of child labor and its negative repercussions on the well-being of children have been recognized by the Nepalese government as well as the international community. Our findings indicate that in spite of the recent efforts of the Nepalese government, children continue to be involved in exploitive and dangerous work. The immediate impact of this work is often injuries and illness, brought on by hard labor and an insufficient diet. The long-term ramifications may be more insidious, as the lack of education reduces employment options and the child's chance of escape from a life of continued poverty.

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