Main Document

Title: Assessing Health and Rehabilitation Needs of People with Disabilities in Cameroon and India

Authors: Ms. Islay Mactaggart1, Dr. Hannah Kuper1, Prof. GVS Murthy2, Ms. Jayanthi Sagar2, Dr. Joseph Oye3, Dr. Sarah Polack1

1 International Centre for Evidence in Disability, London School of Hygiene and Tropical Medicine, London UK

2Indian Institute of Public Health, Hyderabad, India

3Sightsavers Cameroon

Abstract:

Purpose: To assess the association between disability and serious health problems, and the access and uptake of health and rehabilitation services in Cameroon and India.

Methods: We undertook a population-based case-control study, nested within a survey in Fundong Health District, North West Cameroon (August – October 2013) and in Mahbubnagar District, Telangana State, India (February – April 2014). Disability was defined as the presence of self-reported difficulties in functioning, or clinical impairments. One control without disability was selected per case, matched by age, gender and cluster. Information was collected using structured questionnaires on: socioeconomic status, health, access to health services and rehabilitation.

Results: Cases with disability were significantly more likely to report a serious health problem in the last year compared to controls in both India (OR=3.2, 95% CI 2.1-4.8) and Cameroon (OR=1.9, 1.4-2.7). The vast majority of people sought care when seriously ill, and this did not vary between cases and controls. Awareness and use of rehabilitation services was extremely low in both Cameroon and India.

Conclusions: Further focus is needed to improve awareness of rehabilitation services among people with disabilities in India and Cameroon to ensure that their rights are fulfilled and to achieve the goal of Universal Health Coverage.

Key Words: disability, health needs, low-middle income countries, Cameroon, India and assessment

**Introduction**

Several lines of evidence show that people with disabilities are on average at higher risk of serious health events and ill health than the general population. The World Health Survey, undertaken in 2002-2004 across 51 countries, showed that people with disabilities in low and middle income countries were significantly more likely to seek inpatient and outpatient care[[1](#_ENREF_1)]. This finding was supported by a more recent study across 30 countries which showed that children with disabilities consistently report more serious health events than children without disabilities [[2](#_ENREF_2)]. There are several reasons why people with disabilities may have higher health care needs. This may be due to the underlying impairment or health condition, or because of higher risk of chronic conditions and other diseases [[3](#_ENREF_3)]. People with disabilities may also need rehabilitation services or assistive technology. Furthermore, older people are both more likely to have disabilities and to experience ill health.

People with disabilities also report a wide range of barriers that they face in accessing health care. Cost is often an important barrier. The World Health Surveys showed that while one third of people without disabilities (32-33%) were unable to afford health care, this increased to half of people with disabilities (51-53%)[[1](#_ENREF_1),[4](#_ENREF_4)]. This can potentially cause catastrophic health expenditure among people with disabilities that can exacerbate poverty [[5](#_ENREF_5)]. Other commonly reported barriers include physical inaccessibility of healthcare facilities, inaccessible transport options, inaccessible information, and stigma [[6](#_ENREF_6),[7](#_ENREF_7)]. These barriers potentially limit the inclusion of people with disabilities in health care, and are contrary to the UN Convention of the Rights of Persons with Disabilities[[8](#_ENREF_8)]. Furthermore, it is strongly argued that we will not be able to achieve Universal Health Coverage without including people with disabilities, as they make up 15% of the world’s population[[1](#_ENREF_1)]. Consequently, improving access to health and rehabilitation services among people with disabilities is a dominant aim of the World Health Organisation (WHO)’s Global Disability Action Plan 2014-2021[[9](#_ENREF_9)].

Few studies have assessed quantitatively whether people with disabilities have worse access to health and rehabilitation services in low and middle income countries. The World Health Survey suggests that people with disabilities were less likely to receive health care services when needed than people without disabilities[[1](#_ENREF_1)]. In contrast, Trani and Loeb reported no association between disability and access to health in two household surveys conducted in Afghanistan and Zambia [[10](#_ENREF_10)]. Similarly, a multi-national study on childhood disability generally showed that children sought care when they were seriously ill, whether they had a disability or not [[2](#_ENREF_2)]. Furthermore, studies quantifying access to and experience of rehabilitation services amongst people with disabilities in low and middle income countries are lacking.

The aim of this study was to assess the impact of disability on access to health and rehabilitation services in India and Cameroon.

