

2012

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Recommended Citation

Trani, Jean-Francois and Loeb, Mitchell M., "Poverty and disability: A vicious circle? Evidence from Afghanistan and Zambia" (2012). *Brown School Faculty Publications*. Paper 33.
http://openscholarship.wustl.edu/brown_facpubs/33

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Poverty and disability: A vicious circle? Evidence from Afghanistan and Zambia

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Journal of International Development J. Int. Dev. (2010) Published online in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/jid.1709

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Abstract

Disability and poverty have a complex and interdependent relationship. It is commonly understood that persons with disabilities are more likely to be poor and that poverty may contribute to sustaining disability. This interdependency is revealed not only through an examination of poverty in terms of income but also on a broader scale through other poverty related dimensions. Just how robust is this link? This paper compares data collected from household surveys in Afghanistan and Zambia, and explores the potential link between multidimensional poverty and disability. We find evidence of lower access to health care, education and labour market for people with disabilities, whatever is the disability status, but poverty measured by an asset index is not statistically different between people with and without disabilities.

Key words: Afghanistan, disability, poverty.

I. Introduction

In recent years, socioeconomic inequalities and disability prevalence have increasingly been considered as correlated (Beresford, 1996; Elwan, 1999; Welch, 2002; Yeo and Moore, 2003; Filmer, 2008). In a given context, poverty is often perceived as a factor likely to contribute, while interacting with the individual's characteristics (e.g. age, gender, ethnicity, impairment) and the environment (physical, social, cultural, political and economic), to the increase of disability prevalence (Mitra, 2006). At the same time, presence of impairment has often been considered as one of the factors which may lead a person (or their family) into poverty (Harris-White, 1999; Lwanga-Ntale and Mc Clean, 2004; Hoogeveen, 2005). Poverty alleviation policies in developing countries and genuine progress towards achievement of the Millennium Development Goals require that disabled people are explicitly taken into account in multidimensional poverty reduction efforts. This theme has been reiterated in the recently adopted UN Convention on the Rights of Persons with Disabilities (UN, 2006).

Poverty has traditionally been measured using income or consumption indicators. This requires the definition of a subsistence income level (referred to as the poverty line) below which a person is considered to be poor. Current studies have focussed on the identification of the segment of the population that may be considered poor, and the measurement of poverty and inequality, through an aggregation of household characteristics into an overall indicator satisfying certain properties (Sen, 1976, Foster and others 1984, Pyatt, 1987; Foster and Sen, 1997, Zheng, 1997). In welfare economics, well-being is understood in terms of capacity to buy a basket of commodities. Literature generally explored economic well-being of persons with disabilities through the restrictive lens of income (Haveman and Wolfe, 1989, 2000; Moon and Shin, 2006).

The capability approach shifts the focus in poverty analysis away from means (income) to ends that people value and to the freedoms of satisfaction those ends permit (Sen, 1999). If low income is indisputably a major cause of poverty in low income countries, it follows, according to Sen, that poverty must be seen as the deprivation of basic capabilities such as life expectancy, infant mortality, the ability to be well nourished and well sheltered, basic education, employment and health care. Therefore, we argue that the well-being of people depends not only on the one-dimensional approach of income but also on non-monetary dimensions of well-being and, in this way, well-being is intrinsically multidimensional. Enhancing human capabilities and thus well-being can be accomplished by providing access to, as central basic capabilities, education, health care and the labour market that we are exploring in the present paper.

Disability, in the capability perspective, can be considered as the deprivation of capabilities for persons with impairments (Mitra, 2006). Therefore, providing access to basic capabilities to persons with impairment might be a way to reduce prevalence of disability. Little empirical evidence exists, however, examining the link between poverty as deprivation of basic capabilities and disability.

We examine data collected from surveys of living conditions among people with disabilities in Afghanistan and Zambia, and use multidimensional exploratory analysis and logistic regression analysis to demonstrate the possible relationship between different poverty dimensions and disability. Aside from the availability of comparable data from recent national household surveys that can allow econometric analysis of association between poverty and disability, the selected countries are also among the lowest ranking on UNDP's human development index¹ (HDI). In 2005 the HDI for Zambia was

calculated as 0.434 placing the country at 165 among the 177 countries reporting data. The HDI for Afghanistan in 2005 is presented as 0.312, which places it last on the list² (UNDP, 2007). Therefore both countries are characterised by a high proportion of their population living in poverty with potentially high prevalence of impairments resulting from bad health condition, poor awareness about sanitation and disease prevention, malnutrition, deprived conditions of living, and dangerous working conditions. Finally, similar findings questioning the association between poverty and disability in two different cultural, socioeconomic and geopolitical settings provide robust evidence about the existence, in certain dimensions, of a possibly vicious cycle between poverty and disability. The purpose of this article is to explore the nature and the intensity of the association between multidimensional poverty and disability in the context of two low income countries examining the relationship between personal characteristics (age, gender, impairment, marital status, etc.) economic resources (asset ownership) and the economic environment (access to education, health and employment) of the individual.

II. Methodology

II.1 Household surveys in Afghanistan and Zambia: Survey design

The two surveys were carried out independently by two separately funded and operating research teams. The Afghanistan survey was carried out from December 2004 to August 2005 while the Zambia survey was conducted from September 2005 to May 2006³. Both surveys employed cluster random sampling designs using country enumeration areas as the smallest unit of sampling. The most recently collected census data was used to provide the sampling frame. The Zambia survey included 5751 households, 28,189 individuals and identified 3090 persons with disabilities from the 9 provinces. The

Afghanistan survey included 5130 households, 38,320 individuals and identified 1038 persons with disabilities from the 34 provinces.

For the purpose of analyses presented here, data are restricted to people who were between 14 and 65 years old (inclusive) with a disability: that is the population of potentially working individuals, and a set of controls matched by age and gender.⁴

In Zambia, the effective sample size was 3488 (1845 persons with disabilities and 1643 controls); in Afghanistan the effective sample size was 1544 (641 persons with disabilities and 903 controls). One of the major challenges to those concerned with disability measurement internationally is comparability of data between countries (Altman, 2006; Leonardi and others, 2006; Me and Mbogoni, 2006). This paper is an attempt to make such a comparison using two data sets with similar methodologies.

II.2 Definition, Procedure and Identification of Persons with Disabilities

Defining disability is challenging as there is no standard definition or consensus on what disability entails (Altman, 2001). In this paper, our measure of disability is based on the International Classification of Functioning, Disability and Health – ICF (WHO, 2001) definition of disability and includes impairments, activity of daily living limitations and participation restrictions. In both surveys, we adopted multiple disability measures to account for the complexity of identification of disability (Kruse and Schur, 2003; Mitra and Sambamoorthi, 2008). Hence, the National Disability Survey in Afghanistan (NDSA) used a disability screening tool composed of 27 questions divided into five sections and related to different types of impairments, activity of daily living limitations and participation restrictions: mobility and sensory, intellectual and learning, behavioural and psychological, communication and social functioning limitations and restrictions, finally fits, seizure and epilepsy. According to this procedure, a person was considered to be

disabled if he/she had at least one positive answer to the first section (mobility and sensory) and/or at least two affirmative answers to each of the other four sections. The Zambian survey included a disability screening tool based on the work of the Washington Group for Disability Statistics (WG) and the ICF. To identify that portion of the population at greater risk of than the general population of experiencing limited independent participation in society, the WG has identified a short set of six questions based on difficulties doing certain basic activities due to a health problem (seeing, hearing, walking, cognition, self care, and communication)⁵. Each question has four response categories: (1) no difficulty, (2) some difficulty, (3) a lot of difficulty and (4) unable to do the activity. For the purposes of the Zambian survey, a person was considered to have a disability if he/she had *a lot* of difficulty/or was *unable* to do any *one* of the 6 activities, or, in the absence of these more severe categories, at least *some* difficulty with at least *two* activities above.

The National Disability Survey in Afghanistan (NDSA) questionnaires were developed through focus groups and face to face interviews with inputs from a number of partners within and outside of Afghanistan, including disabled people's organisations. They consist of various tools: a checklist and a consent form, a household form, a screening form, an adult and a child forms. The adult form was designed to provide information about education, health conditions and accessibility to existing health services, employment, livelihoods, income, social networks and participation. Design of questions was based on A.K. Sen capability approach and looked not only at functionings, what people effectively achieved, but also at what people's aspirations were (Bakhshi and others, 2006a; Bakhshi and Trani, 2007, Trani and Bakhshi, 2008).

The Zambian survey of living conditions among people with disabilities was developed as the fourth in a regional exercise of data collection and capacity building in the southern African region. In addition, a household survey designed to collect information on household composition and housing situation and a detailed disability survey to be completed by the person identified as having a disability were completed. A report of the Zambian survey, including details of the methodology used can be downloaded here:

<http://www.sintef.no/lc>

II.3 Statistical analysis

The link between demographic characteristics and deprivation of basic capabilities is examined through a set of factors. The socio-demographic variables used in the model were selected based on their level of correlation with the three basic capabilities selected: gender, age, marital status, disability status (disabled/not disabled) as well as types of impairment or severity of disability based on difficulties in carrying out of day to day activities, education level, residence (urban/rural), employment status, availability of a public health facility and level of material wealth as measured by an asset index. The asset index was calculated as a proxy for wealth using principal-components analysis, and by deriving the asset groups from the first factor of analysis (Filmer and Pritchett, 2001). This index is composed of 15 indicators for Afghanistan and 17 for Zambia linked to the possession of certain household or individual items, characteristics of the household dwelling and household ownership. These indicators are culturally appropriate and contextually based. In Afghanistan. Two variables were used for descriptive statistics: ethnicity and access to health care (see Table 1).

