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## Regional Disparities in the Magnitude of Orphanhood in Nepal

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### ABSTRACT

Orphanhood is a vast problem in the world with impacts on the social and public health sectors. Evidence-based information on the geographic distribution of orphans is an important information gap in Nepal. The present study aimed to identify the proportion of children who are orphans and their geographic distribution in Nepal. This study used the population subset of 0-17 year olds from the nationally representative Demographic and Health Survey (DHS) 2011, Nepal. The Generalized Estimating Equations (GEE) method was used while fitting a logistic regression model to adjust for the correlation among children in the same household. The result was adjusted for age and sex of a child and wealth index of the household. The analysis was further stratified by age groups. Of the total 21,484 children, 1,142 (5.3%) were orphaned. Among the 13 sub-regions, Western Mountain and Eastern Terai had higher and Central Hill had lower proportions of orphan children than the overall mean. However, the results differed in age-stratified analysis. The study also explored possible factors related to orphanhood: poverty and famine, conflict and displacement, a high adult mortality related to HIV/AIDS and maternal causes. In conclusion, the distribution of orphan children in households was found to vary by sub-regions. Therefore, orphan welfare programmes should be focused on those regions with higher proportions of orphans.

**Keywords:** Orphans, poverty, disparities, Generalized Estimating Equation (GEE), Nepal

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### INTRODUCTION

Orphanhood is a vast problem in the world with specific impacts on the social and public health sectors. According to the United Nations Children's Fund (UNICEF), children who have lost one or both parents

are defined as orphan children. Orphanhood is the condition of being an orphan. So, these two words are often used interchangeably in the literature and shall be as well in this study. It is estimated that 153 million children worldwide have lost one or both parents (UNICEF, 2010). Although different sources provide different counts on orphan children, Asia is home to the largest number of orphans worldwide, where 60-80 million children are orphaned (UNICEF, 2010). In 2003, due to various causes, 87.6 million orphans were identified in Asia, while sub-Saharan Africa had a total record of 43.4 million orphans (UNAIDS, UNICEF and USAID, 2004). However, the proportion of orphans due to AIDS in Asia is much lower than in sub-Saharan Africa (UNICEF EAPRO, 2005).

Nepal, a country which overcame a decade-long political conflict, is now facing a concentrated epidemic of HIV/AIDS, high adult mortality including high maternal mortality and severe forms of poverty and famine. These factors may have resulted in many orphan children in Nepal. According to the United Nations Office of the High Commissioner for Human Rights (OHCHR) Nepal conflict report (2012), more than 13,000 people were killed during the civil war and many people disappeared. Thousands of children became orphans and were internally displaced (Joshi, 2008; Sing, Dahal, & Mills, 2005). According to the World Food Programme, Nepal (2009), severity of hunger in Nepal is alarming with a global hunger index

score (GHI) of 20.6. The World Health Organisation (2004) categorised Nepal as a high mortality developing country. Globally, communicable diseases contribute to 32.3% of total deaths; however, 41% of deaths are concentrated in South Asia and 49.7% in Nepal (Suvedi, 2007). The World Bank estimation of maternal mortality in 2010 is still high (170/100,000 live births) in Nepal. According to the Nepal country progress report 2012, HIV/AIDS is another cause of adult death mainly concentrated in the western part of the country where male migration to India is common. The estimated deaths from HIV/AIDS are 4,796, which are 3.25% of total deaths from 50 causes (world life expectancy, 2013). There is, however, no information on the total number of children who have lost their parents from AIDS and other causes.

Nepal is a small country with immense cultural and geographical diversity. It is situated in South Asia and surrounded by two large countries, China on the north and India on the south, east and west. It has been divided by latitude into three ecological zones (Mountain, Hill and Terai) and by longitude from east to west into five development regions (Eastern, Central, Western, Mid-western and Far-western). The cross section between three ecological zones and five development regions formed the 15 sub-regions. In this study, Mid-western and Far-western Mountain combined into Western Mountain and created 13 sub-regions (Ministry of Health and Population (MOHP) [Nepal],

New ERA, & ICF International Inc., 2012). There are 75 administrative districts that are further divided into smaller units, called Village Development Committees (VDCs) and Municipalities. The VDCs are rural areas, whereas municipalities are urban regions. Only 17% of the population lives in the urban areas (National Population & Housing Census 2011; MOHP Nepal et al., 2012; Nepal Population Report, 2011).