**Methods**

Study Overview

We undertook an all age population-based disability survey in Fundong Health District, North West Cameroon (August – October 2013) and in Mahbubnagar District, Telangana State, India (February – April 2014). We screened for disability using both a self-reported functioning tool and a battery of clinical impairment screening tools. We undertook a case-control study, nested within this survey, of people with and without disabilities to assess the impact of disability on access to health and rehabilitation.

Study Setting

Both countries are classified as lower middle income, with a poverty headcount ratio in Cameroon of 39.9% and India of 21.9%[[11](#_ENREF_11)]. The most recent estimates available place both countries within the WHO’s “critical shortage of health personnel” category, with a country average of 1.3 and 2.1 doctors, nurses and midwives per thousand population respectively[[12](#_ENREF_12)].

The health worker density (the number of doctors, nurses and midwives per thousand population) estimate for the study regions was lower than the respective national estimate in Cameroon (1.05 vs 1.3/1000) and higher in India (2.1 vs 3.7/1000)[[13](#_ENREF_13),[14](#_ENREF_14)].

In Cameroon, a large faith-based and charity-funded referral hospital existed within the study district, providing free and subsidised services. This hospital also provided outreach services and was linked to a community-based rehabilitation programme. However, topography in the study district was mountainous, with some study sites inaccessible without off-road private transportation and significant disparity in health centre accessibility within the district.

Similarly, in India the district in which the study was held included several government or private run referral hospitals, although none provided free services. A State-government-run poverty reduction programme targeted people with disabilities for organisation into Self Help Groups, but evidence on coverage of this scheme was lacking.

Survey Population and Sampling

A two-stage sampling procedure was used, with 51 clusters of 80 people first selected using probability proportionate to size sampling (with the most recent Census in each country used as the sampling frame). Within clusters, households were selected via modified compact segment sampling [[15](#_ENREF_15)]. Cluster sketch maps were created by team members in collaboration with village leaders, which were used to divide the clusters into segments of approximately 80 people. One segment was selected at random for inclusion and households in this segment were visited door-to-door until 80 people (of all ages) were enumerated.

At each household, a roster was compiled to record the name, age, sex and contact details of each household member. Household members were informed about the survey and invited to attend a previously identified central location over the next two days. If an eligible person did not attend the central location the enumerators visited their household at least twice to encourage attendance. If they were unable to travel to the central location (e.g. due to mobility limitation) the survey team visited them at their household at the end of the second day.

Screening for disability

Participants were screened for self-reported limitations, clinical impairments, epilepsy and depression. Epilepsy as a health condition was included given that self-reported tools do not include questions on seizure history. However, previous research has shown an association both between epilepsy and lower health-related quality of life, and between accidents during seizures and long term physical impairment[[16](#_ENREF_16)].

The screening tools and protocols are described below:

Self-Reported Activity Limitation:Children aged 5-17 years were first screened using the draft United Nations Fund for Children (UNICEF)/Washington Group module on child functioning and disability, with permission from the tool’s developers. The Washington Group on Disability Statistics is a United Nations city group mandated to improve quality and comparability of disability measures[[17](#_ENREF_17)]. Caregivers reported for children aged 5-8 years and children 9-17 years self-reported activity limitations in a range of basic and complex activity domains. Adults aged 18+ self-reported activity limitations using the Washington Group Extended Set on Functioning for Adults[[18](#_ENREF_18)]. In both tools, activity limitations are scored on a severity scale of: no difficulty, some difficulty, a lot of difficulty and cannot do. Children aged 9+ years and adults unable to communicate directly (for cognitive or communication difficulties) were reported for by proxy (e.g. caregiver). Participants in the study were considered to have a disability if they/ their proxy responded “a lot of difficulty” or “cannot do” to any basic activity domain. For children basic activity domains included seeing, hearing, walking, self-care, understanding, being understood, learning, remembering; while for adults these were seeing, hearing, walking or climbing steps, understanding, being understood, remembering, concentrating, self- care, upper body strength and fine motor dexterity.

Vision impairment: Visual acuity was assessed using a tumbling ‘E’ chart with 6/18 size optotype on one side and 6/60 on the other [[19](#_ENREF_19)]. As per the WHO protocol, VA<6/18 in the better eye was categorised as moderate impairment, VA<6/60 and >3/60 as severe and VA<3/60 as blind[[20](#_ENREF_20)].