We use multiple correspondence analysis (MCA) part of multivariate exploratory methods (Benzecri, 1973, 1992), in particular a factorial analysis and a cluster analysis

both based on the same variables, to show the relationship between one set of dichotomized variables characterizing groups of individuals, and another set of variables used as proxies of basic capabilities. The goal is to identify which groups of individuals are deprived of basic capabilities. The factorial analysis displays categorical variables in a property space and maps their associations in two or more axes. The cluster analysis based on the results of the factorial analysis assigns numerical values to observations or individuals and categories or clusters so that individuals within the same category are close together and individuals in different categories are further apart, thereby defining homogeneous subgroups within the population. In our example, the cluster analysis is used to graphically display relationships between the active variables which define the axes in the factorial analysis.

We investigated determinants associated with three basic capabilities: access to employment, education and health care services. Logistic regression analyses were used to assess the effect of demographic and socioeconomic variables on the same three binary variables: working or not, access to education or not and accessibility of health care or not. Statistical comparisons were performed using Wald χ^2 tests from multivariate logistic regression for dichotomous variables. A p value of < 0.05 was considered statistically significant for these analyses. An odds ratio (OR) was considered to be statistically significant if its associated 95 per cent confidence interval (CI) excluded the value 1.0.

III. Results of the Surveys

III.1 Sample characteristics

For the present analyses we use the adult databases of the NDSA and the Zambian surveys which are composed of 1544 and 3488 individuals aged 14 to 65 years old respectively. Demographic sample characteristics are summarized in Table 1 for both

countries. Both surveys include an over-representation of men. In the NDSA data non-disabled persons are more present in the younger age categories whereas disabled persons are over-represented in the oldest age group (over 45). No difference was observed in the age distributions between the disabled and non-disabled sub-populations in the *Zambian* data. Most people were married; however, the *Zambian* data revealed an under-representation of married individuals in the disabled group, and in both countries a higher proportion of disabled people were either separated or divorced. Ethnicity data was not collected in *Zambia*. In *Afghanistan* a majority were Pashtun and one third were Tajik. Data from *Afghanistan* is characterised by a higher proportion of people living in rural areas with only about 20 per cent living in major towns, compared with about 40 per cent in *Zambia*. Access to education *seems* to be more prevalent in *Zambia* with lower non-attendance rates but in both countries a higher proportion of people with disabilities had no education. According to the data presented here, unemployment is high in both countries and people with disabilities are over-represented among the unemployed. There was no significant difference between disabled and non disabled persons in either country regarding level of material wealth as measured by the asset index. If a higher proportion of disabled persons perceived that public health facilities were not available in *Afghanistan*, they also proportionally used them more during the year preceding the interview. Statistically significant differences between those with and those without a disability were observed with respect to age distribution (*Afghanistan* only), the marital status, the level of education, the employment status and the use of health care facilities.

Table 1. Socio-demographic characteristics of non-disabled and disabled respondents from Afghanistan and Zambia

III.2 Wealth Discrepancies

Table 2 reports the scoring factors from the principal component analysis of the 15 (Afghan) and 18 (Zambian) variables used for the composition of the asset indexes considering the economic specificity of each country. For both countries the mean value of the index is 0.0 with a standard deviation of 0.025 for Afghanistan and 1.0 for Zambia. Each asset variable takes the value 0 or 1 for all individual or household goods. The weights are therefore easy to interpret: an increase of 1 changes the index by the ratio of the scoring factor divided by the standard deviation. For instance, a household that owns a radio has an asset index 6.68 lower than one that does not in the case of Afghanistan and an asset index higher by 0.64 in the case of Zambia. Some items are common and have little effect, or even a negative effect, on the asset index. Therefore, their impact on the index is limited. Other items are very uncommon and indicate a higher standard of living, such as televisions which increase the asset index by almost 30 in Afghanistan but only 1.96 in Zambia. Individuals were assigned to one of 3 categories of material wealth according to the index value: the lowest 40 per cent were placed in the 'poorest' group, the middle 40 per cent were placed in the 'middle' group and the upper 20 per cent were placed in the 'richest' group. This categorization follows the differentiation used by Filmer and Pritchett (2001). The difference in the average index between the poorest and the wealthiest group is 2.44 units for Afghanistan and 16.47 for Zambia, illustrating different levels of wealth inequalities between social groups. Thus there appears to be more homogeneity in the Afghani data with respect to asset index, but the index is robust to the assets included in both countries. Previous analyses indicated that there were few

differences between households - and no difference in terms of possessions (both countries), housing standard (Zambia) or access to information (Zambia). The most striking differences were noted in terms of education and employment (Trani and others 2006; Eide and Loeb, 2006).

Table 2: Scoring factors and means for variables included in the principal component analysis of the NDSA and Zambia household databases

III.3 Well-being, gender and disability

As mentioned above, the link between well-being, gender and disability is explored using multinomial correspondence analyses. Multiple correspondence analysis applies the simple correspondence analysis algorithm to multivariate categorical data coded in the form of an indicator matrix or a Burt matrix (Greenacre, 1984, 1993; Greenacre and Blasius, 2006). It measures the association within a set of categorical variables looking at all correlations between these variables. Multiple correspondence analysis allows for the visualization of the interrelationships between response categories of a set of variables, for instance between poverty categories and disability categories. Once the relationships between these categories are visualized using a spatial map and interpreted, the method additionally allows for the display of explanatory demographic variables of interest to us such as gender, age, marital status, education, employment, and access to health services in order to enrich the interpretation (Greenacre and Blasius, 1994).

For the purpose of these analyses, two sets of variables are defined: active and illustrative variables. The characteristic attributes of the former, which relate to measurement of multidimensional poverty as well as to individual socioeconomic characteristics, contribute to define factors and clusters, whereas the latter do not. Characteristic attributes of illustrative variables relate to the same characteristics (poverty measure, socioeconomic characteristics) but offer a different presentation: we use disability type as

an active variable for instance, but we use disability severity score and disability status as illustrative variables. They provide additional information about factors and clusters according to where they are scattered. Illustrative attributes that are similar to active attributes will be scattered together, thereby reinforcing the robustness of the correspondence analysis. All the calculations that lead to the factorial planes, to the hierarchical classification tree and to the final partitions are carried out only on the active cases. The illustrative cases are projected onto the factorial planes constructed, and re-assigned during the partition into classes, of which they are the closest. The active variables defining the factors in Table 3 are demographic characteristics (gender, age, and marital status), impairment type (sensory, mobility or cognitive/mental/multiple), residence (urban/rural), employment status, wealth status (asset index in three categories) and education level. In addition, ethnicity and use of health facility are included as active variables in the Afghani analysis.

Illustrative variables include urban or rural setting (only for Afghanistan), gender of the head of household, severity of disability (none, mild, moderate, severe, very severe or complete) and disability status.

Thus, for the Afghan data 10 active variables representing 32 specific characteristics and 4 illustrative variables representing 11 characteristics are defined for factorial analysis and the cluster analysis, while in Zambia 9 active variables representing 24 characteristics, and 3 illustrative variables representing 9 characteristics are defined.

Figures 1 and 2 are the projections of the set of characteristics obtained using the first two dimensions of the factorial analysis. We base the interpretation of the factorial analysis upon proximities between points on a low-dimensional map (i.e. two or three dimensions

or factors). Considering severity in both factorial analyses allows us to check the robustness of the division in clusters using activity limitation by type of impairment. Test-values represent relative contributions of variables to the factors (Lebart and others, 1995). Attributes in Table 3 are arranged according to their test-values. In general, an attribute is considered significant for a factor if the absolute value of its test-value is higher than 2, which corresponds to an error threshold of 5 per cent. The test-values for characteristics of vulnerability (i.e. access to school, wealth status, availability or use of health facilities, employment status) strongly determine both factors 1 and 2 for Afghanistan and Zambia.

Table 3. Definitions of factors 1 and 2 of the factorial analysis by active variables

The factorial analysis for Afghanistan is essentially uni-dimensional, with women clustered on the positive side of factor 1 (test value of 23.24) and factor 2 (11.17), while men are clustered respectively on the negative side of both factors (-23.29 and -11.14 on factor 1 and 2 respectively). The analysis of the test values shows that the positive side of factor 1 is characterized by widowed, divorced or separated women (9.80) living in rural areas (21.72) from Pashtun backgrounds (8.43) with mental, cognitive or multiple impairments (9.02). They are deprived of basic capabilities, i.e. they have no access to school (27.91) or the labor market (25.05), and are in the poorest group in terms of the asset index (11.61). The negative side of the first factor shows the reverse pattern: young men (-13.97) of Tajik origin (-11.89) living in major towns (-21.78), accessing school (-22.84 for secondary characteristics) but not yet the labor market (-17.25) because they are too young, and belonging to the highest social group in terms of material wealth or asset index (-19.96). Disability is significantly associated with the first factor of the factorial

analysis: poor women who have a mental condition and are deprived of basic capabilities are scattered on the negative side. The illustrative attribute 'absence of difficulty' of the illustrative variable 'severity' is situated on the negative side of this factor. Similarly, the attribute 'moderate difficulty' of the same variable is positioned on the positive side. The second factor is characterized in its positive part by young (30.29 for age group 14-19 years old) single women (29.46) living in rural or semi urban areas (11.14) who have access to education (8.97 for primary education) and are not disabled (6.59). Absence of disability is associated with the positive side of this factor. They are opposed with adult men (-13.03, -11.51 and -11.50 respectively for age groups 35-44, 25-34 and over 45 years old), living in major urban areas (-11.11), with access to the labor market (-19.36), and from rather wealthy backgrounds (-10.36). Some of these men of auspicious means are disabled with limitations restricting their mobility (-8.37).