In many developing countries including Nepal, the children under the age of 18 represent about 50% of the total population. These children are at high risk and are less likely to have basic needs met to achieve a normal and healthy development. Among them, orphans who lost one or both parents are most vulnerable (Maluwa-Banda & Bandawe, 2004; United Nations, 2003) and frequently face many challenges. Because they have lost their parental support, these children have limited access to nutritious food, basic health care, formal education and safe shelter with behavioural ramifications of the absence of support. They may have to undertake various illegal activities like pick-pocketing, robbery or drug transport as a means of survival that may increase their vulnerability (The President's Emergency Plan for AIDS Relief Office, 2006). Such activities not only increase their vulnerability but also increase their tendency to turn to criminal activities. Orphans get involved in such activities generally when they have little or no social support (Maluwa-Banda & Bandawe, 2004).

Therefore, these children have to be taken care of by the state, community or social organisations.

Unfortunately, to date, ample steps have not yet been taken to remediate this situation due to the lack of empirical information on the magnitude of the problem and its geographic distribution in Nepal. Measuring the spatial distribution of any social or public health problem is the primary step in addressing it. The significance of such geographic information is twofold. Firstly, it identifies the area of high prevalence and secondly, it reflects the possible determinants. Hence, this study aimed to identify the sub-regional level variation in distribution of orphans staying in households. Although an investigation of the overall status of these children, including orphans who reside in the children's homes is also essential, this is not the focus of this study and is left to future work. It is expected that the findings of this study will be a useful reference for the concerned authorities or institutions to draft robust policies, set some strong strategies and implement priorities to offer basic standards of food, shelter, health, education and welfare for the overall development of orphans in Nepal. Furthermore, the information will be valuable to accelerate ideas to investigate possible causes of orphanhood and prepare an action plan with appropriate intervention activities in order to prevent or reduce the number of orphans in the country.

## METHODS

### *Data, Sample Size and Sampling Method*

This study analysed the most recent data available from the Nepal Demographic and Health Survey (DHS), 2011. A two-stage stratified cluster sampling method was used to select a nationally representative sample of 10,826 households (MOHP Nepal et al., 2012). There were 49,791 individuals in total from 10,826 surveyed households. Since this study concerned only children 0-17 years, households that did not have children were automatically excluded from the study. Therefore, 21,484 children (43.1% of total individuals) from 8,682 households were considered as the sample size for this study.

### *Variables Under Study*

The outcome variable was defined as “non-orphan” and “orphan” and coded respectively as “0” and “1”, based on parents’ survival status. All the children aged 0-17 years from surveyed households were asked about the survivorship of their biological parents with three alternative answers to choose from “Yes”, “No” and “Don’t know”. The internationally recognised and widely used (Bicego, Rutstein, & Johnson, 2003) definition of orphans, a child who has lost one or both parents, developed by UNAIDS, was used to define the outcome variable. However, we extended this definition and included those 17 children whose parents’ survival status was “Don’t know” into orphan. In Nepal, a large number of citizens disappeared during the conflict,

and it is suspected that these persons were kidnapped, tortured and killed by both state and rebel groups (UNHCR, 2012). The variation in distribution of orphans was assessed in different geographic levels like Ecological, Developmental Sub-regions and urban-rural.

### *Statistical Methods*

Chi-square tests were used to explore the factors associated with orphanhood status. Since the outcome variable is binary, a logistic regression model is appropriate (McNeil, 1996). Separate logistic models were fitted for two geographic variables, development regions and sub-regions, including covariates found associated with orphanhood in chi-square tests.

The logistic regression analysis assumes that observations are independent or uncorrelated. However, this assumption was not met by this data as the children from the same household shared common characteristics. To analyse correlated observations, Liang and Zeger (1986) introduced the Generalized Estimating Equations (GEE) method. This study applied the GEE method when fitting the logistic regression model to control the effect of correlated data (Desilva et al., 2012; Halekoh, Hojsgaard, & Yan, 2006; Hanley, Negassa, Edwardes, & Forrester, 2002).

Each determinant does not have a control or reference group. So, instead of using the treatment contrasts, the present study used sum contrasts. This method gives a measure of its difference for each

level of each determinant factor from the overall mean of the outcome. The estimated proportion of orphans with 95% CI in each geographic parameter was calculated by using coefficients and standard errors obtained from the model. The statistical software system R version 2.15.2 was used for managing and analysing all data (R Core Team, 2012).