Hearing impairment: The WHO Ear and Hearing Disorders Survey Protocol was used to identify hearing impairment in the study[[21](#_ENREF_21)]. Initial screening of all participants was through an otoacoustic emissions (OAE) hearing test to assess middle ear function in both ears. Participants who failed this test in both ears or for whom an OAE reading could not be taken underwent Pure Tone Audiometry (PTA) Screening to assess the level of hearing impairment. Hearing in each ear was measured at 1KHz, 2 KHz, 4 KHz, 0.5KHz and again at 1KHz to ensure consistency of response and the average reading for each ear across the 4 frequencies was recorded.

Hearing impairment was categorised as follows, based on the WHO threshold for adults and Global Burden of Disease threshold for children[[21](#_ENREF_21),[22](#_ENREF_22)]:

* Profound: >80dba
* Severe: 61-80db
* Moderate: 41-60db (adults aged >18 years), 35-60db (children <18 years)
* Normal: <41 (adults) <35 (children)

Physical impairment and epilepsy: The Rapid Assessment of Musculoskeletal Impairment protocol developed for a national survey in Rwanda was adapted for the study [[23](#_ENREF_23)]. Six initial screening questions were used to assess a)difficulty using the musculoskeletal system b)use of mobility aid c)whether the participant considered any body part to be misshapen and d)whether they had experienced seizures. In India, a seventh question on chronic back pain was added. Any participant answering yes to at least one question was examined by a physiotherapist or orthopaedic clinical officer. The examination included standardised observation of activities to assess functioning, a physical examination, history, diagnosis, aetiology, severity and referral information. Based on these examinations and any observed functional limitations, the participant was categorised by the physiotherapist as having either no/mild/moderate/severe physical impairment and/or epilepsy.

Clinical Depression:Depression was measured in those aged 18 years and above using the Patient Health Questionnaire (PHQ-9), previously validated for use In LMIC settings[[24](#_ENREF_24)]. The PHQ-9 consists of three screening questions and a further 6 questions based on responses to the screen. Total scores are calculated from responses. Any participant scoring 20 or above is determined to be experiencing clinically significant symptoms of severe depression.

The definition of disability used in this study was as follows:

* Self-reported Activity Limitations: reporting “a lot of difficulty” or “cannot do” in any basic activity domain
* Vision Impairment: Presenting vision in better eye of <6/18
* Hearing Impairment: Presenting hearing loss in better ear of >40 dBA (adults) or >35dBA (children)
* Musculoskeletal Impairment (MSI): Structure impairment with moderate effect on the musculoskeletal system’s ability to function as a whole 25-49%
* Epilepsy: 3 or more tonic clonic seizures previously
* Depression: score of 20 or above on PHQ-9 Questionnaire (aged 18+)

Nested Case-Control Study

All participants aged 5 and above who screened positive for disability were invited to participate in the nested case-control study. For each case we selected one age, gender and cluster-matched control. Two additional children with disabilities and one additional adult with disabilities were identified per cluster through key informants (e.g. community health worker) to ensure adequate sample size for the case-control study. These participants were selected from outside the segment selected for inclusion in the population-based survey.

Cases and controls were interviewed in detail, including modules on water and sanitation, education, livelihoods, healthcare, rehabilitation, participation and environmental barriers, using existing questionnaires as far as possible. A case-only module explored access to rehabilitation and assistive devices amongst people with disabilities. This paper focuses on the health and rehabilitation module of the case-control study.

The questionnaires used were assessed for local relevance and appropriateness through discussion with local Disabled People Organizations, other experts and through pilot testing. The questionnaires and survey tools were translated into local languages and back-translated by independent translators, who were asked to comment on the appropriateness of language used for the target population. A review was held to discuss differences in the translations and to modify them accordingly and finalise the questionnaires.

Data Entry and Analysis

The Screening data was double entered into a purpose-built Microsoft Access Database by two trained Data Entry Clerks. The Case-Control Questionnaire was administered using ASUS Google Nexus 7 tablets.

Data from both the Screening Questionnaire and the Case-Control Questionnaire were merged in STATA 12.0 for analysis. We constructed a socio-economic status score through principal component analysis (PCA) of household assets. This SES score was then divided into quartiles. We undertook multivariable logistic regression analyses to identify differences between cases and controls in inclusion in health and rehabilitation. Conditional logistic regression was not attempted since matching was not complete, and so analyses were adjusted by the matching variables of age and gender.