For Zambia, Table 3 shows that the positive side of the first axis is plotted with working (test-value 37.84), married (37.66) or widowed, separated or divorced (16.00) adults (25.62 and 17.56 for respectively 45-65 and 35-44 age groups) from the poorest backgrounds (10.75), living in rural areas (9.72). Non disabled persons with no severity score are scattered on this side of the axis. On the negative side of the axis, single (-51.63) unemployed (-30.86), young (-39.55 and -15.44 respectively for 14-18 and 19-24 age groups), wealthy (-12.48), respondents with cognitive, mental or multiple limitations (-19.16) determine the factor. People who score highly on the various disability measures are scattered on this side of the axis (disabled -11.46; cognitive/mental/multiple -19.16; and severe -8.78). Factor 2 is characterized on the positive side by those with little education (23.71 for primary level), of the poorest means (32.37), situated in a rural

setting (35.03), with cognitive, mental or multiple limitations (15.10) with no access to health facilities (32.14) who are widowed, divorced or separated (12.91); as opposed to urban dwelling (-33.30), wealthy (-36.34), educated (-36.52 for secondary or higher education), employed (-15.64), married (-13.82), non disabled (-10.68) people with access to health facilities (-29.54). Disabled female heads of household are scattered on the positive side of the axis whereas non disabled people with no limitations define the negative side of factor 2.

In the case of Zambia, disability is partially significantly correlated with poverty. On the first factor, the disability category of cognitive, mental or multiple impairment is associated with people having a wealthy background as measured by the asset index, and absence of disability is linked to deprived people also measured by the asset index.

Conversely, cognitive, mental or multiple impairment is associated on the second factor with disadvantaged people measured by the asset index, whereas absence of disability is associated with privileged people who have access to health and employment and belong to the wealthiest group according to the asset index. The factorial analysis in the case of Afghanistan shows that no disability or mobility impairment is associated with a relatively wealthy background in terms of asset index, and also with access to basic capabilities (at least education and employment). On the contrary, the category cognitive, mental or multiple impairment is significantly associated with multidimensional poverty and gender. In both cases, results show that disability does not link steadily with poverty, especially when measured by the asset index. But even when considering other dimensions of poverty, such as access to employment or education, results for Afghanistan show that Afghan males with mobility impairments appear to be privileged

in this regard. These results are confirmed by the cluster analysis in the case of both countries.

Table 4. Cluster characteristics for Afghanistan

Table 5. Cluster characteristics for Zambia

Figure 1. Classification in 7 clusters on all dimensions of vulnerability in Afghanistan.



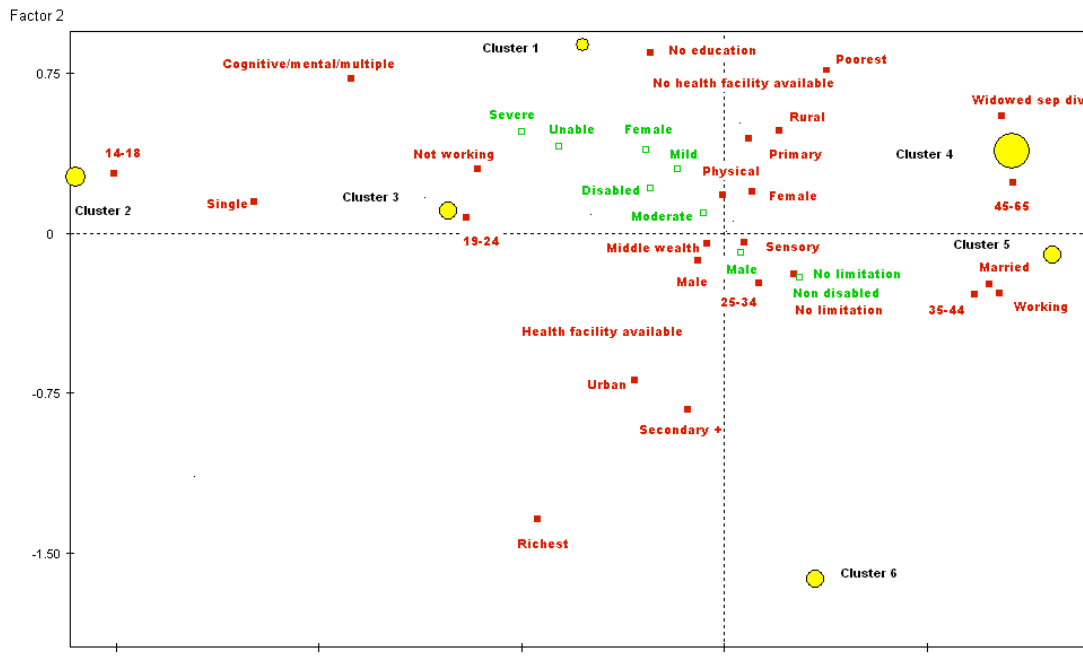
The cluster analysis based on the first two factors described above of both factorial analyses defines a partition in seven groups for Afghanistan (Figure 1 and Table 4) and 6 groups for Zambia (Figure 2 and Table 5). The cluster analyses confirm and refine the results of the factorial analysis by defining subgroups of the samples of Afghanistan and Zambia based on the same set of variables. In other words, these analyses bring together respondents with the same profile in terms of demographic characteristics (age, sex, ethnic origin, marital status), disability status and in terms of multidimensional poverty attributes (wealth, employment status, access to health facilities and to education). The cluster analysis, which is calculated based on the factorial analysis, shows the robustness of the results obtained.

For Afghanistan the first group represents 12.63 per cent of the whole sample population. It is composed of educated (70.26% of all the group has a secondary or higher level of education), urban dwelling (89.23% of the group), wealthy (86.67%), inactive (44.62%), single (50.26%) Tajik (70.77%) males (72.31%). The second group (7.58% of the total) brings together Hazara people from wealthy backgrounds, living and working in urban areas, who have access to health facilities. Cluster three (17.10%) predominantly regroups single young Pashtun males currently in education, living in villages with little or no access to health facilities. Group four (3.43%) is a very small group bringing together people from minority ethnic groups (Aimaq, Pashae, Turkoman...) who live in rural areas. Disability status is not defining any of the first four clusters which are associated with different levels of wealth. In fact, if cluster one is associated with 86.7 per cent of people from the richest group measured by the asset index, cluster three is associated with people with no job (77.7%), and almost half of the cluster is from the middle wealth group (45.8%).

Group five (25.39%) is a large huddle of active adult males, over half of whom are Pashtun and a few of whom are of Uzbek origin working as farmers and living in villages. Some have physical limitations (24.49%), probably due to war wounds. Cluster six (8.35%) gathers disabled women mainly widowed, some separated or divorced. Separation is often due to the economic migration of the husband, either to an adjoining country (Iran or Pakistan) or to a major town. The overwhelming majority of these women (98.45%) never went to school and almost half of them do not access the labor market (46.51%). The population scattered in this cluster relate to sensory impairment (28.68%). The 'disability status' illustrative variable also relates to this cluster with 67.44

per cent of the group being disabled. Cluster seven (25.52%) brings together married women who stay at home to do household tasks in rural areas, the majority of whom are Pashtun. They are mainly non disabled, but a significant subgroup have cognitive, mental or multiple types of limitation (26.65%) with a mild or moderate score.

Figure 2. Classification in 6 clusters on all dimensions of vulnerability in Zambia.



The first cluster (9.58%) of the cluster analysis for Zambia is largely composed of disabled people (88.92% of the group), mainly with cognitive, mental or multiple types of limitation (63.17%), scoring high on the activity limitation severity scale (54.49% have either severe or complete limitation). A large majority are deprived: 41.92 per cent have the poorest asset quintile level, 46.41 per cent have no access to education, or to the labor market (61.68%) or to the health system (44.31%). Therefore, this cluster strongly associates disability with multidimensional poverty. The second group (15.94%) brings together young, urban-dwelling, wealthy, educated people. The third group (13.88%) is similar to the second group. Neither associate absence of poverty with absence of

impairment. The fourth group (31.65%) is composed of about 50 per cent non disabled people and 50 per cent disabled people with sensory or physical limitations. Half of the cluster are very deprived (47.83% are among the poorest), the rest belong to the average wealth group. Most of the oldest people belong to this cluster — 69.97 per cent of the people aged 45-65 in the sample are in this cluster, and half of the 25-34 age group (54.20% of the total). Both disabled and non disabled people are either deprived or of average wealth in this cluster. Cluster 5 (14.45%) is primarily composed of married, active, adult males who are therefore well established in their village communities. However, almost a quarter of the cluster (23.81%) are physically limited. The last group collates the most privileged: urban, educated, wealthy, active, mainly non disabled and predominantly male.