## RESULTS

### *Background Characteristics and Geographic Location of the Study Population*

Of the total 21,484 children, 1,142 (5.3%) were orphans who had lost either one or both parents. Among the 1,142 orphan children, 30% had lost only their mother, 64% had lost only their father and 6% had lost both parents. Table 1 presents the socio-demographic information, including geographic location of the children. Almost half (46%) of the children were 10-17 years, while one quarter (25%) were under 5 years

of age. There were almost equal numbers of children of each sex. Since there is considerable variation in distribution of the population in ecological zones, development regions and in urban and rural areas of Nepal, the number of children in this study also varied across regions. Only 18% of the children were from the Himalayan region and nearly half (42%) were from the Terai region. Similarly, three quarters (76%) of the total number of children were from rural areas. However, almost equal (5-10%) percentages of children were selected from each sub-region.

### *Exploring the Association (Bivariate Analysis)*

Table 1 also presents the results obtained from chi-square tests. Age groups, wealth index, development regions and sub regions were significantly associated ( $p < 0.05$ ) with orphanhood whereas place of residence (urban/rural), ecological region and sex of the child were not associated ( $p > 0.05$ ).

TABLE 1  
Bivariate Analysis Between Orphanhood And Demographic, Economic and Geographic Factors, Nepal Demographic Health Survey-2011

Factors	Total Frequency (%) <sup>a</sup>	Non-orphan Frequency (%) <sup>b</sup>	Orphan <sup>a</sup> Frequency (%) <sup>b</sup>	P values
<b>Demographic factor</b>				
Age groups				< 0.001
Under 5 years	5444(25.3)	5367 (98.6)	77 (1.4)	
5-9 years	6118(28.5)	5888 (96.2)	230 (3.8)	
10-14 years	6606(30.8)	6098 (92.3)	508 (7.7)	
15+ years	3316(15.4)	2989 (90.1)	327 (9.9)	
Sex				0.069
Male	10844(50.5)	10298 (95.0)	546 (5.0)	
Female	10640(49.5)	10044 (94.4)	596 (5.6)	

TABLE 1 (*continued*)

Factors	Total Frequency (% <sup>a</sup> )	Non-orphan Frequency (% <sup>b</sup> )	Orphan <sup>a</sup> Frequency (% <sup>b</sup> )	P values
<b>Economic factors</b>				
Wealth Index				< 0.001
Poorest	5913(27.5)	5521 (93.4)	392 (6.6)	
Poorer	4283(19.9)	4050 (94.6)	233 (5.4)	
Middle	3743(17.4)	3554 (95.0)	189 (5.0)	
Richer	3662(17.0)	3490 (95.3)	172 (4.7)	
Richest	3883(18.1)	3727 (96.0)	156 (4.0)	
<b>Geographic factors</b>				
Place of residence				0.112
Urban	5231(24.3)	4930 (94.2)	301 (5.8)	
Rural	16283(75.7)	15412 (94.8)	841 (5.2)	
Development Region				< 0.001
Eastern	5004(23.3)	4734 (94.6)	270 (5.4)	
Central	4837(22.5)	4631 (95.7)	206 (4.3)	
Western	3524(16.4)	3356 (95.2)	168 (4.8)	
Mid-western	4325(20.1)	4055 (93.8)	270 (6.2)	
Far-western	3794(17.7)	3566 (94.0)	228 (6.0)	
Ecological Zone				0.448
Mountain	3889(18.1)	3681 (94.7)	208 (5.3)	
Hill	8538(39.7)	8066 (94.5)	472 (5.5)	
Terai	9057(42.2)	8595 (94.9)	462 (5.1)	
Sub-regions				< 0.001
Eastern Mountain (EM)	1361(6.3)	1303 (95.7)	58 (4.3)	
Central Mountain (CM)	1090(5.1)	1048 (96.1)	42 (3.9)	
Western Mountain (WM)*	1438(6.7)	1330 (92.5)	108 (7.5)	
Eastern Hill (EH)	1772(8.2)	1671 (94.3)	101 (5.7)	
Central Hill (CH)	1596(7.4)	1539 (96.4)	57 (3.6)	
Western Hill (WH)	1720(8.0)	1627 (94.6)	93 (5.4)	
Mid-Western Hill (MWH)	1788(8.3)	1693 (94.7)	95 (5.3)	
Far-Western Hill (FWH)	1662(7.7)	1536 (92.4)	126 (7.6)	
Eastern Terai (ET)	1871(8.7)	1760 (94.1)	111 (5.9)	
Central Terai (CT)	2151(10.0)	2044 (95.0)	107 (5.0)	
Western Terai (WT)	1804(8.4)	1729 (95.8)	75 (4.2)	
Mid-Western Terai (MWT)	1792(8.3)	1674 (93.4)	118 (6.6)	
Far-Western Terai (FWT)	1439(6.7)	1388 (96.5)	51 (3.5)	