Training

Three survey teams per country received 10 days training. Each team consisted of the following participants:

* Cameroon: 1 Ear Nose and Throat (ENT) nurse, 1 physiotherapist or orthopaedic clinical officer, 1 ophthalmic nurse, 2 enumerators, 3 field assistants and 2 interviewers
* India: 1 audiologist, 1 physiotherapist, 1 Vision Tech or Ophthalmic Assistant, 2 enumerators, 3 field assistants and 2 interviewers. Additionally trained ophthalmologists and an ENT surgeon validated the findings and ascertained the cause of impairment.

Ethical Approval for the study was granted by:

* The London School of Hygiene and Tropical Medicine (London, UK)
* National Ethics Committee for Research in Human Health (CNERSH, Cameroon)
* Cameroon Baptist Convention Health Board Institutional Review Board (Cameroon)
* Indian Institute of Public Health Hyderabad Institutional Ethics Committee (India)
* Government of India Health Ministry Screening Committee (India)

All participants who attended the screening were read an information sheet about the study and given the opportunity to ask questions. If they agreed to participate, written/finger print consent was taken. For children <18 years in India and <21 years in Cameroon a caregiver was required to provide written/finger print consent and to remain present throughout the screening.

Basic medicines were distributed by clinical team members where appropriate and all participants with unmet health or rehabilitative needs were referred to relevant services. Each participant who screened positive for a clinical impairment was examined by a clinician to determine aetiology, diagnosis and appropriate referral.

**Results**

The case control study in India included 508 cases (402 identified through the survey, 106 identified through case finding) and 337 controls (table 1). The case control study in Cameroon included 429 cases (331 from survey and 98 from case finding) and 274 controls. The total number of controls is lower than the number of cases in both countries due to high prevalence of disability amongst adults aged 50+, and consequent limitations on the number of households available from which to identify controls. Cases and controls were well matched on gender, particularly in India. Cases were more likely to be in the oldest age category (66+) in both India and Cameroon. People with disabilities were significantly more likely to be in the poorest quartile in India, but there was no relationship between disability and socio-economic status (SES) in Cameroon. Among the cases, 66% in India and 63% in Cameroon self-reported significant activity limitations. Physical impairment (37% in India and 42% in Cameroon) and hearing impairment (33% and 30% respectively) were the most common impairments amongst cases. These do not constitute prevalence estimates due to case finding undertaken for the case-control survey.

(table 1 here)

Cases were significantly more likely to report a serious health problem in the last year than controls in both India (OR=3.2, 95% CI 2.1-4.8) and Cameroon (OR=1.9, 1.4-2.7) (table 2). The type of serious health condition varied between cases and controls. There were no clear trends in types of serious health conditions experienced. In India, people with disabilities were also significantly more likely to report high blood pressure than controls (1.8, 1.0-3.3), and they appeared more likely to have other chronic diseases, although these results were not statistically significant. This was not assessed in Cameroon. In both India and Cameroon, the vast majority of people sought treatment if they had a serious health problem, and this did not differ between cases and controls. In both settings, treatment was predominantly sought at hospitals for cases (69% India, 60% Cameroon) and controls (59% India, 34% Cameroon) followed by private doctors for both cases (25% India, 24% Cameroon) and controls (17% India, 31% Cameroon). Reported health problems increased with age in both settings and in cases and controls, but the proportion of people seeking care remained relatively constant (data available on request). Among the cases, cost was cited as the major barrier to seeking treatment in both Cameroon (77%) and India (94%). Fewer controls reported cost as the main barrier in either Cameroon (57%) or India (25%). Access to ante-natal care and vaccination of children was assessed for women of reproductive age in Cameroon. The coverage of both was very high among the controls, so that it was not possible to assess a difference with cases, although coverage was lower in that group.

(table 2 here)

Cases with disabilities were asked whether they needed and used particular assistive devices, in order to ascertain coverage (table 3). Coverage was high for walking sticks and guides in both India (87%, 86%) and Cameroon (93%, 67%). There was a high expressed need for glasses but low coverage in both India (46%) and Cameroon (33%). Coverage of hearing aids was particularly low in both India (6%) and Cameroon (24%), despite high expressed need for the device.

(table 3 here)

In India, cases expressed a low awareness, need for and receipt of rehabilitative services (table 4). Amongst those few who reported needing the service, however, coverage was relatively high. These findings were supported by the results from Cameroon (table 5).