In both cases, the hierarchical cluster analyses confirm the results obtained with the factorial analyses, and do not systematically associate asset deprivation and the presence of disability or wealth measured by the asset index and the absence of disability.

Nevertheless, in both classifications, disability appears to be associated with lack of education, lack of access to health services, lack of access to the labour market, and lack of access to marriage, especially for women (clusters 1 and 6 respectively in Zambia and Afghanistan classifications). In both classifications, cluster 5 associates males with physical impairments with access to employment, but with little education and poor or average wealth in terms of assets.

Both the factorial and cluster analyses show to some degree a relation between certain poverty dimensions and some types of impairment, but also with absence of disability.

The results show complex and variable relationships between multidimensional poverty

characteristics and disability. To disentangle the determinants of disability and confirm the robustness of our analysis, we completed them by estimating two logistic regressions, with ‘disability status’ and ‘impairment type’ as the dependent variables.

III.4 Multidimensional poverty and disability

Factorial and cluster analyses are descriptive and exploratory methods that provide an initial understanding of how several variables correlate, and the characteristic attributes of identified groups or clusters in a large volume of data. Our results show very complex patterns. However, the identified relationships between characteristic attributes must be further investigated in order to complete our understanding of the link between disability and multidimensional poverty. For this reason we performed binary logistic regression analyses of the effect of selected demographic and socioeconomic factors to employment, education and health care outcomes, in which all variables were entered simultaneously. The dependent variable in the 3 models are respectively a dummy indicating whether the respondent is employed, had access to school and accessibility to health care.

Logistic regression on access to employment

Table 6 shows separate results of binary regression for both countries and for respondents with and without disability. In both countries, the right column of Table 6 indicates that persons with disabilities have a negative and significant association with employment. Results from distinct employment equations demonstrate that several variables have different effects on employment among disabled and non disabled people. In Zambia, being educated, whatever the level reached, living in a rural area and being wealthier significantly increased the likelihood to work for persons with disabilities but not significantly for non disabled persons. Being single, widowed, divorced or separated was significantly associated with a lower likelihood to work for both disabled and non

disabled respondents, but with a higher probability for the latter. In Afghanistan, women in general have a lower probability to be employed. Similarly to Zambia, rural wealthier disabled respondents have a higher probability to be employed than urban and poor non disabled respondents. Having a primary, secondary or higher education level is associated with lower probability to work for non disabled in Afghanistan, but not for disabled respondents. This may reflect the importance of farming work as well as the general low level of access to education in the country until recently. In both countries, we found that persons with cognitive, mental or multiple disabilities are the least likely to work in contrast with persons with sensory disability.

Table 6: Employment logistic model

Logistic regression on access to education

The education logistic model also shows that people with disabilities in both countries are less likely to access school. In Zambia, wealth and employment are significantly and positively associated with access to school for people with disabilities but not for non-disabled. In Afghanistan, only wealth is associated with higher access to education for both disabled and non-disabled respondents. Women with disabilities have a very low likelihood to have had access to school (OR 0.15, 95% CI 0.08-0.27). Both disabled and non-disabled respondents living in rural areas had low probability to receive education, but we did not find any difference according to the type of disability.

Table 7: Education logistic model

Logistic regression on accessibility to health care services

Accessibility to health care services is neither significantly different for disabled and non-disabled people, nor between various types of disability status. More research is needed to find out if people with disabilities, although considering having the same level of accessibility as non-disabled people benefit from similar quality service and do not face discrimination during visits. In both countries, educated persons from wealthier groups have significantly better accessibility. In Zambia, urban residents have better accessibility as well. In Afghanistan, non disabled respondents have significantly higher likelihood of access but this is not the case for educated disabled respondents.

Table 8 Health care logistic model

IV. Poverty and Disability: A complex relationship

The relationship between poverty and disability is complex and the implications that this complex relationship has for policy development, for social development and for meeting both the Millennium Development Goals as well as complying with the UN Convention on the Rights of Persons with Disability are far-reaching. Case studies of two low income countries, Afghanistan and Zambia, provide the setting and the data for the examination of the link between poverty and disability. These studies, conceived and carried out independently, employed similar methodologies of measurement for both disability and indicators of multidimensional poverty.

Certain aspects of the research presented here may limit the applicability of the results and should be acknowledged. One possible limitation is linked to the decision to assess disability through type of activity limitation, rather than activity limitation severity scores using a scale based on the degree of difficulty experienced. In this case, each of the studies used different scales which made it difficult to create comparable cut-points between levels of severity. Furthermore, other studies have reported that response category cut-points were different across socio-economic groups within a country (Murray and others, 2001) and between countries (Sadana and others, 2000). To address this limitation, we repeated our calculation using two activity limitation five-point scales to assess disability. Findings were similar for both countries, and poverty measured by the level of the asset index was not a significant determinant of disability (data not shown).

The survey design and household surveys approach in both countries restricted informants to permanent residents of households (and temporary/temporarily absent residents in Afghanistan). People with disabilities living in institutions, homeless disabled people and displaced and nomadic populations were not included in the sampling. This might impact on the measure of poverty as these individuals may belong to the poorest and most vulnerable groups. In the case of Afghanistan, the impact is bound to be low for the former, as few institutions welcome disabled people, and abandoning members of the family is socially condemned in Afghan culture. The issue of nomadic or displaced populations is more problematic. These populations were only included in the sample when they settled down inside the limits of a sample cluster. The omission of these

individuals may further affect the generalizability of the results to the overall population of persons with disabilities.

A further possible limitation of our results was that the construction of a collective asset index might be insufficient to discriminate socioeconomic status in two countries where most families live under more or less impoverished conditions and own very few assets. Whether the ranking of households according to assets owned is a coherent and stable measure of wealth has been previously disputed (Filmer and Pritchett, 2001; Houweling and others; 2003). In a separate analysis (data not shown), we reiterated our analysis using a different measure of economic status; a categorization of respondent's total possessions in relation to the median number of possessions in the entire sample. These findings were not significantly different from those using the asset index.

Notwithstanding these limitations, it is a widely held belief that persons with disabilities experience discrimination and exclusion, and, because of the barriers they face, are less able to access existing resources, in particular in the form of education, employment and health care services. They are therefore at higher risk of poverty than non-disabled persons (Yeo and More, 2004; DFID, 2000). Our data both challenges and supports the contention of a poverty-disability interdependency. On the one hand poverty is a great equalizer and affects families with non-disabled family members to the same degree as it does families with a disabled family member. Our results show that poverty, measured by an index of assets, is neither systematically associated with disability, measured by types of activity limitation, nor can it be considered as a significant risk factor for disability. Compared with people in the highest economic group, those in the lower groups were not more or less likely to be disabled.

On the other hand, we have demonstrated that asset ownership is but one dimension of poverty or wealth; and other dimensions of poverty have been identified as important determinants of disability. Consequently, as many authors have suggested, the concept of poverty should not be restricted solely to approaches based on income or material wealth, but it should be open to a multidimensional approach (Sen, 1976; Kolm, 1977; Atkinson and Bourguignon, 1982; Sen, 1985, 1992; Ravallion, 1996). Poverty can be fathomed

more thoroughly using a broader socio-economic deprivation approach. We focused on the role of lack of access to education, health care facilities, and employment in the determination of risk of becoming disabled. Disabled people are less likely to be educated, employed and well-provided for in terms of health care as our results show for both Afghanistan and Zambia. There is most probably a co-dependent relationship between disability and some dimensions of poverty as already emphasised by the literature (Elwan, 1999; Yeo and Moore, 2003). One notable exception is Afghan men with mobility restrictions. Men disabled by war in Afghanistan have a very high social status as they are considered heroes by the community and often escape poverty through privileged access to land, employment, and public facilities (Trani and Bakhshi, 2008).

People with disabilities experienced more difficulty in accessing education or employment. This is even more the case for people with cognitive disabilities, mental illnesses or multiple disabilities who are less likely than other disabled persons to access the labour market. This result is consistent with other studies showing high level of stigma and prejudice towards persons with mental impairments especially when it comes to the labour market both in developed and developing countries. Baldwin and Johnson (2000) showed wage discrimination and barriers to employment caused by prejudice towards people with mental illness in the United States. Mitra and Sambamoorthi (2008) reported an overall gap in employment rates between people with and without disabilities explained by productivity limitation and discrimination through prejudice in Pudukottai, a rural district of Tamil Nadu, a state in southern India. Yet, the authors did not find wage differences. Our analysis confirms the need for an integrated approach required to tackle the needs of all disabled people, and incorporate them into the mainstream of multidimensional poverty reduction strategy.

As shown in other developing countries, children with disabilities are less likely to participate in schooling (Filmer, 2008). 'Education For All' is based on the strong belief that having access to school is a major component in fighting poverty and inequality in the long term (UNESCO, 2002). However, as is frequently the case when policies and programmes are established, the special needs of children with disabilities is often neglected — at precisely the time when such measures can be most efficiently and easily

implemented, both in terms of human efforts and financial costs. Too often disability concerns are only taken into account once they become a glaring reality in the field, and only when the number of children with disabilities is considered high enough to take action. In this situation there is no advantage to having 20/20 hindsight. On the contrary, experience has shown that taking into consideration the concerns of all vulnerable groups (children with disabilities in particular) at the time when crucial decisions are being made, is not only effective and economical, but is also the only solution that is sustainable in the long term (UNESCO, 2005). Mainstreaming disability also means making education structures sensitive, not only to accepting and including children with disabilities, but also to going the extra step and actively seeking out children with disabilities who are not currently accessing education.