**NOTE:** <sup>a</sup> The figures in parentheses are the column percentages.

<sup>b</sup> The figures in parentheses are the row percentages.

\* Western Mountain includes the Mid-Western and Far-Western Mountain



*Distribution of Orphan Children by Development Region (Multivariate Analysis)*

The association found in bivariate analysis was further assessed in multivariate analysis. Table 2 presents the coefficients, standard errors and p values for all the parameters obtained from three different statistical models fitted between development regions

and orphan status. Model 1 was the null model, Model 2 included covariates age, sex and wealth index while Model 3 was further adjusted with correlated observation using GEE methods. The association found in the chi-square test and logistic regression Models 1 and 2 could not be verified in Model 3. The fitted percentage including

TABLE 2

Statistical Modelling of Children by Development Regions Adjusted with Age, Sex and Wealth Index, Nepal Demographic Health Survey-2011

	Coefficient (Standard error)		
	Model 1	Model 2	Model 3 (geeglm)
Development regions			
Eastern	0.022 (0.057)	0.009 (0.058)	0.039 (0.079)
Central	-0.227 (0.063)***	-0.196 (0.064)**	-0.119 (0.085)
Western	-0.108 (0.069 )	-0.068 (0.070)	-0.087 (0.095)
Mid-western	0.177 (0.058)**	0.154 (0.059)**	0.092 (0.086)
Far-western	0.136 (0.061)*	0.101 (0.063)	0.077 (0.088)
Age groups			
Under 5 years		-1.229 (0.089)***	-1.156 (0.084)***
5-9 years		-0.214 (0.061)***	-0.135 (0.041)**
10-14 years		0.569 (0.050)***	0.488 (0.045)***
15+ years		0.874 (0.057)***	0.803 (0.052)***
Sex groups			
Male		-0.034 (0.031)	-0.019 (0.023)
Female		0.034 (0.031)	0.019 (0.023)
Wealth index			
Poorest		0.315 (0.055)***	0.272 (0.076) ***
Poorer		0.084 (0.062)	0.076 (0.086)
Middle		-0.014 (0.067)	-0.001 (0.090)
Richer		-0.116 (0.069)	-0.096 (0.090)
Richest		-0.269 (0.072)***	-0.251 (0.090)**
<b>P values from model</b>			
Development region	7.203e-05 ***	7.203e-05***	0.1077
Age groups		< 2.2e-16***	<2e-16***
Sex groups		0.181	0.3716
Wealth index		2.652e-08***	0.0012**
Number of cluster			8682
Maximum cluster size			20

**NOTE:** \*=p<.05, \*\*=p<.01 \*\*\*=p<.001

Contrast= Used sum contrast while fitting the model.



a 95% confidence interval obtained from Model 3 is also presented in Fig.1. The overall percentage of orphans was included in the confidence interval for all five regions, so the variation is not statistically significant. The figure shows that the proportion of orphans found was significantly lower in <10 years age group and significantly higher in >10 years age group compared with the overall percentage (5.32%). This result was expected as older children are more likely to be orphans due to the longer exposure time for their parents to experience mortality and to the fact that the parents are older. But the result shows no variation by sex. Significantly, a higher and lower proportion of orphan children was found respectively in the poorest and the wealthiest households.