(table 4 here)

(table 5 here)

**Discussion**

Our study showed that people with disabilities were substantially more likely to report a serious health problem in the last year than people without disabilities, in both India and Cameroon. Most people reported seeking treatment from hospitals or private doctors when they were seriously ill, and this did not differ between people with and without disabilities. This was true in both India and Cameroon. For those few people who did not seek treatment, cost was reported as the major barrier, particularly among cases. Coverage was relatively high for assistive devices among people with disabilities, although this could still be increased substantially. In contrast, awareness and use of rehabilitation services was very low among people with disabilities.

Other studies in the literature have showed that people with disabilities are more at risk of serious health events and ill health than the general population[[1-3](#_ENREF_1)]. These studies are cross sectional in nature, and therefore causality cannot be determined. However, there are a number of plausible explanations for the association between disability and heightened frequency of serious health conditions. Firstly, this may be because people with disabilities experience ill health as a consequence of their underlying impairment, or because an underlying condition (e.g. diabetes) causes both ill health and impairment. Another possibility, if the association is causal, is that people with disabilities are often poorer, and therefore potentially more vulnerable to ill health. Finally, ageing is also independently related to both disability and poor health.

Our findings are also consistent with previous studies which showed that people with disabilities were not less likely to access care when needed [[2](#_ENREF_2),[10](#_ENREF_10)]. This is a surprising finding, given the widely reported barriers facing people with disabilities in accessing health care[[5-7](#_ENREF_5)].

There are several possible explanations. The first is that although people with disabilities face difficulties accessing health, they manage to overcome these barriers to have equal inclusion in health. This may particularly be the case where health services are more readily available. In Cameroon, the large faith-based hospital in the region would have assisted in the provision of free services, and in India the health worker density in the region was considerably larger than the country-wide average.

The second is that equal access amongst people with and without disabilities does not necessarily mean equal service quality or patient experience for people with disabilities compared to those without. Another possibility is that we need to address this question in a more nuanced way. Perhaps when people are seriously ill they will seek care, but that access will be poorer if the condition is less severe. This would be reflected in lower coverage of routine treatments such as treatment for hypertension or diabetes, among people with disabilities. A final possibility is that people with disabilities are in greater contact with health services as a result of their disability, and therefore this enables them to overcome some of the additional barriers that they face and seek when it is needed. More detailed studies are needed in future to explore these possibilities.

In contrast, we found clear evidence that people with disabilities had low awareness of rehabilitation services, and consequently were not often using these services. This is consistent with a previous study undertaken in Haiti[[25](#_ENREF_25)]. This finding supports the aim of the WHO’s Global Disability Action Plan to increase access to rehabilitation services, as well as health services, among people with disabilities[[9](#_ENREF_9)]. Improving access to rehabilitation services is crucial to allow people with disabilities to achieve their full potential on an equal basis with others. It should therefore be considered an essential component of Universal Health Coverage. A central implication of this study is therefore that awareness and availability of rehabilitation services needs to be increased in both India and Cameroon. Further work is needed to ensure health information is accessible at the community level and to provide clear networks for rehabilitative referral.

Strengths and Limitations

This was a large case-control study, conducted using comparable methods in two contrasting settings. Furthermore, we assessed in detail access to health care, as well as rehabilitation and assistive devices. We also used a comprehensive approach to the assessment of disability.

In terms of limitations, whilst participants who screened positive for disabilities were referred to local CBR programmes, we did not investigate access to CBR in the case-control questionnaire. We investigated serious health events, but perhaps should have broadened this to look at other specific measures of morbidity in both settings. We also did not focus on the quality or cost of the care received, which may have differed between people with and without disabilities. Finally, we relied on self-reported health and activities, rather than observing actual behaviour.

Conclusion

In conclusion, our study showed that people with disabilities are significantly more vulnerable to serious health conditions in India and Cameroon but appeared able to access health care services when these are needed. Awareness and use of rehabilitation services is low and should be increased. We also need to explore in more detail whether people with disabilities are able to access more routine health care, rather than focussing on more serious conditions.

**Declaration of interests**

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**References**

[1] World Health Organization. World Report on Disability Geneva: World Health Organization; 2011.

[2] Kuper H, Monteath-van Dok A, Wing K, Danquah L, Evans J, Zuurmond M, Gallinetti J. The impact of disability on the lives of children; cross-sectional data including 8,900 children with disabilities and 898,834 children without disabilities across 30 countries. PLoS One 2014;9:e107300.