Accessibility to health services did not show major difference between disabled and non disabled persons in both countries. This is not the case for persons with mental illnesses or intellectual disabilities . The number of specialised services is still very limited in both countries (Ventevogel and others, 2006), and acquiring knowledge will constitute a first step towards providing adequate treatment and support for persons with these types of disabilities.

Lack of access to employment in order to become economically independent is a major complaint expressed by disabled people (Santos-Zingale and McColl, 2006).

Opportunities for work are often limited in economies dominated by the agricultural sector, especially for severely disabled people and women with disabilities. In urban areas, however, where the service sector having been stimulated by development efforts and is growing rapidly, two major initiatives could be taken in order to improve the situation. The first would be the fight against stereotypes and attitudinal barriers which lead to the belief that persons with disabilities (especially women) cannot work due to their impairment. Sensitisation can also be achieved by mainstreaming persons with disabilities in the workplace. However, as sensitisation is not enough; a second set of affirmative actions would be the passing and implementation of legislation requiring equality in terms of the employment of persons with disabilities. This obligation, imposed on all employers (both within the state administration and the private sector) is proactive,

and could decisively help persons with disabilities in their struggle for the right to employment.

In addition to the benefits afforded those who gain access to education, employment and health care services, and individual's well-being can also be measured through aspects of social participation and the ability to fulfil certain roles in society. "Some functionings are very elementary, such as being adequately nourished, being in good health, etc. [...] Others maybe more complex, but still widely valued, such as achieving self-respect or being socially integrated" (Sen, 1993:31). We have also been able to demonstrate a significant relationship between disability, unemployment and being single. Marriage is, in fact, a major step in the process of gaining a rightful place within society. In many societies marriage is closely linked with the ability to contribute to the family and the community in general. Our results suggest that disability is seen as a barrier to taking charge of a family, in particular for women. This is confirmed by other analyses in Afghanistan (Trani and Bakhshi, 2006; Thakkar and others, 2004).

Disability is not a permanent state that remains unchanged throughout life. The challenges to our understanding of disability and to its measurement lie in the complexity of disability. For research purposes, disability becomes a matter of definition, and of the operationalization of various environmental, social and political aspects that are unique for each context considered. There are several forces at work here: as our understanding of disability improves, as our awareness and knowledge increase, the prevalence of disability will increase – to include those with mild or moderate difficulties; those who have lesser needs, but needs none-the-less. At the same time, as access to health services, nutrition and hygiene improve in low income countries (such as Afghanistan and Zambia) fewer people will suffer the consequences of preventable illnesses that are the underlying causes of several disabling conditions. Finally, the more we acknowledge the role of education, employment and social well-being to the life of a person with disabilities, the better we will be able to afford them the self-respect they deserve, to provide them with equitable access to education, employment and social services, and to lift them – and their families – from poverty and thereby break the poverty-disability interdependency.

Notes

1. The HDI is a composite indicator measuring a combination of literacy rate, gross school enrolment ratio, life expectancy and gross domestic product in purchasing power parity. Highest ranked was Iceland with a HDI of 0.968 and lowest was Sierra Leone with an HDI of 0.336.
2. Afghanistan is not listed in the report but in separate tables.
3. Details of survey designs are available, for Zambia, at: <http://www.sintef.no/lc> and, for Afghanistan, at: <http://www.handicap-international.org/dans-le-monde/nospays-dintervention/programmes/afghanistan/afghanistan-toolkit-on-disability/index.html>
4. In Zambia, for each person identified as having a disability, a person without a disability was manually identified in the database and matched according to sex and age (within 5 years) living in the same district (and constituency/ward if possible). In 202 cases no match could be found. These individuals were not deleted from the analysis. In Afghanistan, for every disabled respondent, a matched individual with no disability, of the same sex and within 2 years difference of age from the disabled respondent, was interviewed. If the 2-year age gap was too narrow, the interviewer then randomly selected a non disabled person of the same sex within the broader age category: 14 and below for children or 15 and above for adults. Finally, if there were no non disabled individuals of the same sex within the same broader category, then an individual of the same sex in the other age category was chosen as control.
5. The six questions recommended for census and national surveys by the WG are:
 - 1 Do you have difficulty seeing, even if wearing glasses?
 - 2 Do you have difficulty hearing, even if using a hearing aid?
 - 3 Do you have difficulty walking or climbing steps?
 - 4 Do you have difficulty remembering or concentrating?
 - 5 Do you have difficulty (with self-care such as) washing all over or dressing?
 - 6 Because of a physical, mental, or emotional health condition, do you have difficulty communicating, (for example understanding or being understood by others)?

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Table 1. Socio-demographic characteristics of non-disabled and disabled respondents from Afghanistan and Zambia

Characteristics		Afghanistan		Zambia	
		Number of Respondents (%)			
		Non-disabled (n=903)	Disabled (n=641)	Non-disabled (n=1643)	Disabled (n=1845)
Sex	Male	494 (54.7)	373 (58.2)	932 (56.7)	1055 (57.2)
	Female	409 (45.3)	268 (41.8)	711 (43.3)	790 (42.8)
Age	14-19	270 (29.9)	119 (18.6)	268 (16.3)	308 (16.7)
	19-24	165 (18.3)	68 (10.6)	245 (14.9)	259 (14.0)
	25-34	201 (22.3)	129 (20.1)	386 (23.5)	424 (23.0)
	35-44	138 (15.3)	130 (20.3)	307 (18.7)	348 (18.9)
	> 45	129 (14.3)	195 (30.4)	437 (26.6)	506 (27.4)
Marital status	Married	515 (57.0)	390 (60.8)	919 (56.5)	781 (43.2)
	Single or engaged	341 (37.8)	195 (30.4)	505 (31.1)	757 (41.8)
	Widowed or separated	47 (5.2)	56 (8.8)	202 (12.4)	271 (15.0)
Ethnicity	Pashtun	441 (48.9)	327 (51.0)	-	-
	Tajik	275 (30.5)	184 (28.7)	-	-
	Uzbek	81 (9.0)	58 (9.1)	-	-
	Hazara	68 (7.5)	54 (8.4)	-	-
	Other	37 (4.1)	18 (2.8)	-	-
Education	None	631 (69.9)	491 (76.7)	37 (2.6)	118 (7.7)
	Primary	93 (10.3)	49 (7.7)	733 (50.9)	829 (54.4)
	Secondary or higher	179 (19.8)	100 (15.6)	671 (46.6)	577 (37.9)
Residence	Urban	178 (19.7)	141 (22.0)	682 (41.5)	709 (38.4)
	Rural	725 (80.3)	500 (78.0)	961 (58.5)	1136 (61.6)
Employment	Working	382 (42.3)	197 (30.8)	920 (61.2)	724 (44.7)
	Not working	160 (17.7)	259 (40.5)	584 (38.8)	896 (55.3)
	Household tasks*	361 (40.0)	168 (28.6)	-	-
Asset index	Poorest 40%	356 (40.0)	245 (38.6)	550 (37.9)	642 (39.6)
	Middle 40%	338 (38.0)	258 (40.7)	604 (41.6)	669 (41.3)
	Richest 20%	195 (21.9)	131 (20.7)	297 (20.5)	310 (19.1)
Use of health facility	No	663 (73.4)	408 (63.7)	-	-
	Yes	240 (26.6)	233 (36.4)	-	-
Health facility availability	No	305 (33.8)	237 (37.2)	590 (39.1)	674 (40.5)
	Yes	597 (66.2)	400 (62.8)	919 (60.9)	992 (59.5)

Note: *"Household tasks" was not an employment category in Zambia.

Table 2: Scoring factors and means for variables included in the principal component analysis of the NDSA and Zambia household databases

NDSA: N=1661							
Assets	Scoring Factors	Mean	SD	Scoring Factor / SD	poorest 40%	Means middle 40%	richest 20%
Own a bicycle	-0.026	0.321	0.012	-2.24	0.284	0.246	0.546
Own a radio	-0.075	0.700	0.011	-6.68	0.785	0.539	0.852
Own a TV	0.291	0.202	0.010	29.59	0.002	0.106	0.812
Own a sewing-machine	-0.091	0.467	0.012	-7.37	0.551	0.312	0.605
Own a motorbike	0.028	0.083	0.007	4.11	0.049	0.058	0.194
Own a refrigerator	0.269	0.047	0.005	51.27	0.000	0.000	0.241
Own a car	0.170	0.039	0.005	35.76	0.000	0.025	0.151
Drinking water from pump/pipe	-0.107	0.341	0.012	-9.17	0.358	0.235	0.515
Drinking water from open source	0.115	0.340	0.012	9.92	0.255	0.545	0.090
Light from power/generator	0.313	0.233	0.010	30.18	0.005	0.166	0.840
Main cooking using biomass	-0.292	0.834	0.009	-31.82	0.998	0.925	0.315

Toilet facility Flush toilet	0.090	0.073	0.006	14.00	0.022	0.061	0.210
Pit toilet/latrine	0.076	0.646	0.012	6.46	0.535	0.691	0.772
Own a house	-0.222	0.770	0.010	-21.44	0.986	0.651	0.574
Number of Rooms	0.072	1.758	0.017	4.30	1.644	1.705	2.090
Asset Index		-3.53E-16	0.025		-0.759	-0.078	1.681