#### *Distribution of Orphan Children in Sub-Regions Stratified by Age Groups (Multivariate Analysis)*

The association between sub-regions and orphan status, explored in preliminary analysis (Table 2), was also proved in multivariate analysis. Four models were fitted by stratifying by age groups, and results were presented in the thematic map (Fig.2). The pink, yellow and blue colours in the thematic map indicate the higher, average and lower proportion of orphan children compared with the overall proportion in that specific age group. Significantly, a high proportion of orphans in children of all ages was concentrated in Western Mountain and Eastern Terai regions whereas a significantly lower proportion was found in Central Hill region. The scenario was a little different

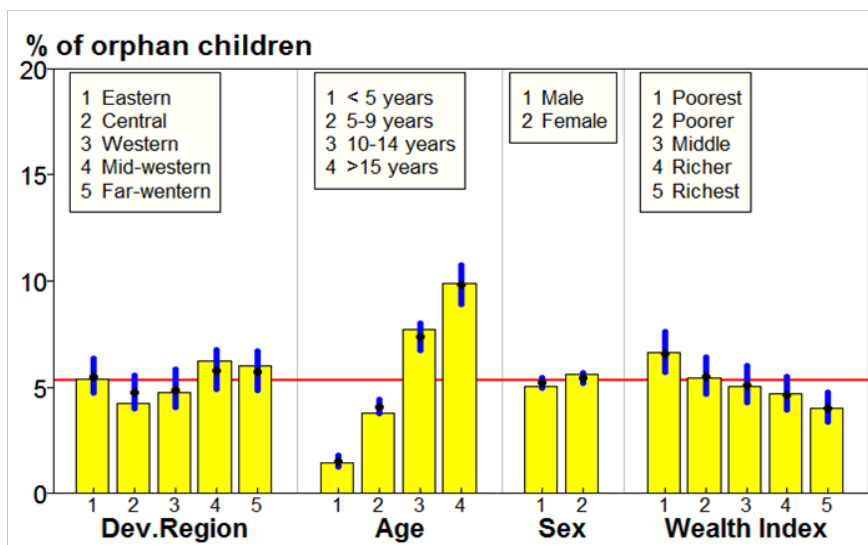


Fig.1: Percentage distribution of orphan children with 95% confidence interval from model, DHS 2011, Nepal.

in age-stratified analysis. In the 0-4 years age group, the proportion was found high in Western and Far Western Hills. However, in the 5-9 years age group, it was found high in Mid-Western and Central Terai. Among the children above 10 years of age, a higher proportion was found in Western Mountain region.

## DISCUSSION

The present study found that 5.3% of children are orphans in Nepal. This figure is lower in comparison to some Asian countries like Afghanistan, Democratic People's Republic of Korea and Laos (>10%) but similar to neighbouring countries like China (5%), India (6%) in 2010 and Bangladesh (5.8%) in 2006 (BBS & UNICEF, 2007; UNAIDS, UNICEF, & USAID, 2004). Similar to the findings of studies conducted in Cambodia

(The National Multi-sectoral Orphans and Vulnerable Children Task Force, 2008) and in India (SOS Children Villages, 2008), this study found that the likeliness of being an orphan increases as the child grows older. This finding is also consistent with the findings from sub-Saharan African countries where the parents died due mainly to AIDS and the children were also likely to be affected by HIV (*Bicego et al., 2003; Monasch & Boerma, 2004*).

Similar to the findings in Cambodia (UNICEF EAPRO, 2009) and Bangladesh (BBS & UNICEF, 2007), this study found evidence of sub-regional level variation in distribution of orphans in Nepal. It is common to find such a type of variation in distribution of any social or public health problem within a country. But the important thing here is to understand the

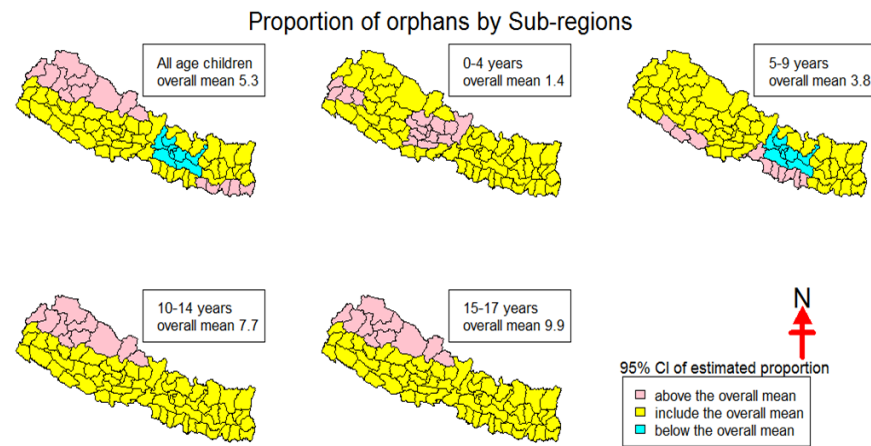


Fig.2: Thematic map from model on variation in distribution of orphan children by sub-region and age groups in Nepal 2011