[3] Gudlavalleti MV, John N, Allagh K, Sagar J, Kamalakannan S, Ramachandra SS, South India Disability Evidence Study G. Access to health care and employment status of people with disabilities in South India, the SIDE (South India Disability Evidence) study. BMC Public Health 2014;14:1125.

[4] World Health Organization. World Health Report 2000 - Health Systems: Improving Performance. Geneva: World Health Organisation; 2000.

[5] Maulik PK, Darmstadt GL. Childhood disability in low- and middle-income countries: overview of screening, prevention, services, legislation, and epidemiology. Pediatrics 2007;120 Suppl 1:S1-55.

[6] Mannan H, MacLachlan M. Disability and Health: A Research Agenda. Social Inclusion 2013;1:37-45.

[7] Krahn GL, Reyes M, Fox M. Towards a conceptual model for national policy and practice considerations. Disability and health journal 2014;7:13-8.

[8] The United Nations. Convention of the Rights of Persons with Disabilities and Optional Protocol. New York: United Nations; 2006.

[9] World Health Organization. Draft WHO global disability action plan 2014-2021: Better health for all people with disability. Geneva: World Health Organization; 2014.

[10] Trani J-F, Browne J, Kett M, Bah O, Morlai T, Bailey N, Groce N. Access to health care, reproductive health and disability: a large scale survey in Sierra Leone. Social science & medicine (1982) 2011;73:1477-89.

[11] The World Bank. World Development Indicators. Available from: <http://data.worldbank.org/> Accessed 28.15.2015.

[12] World Health Organization. The World Health Report 2006: working together for health. Geneva: World Health Organization; 2006.

[13] Tandi TE, Cho Y, Akam AJ-C, Afoh CO, Ryu SH, Choi MS, Kim K, Choi JW. Cameroon public health sector: shortage and inequalities in geographic distribution of health personnel. International journal for equity in health 2015;14:43.

[14] Hazarika I. Health workforce in India: assessment of availability, production and distribution. WHO South-East Asia Journal of Public Health 2013;2:106.

[15] Turner AG, Magnani RJ, Shuaib M. A not quite as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) Cluster Survey design. International journal of epidemiology 1996;25:198-203.

[16] Simms V, Atijosan O, Kuper H, Nuhu A, Rischewski D, Lavy C. Prevalence of epilepsy in Rwanda: a national cross-sectional survey. Tropical Medicine & International Health 2008;13:1047-53.

[17] Washington Group on Disability Statistics/UNICEF. Module on Child Functioning and Disability. XIV.th Meeting of the Washington Group on Disability Statistics. Buenos Aires, Argentina 2014.

[18] Madans JH, Loeb ME, Altman BM. Measuring disability and monitoring the UN Convention on the Rights of Persons with Disabilities: the work of the Washington Group on Disability Statistics. BMC public health 2011;11:S4.

[19] Mathenge W, Kuper H, Limburg H, Polack S, Onyango O, Nyaga G, Foster A. Rapid Assessment of Avoidable Blindness in Nakuru District, Kenya. Ophthalmology 2007;114:599-605.

[20] Lindfield R, Griffiths U, Bozzani F, Mumba M, Munsanje J. United States: International Centre for Eye Health, London School of Hygiene and Tropical Medicine-LSHTM, London, United Kingdom. Robert.lindfield@lshtm.ac.uk; 2012 -]; Available from: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=medl&NEWS=N&AN=22737211>.

[21] Smith A, Mackenzie I. WHO Ear and Hearing Disorders Survey Protocol. Geneva: World Health Organization; 1999.

[22] Stevens G, Flaxman S, Brunskill E, Mascarenhas M, Mathers CD, Finucane M. Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries. The European Journal of Public Health 2013;23:146-52.

[23] Atijosan O, Rischewski D, Simms V, Kuper H, Linganwa B, Nuhi A, Foster A, Lavy C. A National Survey of Musculoskeletal Impairment in Rwanda: Prevalence, Causes and Service Implications. PLoS ONE 2008;3:e2851.

[24] Adewuya AO, Ola BA, Afolabi OO. Validity of the patient health questionnaire (PHQ-9) as a screening tool for depression amongst Nigerian university students. Journal of Affective Disorders 2006;96:89-93.

[25] Danquah L, Polack S, Brus A, Mactaggart I, Houdon CP, Senia P, Gallien P, Kuper H. Disability in post-earthquake Haiti: prevalence and inequality in access to services. Disability & Rehabilitation 2014:1-8.