Zambia: N=5412

	Scoring Factors	Mean	SD	Scoring Factor / SD	poorest 40%	Means middle 40%	richest 20%
Own a sewing machine	0.254	0.100	0.300	0.85	0.012	0.131	0.215
Own a cell phone	0.786	0.186	0.389	2.02	0.000	0.081	0.765
Own a refrigerator	0.662	0.093	0.291	2.28	0.000	0.006	0.453
Own a bicycle	-0.044	0.349	0.477	-0.09	0.333	0.385	0.310
Own a motor bike	0.086	0.011	0.106	0.82	0.002	0.015	0.023
Own a motor vehicle	0.400	0.031	0.173	2.31	0.000	0.004	0.146
Own a radio/tape player	0.321	0.515	0.500	0.64	0.290	0.625	0.747
Own a television	0.835	0.238	0.426	1.96	0.000	0.139	0.913
Drinking water from well	-0.372	0.335	0.472	-0.79	0.460	0.367	0.020
Drinking water from pipe	0.785	0.360	0.480	1.63	0.000	0.415	0.972
Drinking water from open source	-0.437	0.305	0.460	-0.95	0.540	0.218	0.007
Main cooking by biomass	-0.880	0.768	0.422	-2.09	1.000	0.898	0.045
Main light by electric	0.892	0.250	0.433	2.06	0.000	0.133	0.986
Toilet facility flush toilet	0.805	0.190	0.392	2.05	0.000	0.078	0.796
Toilet facility latrine toilet	-0.507	0.677	0.468	-1.08	0.804	0.793	0.193
No toilet facility	-0.232	0.133	0.339	-0.68	0.196	0.130	0.011
Dwelling of all high quality materials*	0.653	0.190	0.392	1.66	0.000	0.161	0.629
Dwelling of all low quality materials*	-0.682	0.492	0.500	-1.36	1.000	0.228	0.006
Asset Index		0.000	1.000		-5.16	-1.3	11.31

Source: Authors calculation from NDSA and Zambia survey. Note: * High quality materials include: windows of glass; floors of concrete/cement; roof of asbestos/iron sheets or tiles/shingles; walls of concrete or bricks. * Low quality materials include: windows (none); floors of mud; roof of paper/plastic; walls of poles/mud. The percentage of the covariance explained by the first principal component is 23% and 39% respectively for Afghanistan and Zambia. The first Eigen value is 3.89 and 6.46 respectively for Afghanistan and Zambia.

Table 3. Definitions of factors 1 and 2 of the factorial analysis by active variables

Variable	Characteristic attributes	Test-Value*	Weight
Factor 1 Afghanistan			
Gender	Male	-23.29	867
Level of education	Secondary +	-22.84	279
Residence	Major towns	-21.78	319
Wealth status	Richest	-19.96	326
Marital status	Single	-18.94	536
Employment status	Not working	-17.25	419
Age group	14-19	-13.97	389
Level of education	Primary	-12.60	142
Ethnic origin	Tajik	-11.89	459
Settings†	Urban	-19.37	475
Severity†	No Difficulty	-4.86	526
Ethnic origin	Pashto	8.43	768

Type of impairment	Cognitive/mental/multiple	9.02	261
Marital status	Widowed, divorced or separated	9.80	103
Wealth status	Poorest	11.61	601
Marital status	Married	13.28	905
Residence	Rural/semi urban	21.72	1225
Gender	Female	23.24	677
Employment status	Household tasks	25.05	544
Level of education	No education	27.91	1122
Severity†	Moderate Difficulty	3.02	381
Settings†	Rural	19.33	1069
Factor 2 Afghanistan			
Marital status	Married	-27.28	905
Employment status	Working	-19.36	579
Age group	35-44	-13.03	268
Age group	25-34	-11.51	330
Age group	over 45	-11.50	324
Gender	Male	-11.14	867
Residence	Major towns	-11.11	319
Wealth status	Richest	-10.36	326
Type of impairment	Mobility	-8.37	254
Settings†	Urban	-8.63	475
Disability status†	Disabled	-6.64	641
Type of impairment	Non Disabled	6.59	904
Use of health facility	No health facility	7.11	1071
Level of education	Primary	8.97	142
Employment status	Household Tasks	9.31	544
Employment status	Not Working	11.09	419
Residence	Rest of the country	11.14	1225
Gender	Female	11.17	677
Marital status	Single	29.46	536
Age group	14-19	30.29	389
Disability status†	Non disabled	6.67	903
Settings†	Rural	8.67	1069
Factor 1 Zambia			
Marital status	Single	-51.63	1262
Age group	14-18	-39.55	576
Employment status	Not working	-30.86	1480
Type of impairment	Cognitive/mental/multiple	-19.16	385
Age group	19-24	-15.44	504
Wealth status	Richest	-12.48	607
Disability status†	Disabled	-11.46	1845
Severity†	Unable to do the activity	-8.78	411
Residence	Rural	9.72	2097
Wealth status	Poorest	10.75	1192
Marital status	Widowed sep div	16.00	473
Age group	35-44	17.56	655
Age group	45-65	25.62	943
Marital status	Married	37.66	1700
Employment status	Working	37.84	1644

Disability status†	Non disabled	10.38	1643
Severity†	No limitation	10.38	1643
Factor 2 Zambia			
Level of education	Secondary +	-36.52	1248
Wealth status	Richest	-36.34	607
Residence	Urban	-33.30	1391
Health facility available	Available	-29.54	1911
Employment status	Working	-15.64	1644
Marital status	Married	-13.82	1700
Type of impairment	None	-10.68	1643
Disability status†	Non disabled	-11.59	1643
Severity†	No limitation	-11.59	1643
Marital status	Widowed sep div	12.91	473
Type of impairment	Cognitive/mental/multiple	15.10	385
Employment status	Not working	15.32	1480
Level of education	Primary	23.71	1562
Health facility available	None available	32.14	1264
Wealth status	Poorest	32.37	1192
Residence	Rural	35.03	2097
Gender head of household†	Female	12.01	744
Disability status†	Disabled	13.13	1845

Source: Authors calculation from NDSA and Zambia survey. Note: * measures the relative contribution of the given characteristic. † Illustrative variables are also shown with corresponding locations on the factors. ‡: total percentage of respondents of the cluster with the given category. ‡ measures the relative contribution of the given characteristic attribute to the factor.

Table 4. Cluster characteristics for Afghanistan

Variable	Characteristic attributes	% of category in group*	% of category in set †	% of group in category‡	Test-value‡	Probability	Weight
Cluster 1 (n=195, 12.63)							
Residence	Major towns	89.23	20.66	54.55	22.69	0.000	319
Wealth status	Richest	86.67	21.11	51.84	21.55	0.000	326
Settings††	Urban	95.38	30.76	39.16	20.66	0.000	475
Level of education	Secondary +	70.26	18.07	49.10	17.63	0.000	279
Ethnic origin	Tajik	70.77	29.73	30.07	12.69	0.000	459
Employment status	Not working	44.62	27.14	20.76	5.56	0.000	419
Gender	Male	72.31	56.15	16.26	4.88	0.000	867
Marital status	Single	50.26	34.72	18.28	4.70	0.000	536
Health services available	No facility available	49.74	35.10	17.90	4.42	0.000	542
Cluster 2 (n=117, 7.58)							
Ethnic origin	Hazara	82.05	7.90	78.69	21.85	0.000	122
Residence	Major towns	59.83	20.66	21.94	9.62	0.000	319
Settings††	Urban	60.68	30.76	14.95	6.87	0.000	475
Level of education	Primary	26.50	9.20	21.83	5.64	0.000	142
Wealth status	Richest	43.59	21.11	15.64	5.63	0.000	326
Age group	35-44	36.75	17.36	16.04	5.16	0.000	268
Use of health facility	Health facility used	51.28	30.63	12.69	4.76	0.000	473
Employment status	Working	54.70	37.50	11.05	3.83	0.000	579
Marital status	Married	75.21	58.61	9.72	3.79	0.000	905
Cluster 3 (n=264, 17.10)							
Marital status	Single	98.86	34.72	48.69	24.96	0.000	536
Age group	14-19	79.17	25.19	53.73	20.74	0.000	389
Employment status	Not working	65.53	27.14	41.29	14.50	0.000	419