possible reasons behind such a variation and to best utilise this information to address that problem. Therefore, this study further discusses the possible reasons behind the inequality in distribution of orphan children based on evidence from literature reviews.

One of the most probable reasons for a high proportion of orphans in the Western Mountain sub-regions could be hunger and famine. Nepal ranks 57th out of 88 developing countries with a GHI of 20.6. The highest prevalence of poverty and hunger, which is an extremely alarming situation ( $\text{GHI} \geq 30$ ), was found in Far- and Mid-Western Hills and Mountain regions (WFP Nepal, 2009). Due to an inadequate nutritional diet, people die at a young age. According to a human development report, the life expectancy of people from this area is lowest (50-52 years) compared with other sub-regions, and the overall life expectancy of Nepal (United Nations Development Program, 2004). This finding corroborates the findings of neighbouring country India, where the prevalence of orphans is high in the poorest districts like Bihar, followed by Orissa and Jharkhanda (SOS Children's Villages of India). The Central Hill region, having a significantly lower proportion of orphans, was in the first rank of the hunger index that indicates better food security conditions compared with other sub-regions in Nepal (WFP Nepal, 2009). This result also proved that hunger is the main reason behind orphanhood.

Other than poverty, HIV/AIDS might be the cause for premature adult death among male labour migrants (particularly to India)

and their wives from the Western part of the country. According to the National Centre for AIDS and STD Control (2012), around 50,000 people are living with HIV with an overall national HIV prevalence of 0.3% among adults aged 15-49 years in Nepal. But the prevalence was found to be 2.8% in 2006 and 1.8% in 2010 among male labour migrants in six districts of Mid- and Far-western regions (Nepal country progress report 2012).

The high rate of premature female death in Nepal is due to maternal causes. The Maternal Mortality Ratio (MMR) is still high (170/100,000 live births) in the country (World Bank, 2012). The significant variation in MMR by caste/ethnicity was found in a survey conducted in 8 districts (FHD, 2009). Muslim and Terai/Madhese groups have very high ( $>300/100,000$  live births) maternal mortality. The higher proportion of orphans found in Mid-Western Terai and Central Terai in the 5-9 years age group might be due to high maternal mortality.

One of the possible reasons for a high proportion of orphans in the Eastern Terai could be the displacement of conflict-affected families. However, although the effect of conflict was throughout the country, the impact was found most severe in Far West and Eastern Terai. A high number of widows and orphans have been reported in the Far and Mid-Western regions due to conflict (WFP and OCHA, 2007). According to UNFCO, Biratnagar (2013), more than 1,991 individuals were killed and 3,979 people were displaced during the decade

long conflict only in this region. Civil unrest continues today through the identity-based groups in this region. There was no age-specific high magnitude of orphans in these sub-regions; however, the proportions in the <5 year ( $p=0.07$ ) and in 10-14 years ( $p=0.06$ ) age groups were borderline.

The strengths of this study are the use of advanced stratified statistical analysis and the use of sufficient subjects for such analysis from the most recent nationwide population-based study. Since information on the distribution of orphans in different geographic area is lacking, the results of the study would help in understanding the prevalence of orphans, particularly in different sub-regions of Nepal.

## CONCLUSION AND RECOMMENDATION

In conclusion, the proportion distribution of orphan children in households varies by sub-regions and age groups in Nepal. The proportion was found high in the poorest region. Hence, priority should be given to planning and implementing welfare programmes to those pocket areas where the proportion is higher. This study explored the possible factors of poverty, conflict and displacement, HIV/AIDS and maternal mortality. It would be of interest and useful to learn if there were any patterns in levels of armed conflict, HIV and other infectious disease outbreak and other possible related causes in a further study. This study identified and compared the proportion of orphans in households; estimating the absolute number of orphans

in the population including institutional and street children would provide more valuable information for planning programmes.

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