Level of education	Primary	29.92	9.20	55.63	11.04	0.000	142
Gender	Male	77.65	56.15	23.64	7.89	0.000	867
Residence	Rural/semi urban	94.32	79.34	20.33	7.26	0.000	1225
Settings††	Rural	80.68	69.24	19.93	4.50	0.000	1069
Ethnic origin	Pashto	59.85	49.74	20.57	3.55	0.000	768
Use of health facility	No facility used	77.27	69.37	19.05	3.05	0.001	1071
Wealth status	Middle	45.83	38.60	20.30	2.57	0.005	596
Cluster 4 (n=53, 3.43)							
Ethnic origin	Other	100.00	3.56	96.36	20.76	0.000	55
Settings††	Rural	94.34	69.24	4.68	4.37	0.000	1069
Residence	Rural/semi urban	98.11	79.34	4.24	3.86	0.000	1225
Cluster 5 (n=392, 25.39)							
Gender	Male	98.21	56.15	44.41	21.82	0.000	867
Employment status	Working	82.91	37.50	56.13	21.59	0.000	579
Marital status	Married	89.80	58.61	38.90	15.44	0.000	905
Residence	Rural/semi urban	97.70	79.34	31.27	11.94	0.000	1225
Settings††	Rural	84.69	69.24	31.06	7.96	0.000	1069
Age group	25-34	32.65	21.37	38.79	6.05	0.000	330
Age group	over 45	31.63	20.98	38.27	5.75	0.000	324
Wealth status	Poorest	50.00	38.92	32.61	5.11	0.000	601
Activity limitation type	Mobility	24.49	16.45	37.80	4.74	0.000	254
Ethnic origin	Pashto	59.18	49.74	30.21	4.28	0.000	768
Activity limitation score††	None	43.11	34.07	32.13	4.27	0.000	526
Age group	35-44	24.23	17.36	35.45	3.98	0.000	268
Head of Household gender††	Man Head Household	98.98	96.05	26.16	3.68	0.000	1483
Level of education	No education	78.83	72.67	27.54	3.15	0.001	1122
Wealth status	Middle	44.13	38.60	29.03	2.53	0.006	596
Ethnic origin	Uzbek	12.24	9.00	34.53	2.44	0.007	139
Cluster 6 (n=129, 8.35)							
Marital status	Widowed, div. or sep.	72.09	6.67	90.29	21.88	0.000	103
Age group	over 45	79.07	20.98	31.48	14.89	0.000	324
Gender	Female	80.62	43.85	15.36	8.84	0.000	677
Level of education	No education	98.45	72.67	11.32	8.12	0.000	1122
Activity limitation score††	Very severe	45.74	16.84	22.69	8.01	0.000	260
Activity limitation type	Sensory	28.68	8.10	29.60	7.27	0.000	125
Head of Household gender††	Woman head Household	17.05	3.95	36.07	6.12	0.000	61
Disability status††	Disabled	67.44	41.52	13.57	6.11	0.000	641
Employment status	Not working	46.51	27.14	14.32	4.84	0.000	419
Cluster 7 (n=394, 25.52)							
Employment status	Household tasks	99.24	35.23	71.88	32.55	0.000	544
Gender	Female	98.73	43.85	57.46	27.63	0.000	677
Level of education	No education	97.72	72.67	34.31	14.84	0.000	1122
Marital status	Married	75.63	58.61	32.93	8.07	0.000	905
Residence	Rural/semi urban	92.13	79.34	29.63	7.75	0.000	1225
Settings††	Rural	82.23	69.24	30.31	6.64	0.000	1069
Activity limitation type	Cognitive/mental/multiple	26.65	16.90	40.23	5.69	0.000	261
Disability status††	Non disabled	69.80	58.48	30.45	5.28	0.000	903
Activity limitation type	Non disabled	69.80	58.55	30.42	5.26	0.000	904
Ethnic origin	Pashto	60.66	49.74	31.12	4.98	0.000	768
Age group	20-24	22.59	15.09	38.20	4.58	0.000	233
Age group	25-34	28.17	21.37	33.64	3.67	0.000	330
Activity limitation score††	Moderate	31.47	24.68	32.55	3.50	0.000	381
Use of health facility	No facility used	76.40	69.37	28.10	3.50	0.000	1071
Activity limitation score††	Mild	21.07	15.54	34.58	3.34	0.000	240

Source: Authors calculation from NDSA. Note: *: total percentage of respondents with the characteristic within the cluster. † total percentage of respondents with the characteristic within the sample. ‡: total percentage of respondents of the cluster with the given category. †† measures the relative contribution of the given characteristic attribute to the factor. ††† relative contributions of attributes to the factors ††† Illustrative variables.

Table 5. Cluster characteristics for Zambia

Variable	Characteristic attributes	% of category in group*	% of category in set †	% of group in category‡	Test-value‡	Probability	Weight
Cluster 1 (n=334, 9.58)							
Level of education	No education	46.41	4.44	100.00	28.24	0.000	155
Activity limitation type	Cognitive/mental/multiple	63.17	11.04	54.81	25.17	0.000	385
Disability Status††	Disabled	88.92	52.90	16.10	14.75	0.000	1845
Activity limitation score††	Severe	24.55	5.99	39.23	11.97	0.000	209
Activity limitation score††	Unable	29.94	11.78	24.33	9.45	0.000	411
Employment status	Not working	61.68	42.43	13.92	7.38	0.000	1480
Age group	45-65	38.32	27.04	13.57	4.68	0.000	943
Age group	25-34	32.63	23.22	13.46	4.08	0.000	810
Marital status	Single	44.91	36.18	11.89	3.39	0.000	1262
Health facility available	None available	44.31	36.24	11.71	3.13	0.001	1264
Wealth index	Poorest	41.92	34.17	11.75	3.04	0.001	1192
Marital status	Widowed sep div	19.16	13.56	13.53	2.94	0.002	473
Gender head of household††	Female	27.54	21.33	12.37	2.78	0.003	744
Residence	Rural	66.77	60.12	10.63	2.57	0.005	2097
Cluster 2 (n=556, 15.94)							
Age group	14-18	95.68	16.51	92.36	49.63	0.000	576
Marital status	Single	96.58	36.18	42.55	33.40	0.000	1262
Employment status	Missing category	27.52	10.44	42.03	12.70	0.000	364
Employment status	Not working	65.65	42.43	24.66	11.99	0.000	1480
Level of education	Primary	55.58	44.78	19.78	5.52	0.000	1562
Wealth index	Richest	21.58	17.40	19.77	2.72	0.003	607
Residence	Urban	44.96	39.88	17.97	2.61	0.004	1391
Cluster 3 (n=484, 13.88)							
Age group	19-24	100.00	14.45	96.03	51.26	0.000	504
Marital status	Single	63.02	36.18	24.17	12.91	0.000	1262
Employment status	Not working	52.89	42.43	17.30	4.94	0.000	1480
Sex	Female	48.35	43.03	15.59	2.49	0.006	1501
Cluster 4 (n=1104, 31.65)							
Age group	45-65	59.51	27.04	69.67	28.80	0.000	943
Age group	25-34	39.76	23.22	54.20	15.30	0.000	810
Residence	Rural	75.27	60.12	39.63	12.64	0.000	2097
Marital status	Married	63.50	48.74	41.24	11.88	0.000	1700
Wealth index	Poorest	47.83	34.17	44.30	11.41	0.000	1192
Marital status	Widowed sep div	23.55	13.56	54.97	11.28	0.000	473
Level of education	Primary	56.70	44.78	40.08	9.59	0.000	1562
Employment status	Working	58.42	47.13	39.23	9.06	0.000	1644
Health facility available	None available	46.11	36.24	40.27	8.15	0.000	1264
Level of education	Missing category	20.92	14.99	44.17	6.48	0.000	523
Activity limitation type	Sensory	27.90	22.96	38.45	4.62	0.000	801
Activity limitation type	Mobility	21.92	18.89	36.72	3.03	0.001	659
Wealth index	Middle	40.04	36.50	34.72	2.91	0.002	1273
Sex	Female	46.56	43.03	34.24	2.82	0.002	1501
Disability Status††	Non disabled	50.09	47.10	33.66	2.37	0.009	1643
Activity limitation type	No limitation	50.09	47.10	33.66	2.37	0.009	1643
Activity limitation score††	No limitation	50.09	47.10	33.66	2.37	0.009	1643
Cluster 5 (n=504, 14.55)							

Age group	35-44	100.00	18.78	76.95	46.51	0.000	655
Marital status	Married	74.60	48.74	22.12	12.72	0.000	1700
Employment status	Working	68.06	47.13	20.86	10.19	0.000	1644
Level of education	Primary	53.77	44.78	17.35	4.33	0.000	1562
Residence	Rural	68.45	60.12	16.45	4.13	0.000	2097
Gender head of household††	Male	84.72	78.64	15.57	3.65	0.000	2743
Wealth index	Middle	42.66	36.50	16.89	3.03	0.001	1273
Activity limitation type	Mobility	23.81	18.89	18.21	2.92	0.002	659
Sex	Male	62.90	56.97	15.95	2.87	0.002	1987
Wealth index	Missing category	15.48	11.93	18.75	2.52	0.006	416
Cluster 6 (n=506, 14.51)							
Wealth index	Richest	69.96	17.40	58.32	29.50	0.000	607
Level of education	Secondary +	88.74	35.78	35.98	26.90	0.000	1248
Residence	Urban	82.21	39.88	29.91	21.12	0.000	1391
Health facility available	Available	85.38	54.79	22.61	15.70	0.000	1911
Age group	25-34	47.23	23.22	29.51	12.92	0.000	810
Employment status	Working	72.13	47.13	22.20	12.27	0.000	1644
Marital status	Married	68.77	48.74	20.47	9.79	0.000	1700
Disability Status††	Non disabled	58.89	47.10	18.14	5.70	0.000	1643
Activity limitation score††	No limitation	58.89	47.10	18.14	5.70	0.000	1643
Activity limitation type	No limitation	58.89	47.10	18.14	5.70	0.000	1643
Sex	Male	65.22	56.97	16.61	4.04	0.000	1987
Gender head of household††	Male	84.98	78.64	15.68	3.82	0.000	2743

Source: Author's calculation from Zambian survey. Note: *: total percentage of respondents with the characteristic within the cluster.

† total percentage of respondents with the characteristic within the sample. ‡: total percentage of respondents of the cluster with the given category. † measures the relative contribution of the given characteristic attribute to the factor. ‡ relative contributions of attributes to the factors †† Illustrative variables.

Table 6: Employment logistic model

Characteristics	Afghanistan						Zambia							
	Non-disabled		disabled		All		disabled		Non-disabled		disabled		All	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Disabled					0.201***	0.13-0.30							0.557***	0.45-0.67
Female	0.012***	0.00-0.03	0.023***	0.01-0.05	0.013***	0.00-0.03	0.027***	0.01-0.06	1.132	0.83-1.54	0.973	0.72-1.29	1.060	0.86-1.30
Age	1.285***	1.11-1.48	1.161***	1.06-1.27	1.282***	1.12-1.46	1.217***	1.09-1.35	1.240***	1.15-1.33	1.238***	1.16-1.31	1.243***	1.18-1.30
(Age) ² /100	0.746***	0.62-0.88	0.814***	0.72-0.90	0.746***	0.63-0.87	0.767***	0.67-0.87	0.772***	0.700-.84	0.762***	0.70-0.82	0.764***	0.72-0.80
Single or engaged	0.673	0.24-1.81	0.354***	0.18-0.67	0.652	0.25-1.67	0.452**	0.22-0.92	0.145***	0.090-.21	0.190***	0.13-0.27	0.165***	0.12-0.21
Widowed or separated	0.869	0.21-3.44	0.535	0.15-1.88	0.861	0.22-3.24	0.488	0.14-1.63	0.351***	0.22-0.54	0.700*	0.47-1.03	0.512***	0.38-0.68
Primary	0.426*	0.15-1.20	1.187	0.54-2.60	0.449	0.16-1.20	1.178	0.53-2.56	1.063	0.44-2.56	2.584***	1.41-4.72	1.879**	1.17-3.00
Secondary or higher	0.175***	0.08-0.35	0.783	0.45-1.35	0.185***	0.09-0.36	0.738	0.42-1.29	1.611	0.64-4.01	3.600***	1.91-6.77	2.678***	1.64-4.37
Rural areas	1.072	0.54-2.09	1.739**	1.00-3.00	1.083	0.56-2.07	1.837**	1.04-3.21	1.234	0.89-1.69	1.373**	1.02-1.83	1.289**	1.04-1.59
Middle 40%	1.122	0.65-1.93	1.785**	1.09-2.90	1.134	0.67-1.90	1.741**	1.04-2.90	1.142	0.81-1.60	1.209	0.89-1.63	1.212*	0.96-1.51
Richest 20%	1.351	0.62-2.90	3.714***	1.87-7.37	1.385	0.66-2.90	3.806***	1.89-7.63	1.025	0.63-1.66	1.762**	1.14-2.71	1.414**	1.02-1.95
Physical							0.832	0.47-1.46						
Cognitive/mental/multiple							0.478**	0.26-0.87						

Source: Authors calculation from NDSA and Zambia survey. Note: *: statistically significant at 0.05 level. **: statistically significant at 0.01 level or better. ***: statistically significant at 0.0001 level

or better; n.a. : not applicable.

Table 7: Education logistic model

Characteristics	Afghanistan						Zambia									
	Non-disabled		disabled		All		disabled		Non-disabled		disabled		All		disabled	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Disabled					0.364***	0.24-0.55							0.688***	0.55-0.85		
Male	0.049***	0.02-0.11	0.151***	0.08-0.27	0.052***	0.02-0.11	0.166***	0.09-0.30	0.381***	0.260.54	0.528***	0.39-0.70	0.453***	0.36-0.56	0.566**	0.34-0.92
Female	0.979	0.86-1.10	0.993	0.90-1.08	0.978	0.87-1.09	0.986	0.891.08	1.013	0.931.10	1.006	0.94-1.06	0.998	0.95-1.04	0.977	0.88-1.07
(Age) ² /100	1.031	0.88-1.19	0.977	0.87-1.09	1.030	0.89-1.18	0.983*	0.87-1.10	0.933	0.841.03	0.971	0.90-1.04	0.967***	0.91-1.02	1.002	0.88-1.13
Single or engaged	2.598**	1.21-5.56	0.857	0.48-1.51	2.505**	1.20-5.19	0.794	0.43-1.43	0.801	0.441.44	0.463***	0.31-0.68	0.532	0.38-0.72	0.461**	0.23-0.91
Widowed or separated	1.200	0.24-5.02	0.072**	0.00-0.70	1.147	0.24-5.41	0.072**	0.00-0.70	1.205	0.741.93	0.786	0.52-1.18	0.972**	0.71-1.32	1.410	0.51-2.44

Working	0.207***	0.09-0.43	0.828	0.49-1.38	0.221***	0.10-0.44	0.755	0.44-1.27	1.450**	0.992.10	1.391**	1.02-1.87	1.353	1.07-1.70	2.910***	1.60-5.27
Rural areas	0.316	0.16-0.61	0.297***	0.18-0.48	0.318***	0.16-0.60	0.305***	0.18-0.50	0.931	0.641.35	0.724**	0.53-0.98	0.802***	0.63-1.01	0.713	0.42-1.20
Middle 40%	1.045	0.58-1.86	0.891	0.53-1.47	1.044	0.59-1.82	0.956	0.56-1.60	2.104***	1.463.01	2.084***	1.55-2.79	2.070***	1.65-2.59	1.286	0.78-2.11
Richest 20%	4.716***	2.27-9.77	2.266**	1.19-4.30	4.644***	2.28-9.42	2.446**	1.28-4.67	9.875***	4.3422.4	5.514***	3.18-9.54	6.679***	4.25-10.4	2.951**	1.21-7.16
Physical								1.344	0.76-2.35						1.345	0.78-2.30
Cognitive/mental/multiple								0.823	0.431.57						1.057	0.57-1.94

Source: Authors calculation from NDSA and Zambia survey. Note: *: statistically significant at 0.05 level. **: statistically significant at 0.01 level or better. ***: statistically significant at 0.0001 level

n.a. : not applicable.

Table 8 Health care logistic model

Characteristics	Afghanistan						Zambia									
	Non-disabled		disabled		All		disabled		Non-disabled		disabled		All		disabled	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Disabled					0.976	0.73-1.30							0.894	0.74-1.07		
Female	1.004	0.59-1.68	0.805	0.52-1.22	0.987	0.60-1.61	0.829	0.53-1.28	1.109	0.83-1.46	1.252	0.94-1.66	1.175	0.96-1.43	1.252	0.94-1.66
Age	1.017	0.92-1.12	0.984	0.91-1.05	1.016	0.92-1.11	0.998	0.92-1.07	1.023	0.95-1.09	0.999	0.94-1.05	1.006	0.96-1.05	1.003	0.94-1.06
(Age) ² /100	0.965	0.85-1.09	1.015	0.92-1.10	0.968	0.86-1.08	0.997	0.91-1.09	0.959	0.87-1.04	1.000	0.92-1.07	0.984	0.93-1.04	0.993	0.92-1.07
Single or engaged	0.782	0.42-1.43	0.969	0.57-1.62	0.791	0.44-1.41	1.050	0.61-1.80	1.018	0.65-1.58	1.117	0.76-1.62	1.057	0.79-1.40	1.165	0.79-1.70
Widowed or separated	1.456	0.59-3.56	1.521	0.79-2.90	1.461	0.63-3.37	1.503	0.78-2.87	0.941	0.60-1.45	0.763	0.50-1.14	0.870	0.64-1.16	0.772	0.51-1.16
Primary	3.142**	1.54-6.40	0.895	0.45-1.74	2.971***	1.51-5.84	0.871	0.44-1.69	1.099	0.50-2.39	1.295	0.78-2.12	1.261	0.83-1.90	1.310	0.79-2.14
Secondary or higher	1.995**	1.09-3.62	1.010	0.61-1.65	1.944**	1.09-3.44	1.014	0.61-1.67	1.360	0.60-3.04	1.558***	0.91-2.64	1.539**	0.99-2.37	1.574	0.92-2.67
Working	1.365	0.82-2.24	0.812	0.52-1.25	1.327	0.82-2.13	0.844	0.54-1.31	0.909	0.66-1.24	1.046	0.78-1.39	0.978	0.79-1.20	1.022	0.76-1.36
Rural areas	2.783***	1.50-5.15	2.131**	1.24-3.64	2.776***	1.53-5.03	2.116**	1.23-3.63	0.599***	0.45-0.79	0.484***	0.36-0.64	0.539***	0.44-0.65	0.484	0.36-0.64
Middle 40%	0.775	0.50-1.18	1.044	0.71-1.52	0.783	0.51-1.18	1.032	0.70-1.52	1.800***	1.34-2.40	1.797***	1.36-2.37	1.782***	1.46-2.17	1.780	1.34-2.34
Richest 20%	1.005	0.51-1.96	0.887	0.49-1.59	1.006	0.52-1.92	0.861	0.47-1.55	4.816***	2.96-7.81	6.913***	4.21-11.3	5.688***	4.03-8.01	6.679	4.07-10.9
physical								0.847	0.52-1.37						0.825	0.61-1.09
Cognitive/mental/multiple								0.801	0.49-1.30						0.734*	0.50-1.06

Source: Authors calculation from NDSA and Zambia survey. Note: *: statistically significant at 0.05 level. **: statistically significant at 0.01 level or better. ***: statistically significant at 0.0001 level

n.a. : not applicable.

