

Disability and its prevalence and cause in northwestern Ethiopia: evidence from Dabat district of Amhara National Regional State: A community based cross-sectional study

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Abstract

Background: Disability is the social outcome of unfavorable interactions between individuals' impairments, on the one hand, and inaccessible physical spaces, disabling cultural environment and negative attitudes towards disability and persons with disabilities, on the other. Despite the fact that it directly affects 15% of Ethiopians, understanding and policy-relevant studies on disability and the conditions of persons with disabilities are lacking. The Dabat Demographic Health Surveillance System is part of the response to fill this gap. With significant drawbacks in the Surveillance System, this study aimed at assessing the prevalence, types and major causes of disability in Dabat district.

Method: A community-based cross-sectional study design was employed and covered 17,000 households residing in 13 *Kebeles* of Dabat district. The study was conducted in 2018 utilizing the modified 12-item World Health Organization's Disability Assessment Schedule (WHODAS 2.0) and 7-item WHO Minimal Generic Set of Domains of Functioning and Health to collect pertinent data on disability in the district. The data was organized and presented using frequencies and percentages in table and figures. Relevant variables were used to construct a logit model that predicts the likelihood of disability whereby P-value < 0.05 was considered as statistically significant.

Results: This study found that the overall prevalence of disability in Dabat district was 2.14% [95% CI: 2.03, 2.24]. About 8.3% of households reported at least one member with disability. Visual impairment was the most commonly reported impairment (51%) while 8.19% had multiple impairments. Eighty-three percent of immediate the causes of disability were modifiable – specifically, illness (36.93%), injury (17.81%), and congenital (10.86%). The aged [AOR=1.0; 95% CI: 1.03, 1.04], those unable to read or write illiterate [AOR=1.57; 1.15, 2.14], the unmarried/single [AOR=1.39; 95% CI: 1.85, 2.47] and the separated [AOR=2.78; 95% CI: 4.14, 6.19] were more likely to risk disability in the population.

Conclusion: This study reported an increased likelihood of impairment among those with advanced ages. The proportion of households with PwDs was also high. While most disabilities were visual, there were significant numbers with mobility impairments and hard of hearing. Most school-age PwDs did not complete secondary education, while employment was significantly limited. The findings indicated that most causes of disability were reversible if impairments were screened or identified early and preventive or medical treatments were sought. Without undermining the role of specialized medical treatments, this study underlines the significance of early screening and preventive community interventions through CBR programs and rehabilitation workers in lowering disability rates in the district.

Background

With multiple types and causes, impairment or disability can affect by any person at some point in life, temporarily or permanently. Though impairment and disability had been used interchangeably well into the 1970s, disability movement espoused a social model that distinguished between the two i.e. impairment as a function of the condition the body or mind, and disability as an undesirable "outcome of an oppressive relationship between people with impairments and the rest of society" (31). This powerful distinction between the body and the society/culture, impairment and disability has helped the disability movement towards the advancement of the rights of persons with disabilities (PwDs).

But these achievements of the social model came at the cost of, some writers (e.g. Hughes and Paterson 1997) argued, emptying disability from the rich personal experiences of impairment, which made disability inadequate as a concept in postmodern identity politics centered on the body as a contested cultural terrain (32). Hughes and Paterson (1997) made a powerful proposal that not only brings back the body/impairment experience into the cultural, symbolic space but also enables us to take into account the multiple, individualized representations of pain and the oppressive societal/environmental factors. If the body enters the cultural realm in disability studies and movement, they argued, it can become a powerful 'emancipatory' concept.

In this study, we employ the WHO-ICF definition of disability whereby a person is considered disabled if and when his/her activity performances in his/her usual environment are limited in nature, function, or quality. This definition shifts the focus from individual factors measured in terms of medical or health indicators to broader factors that include health, education, social relationships and cultural participation. It treated disability in contrast to full functionality and both are "conceived as a dynamic interaction between health conditions (diseases, disorders, injuries, traumas, etc.) and contextual factors." (33) In a way, such a definition draws on the complementary conceptualization of disability – with their own variations, of course – in the social model and the capabilities framework i.e. not only in understanding disability in terms of social/environmental barriers to equal opportunities and resources but also in identifying discrimination and oppression as central to its characterization (31). As such, this study recognizes all physical or learning and intellectual impairments that cause limited social functionality, opportunities and autonomy that are inconsistent with human dignity, equality and inclusion as disability.

Disability statistics and consequences. Based on the earlier definition of disability, the WHO and the World Bank (WB) estimated that about 80% of the global 1 billion persons with disabilities (PwDs) currently live in low and middle-income countries (1). In most of these countries, especially on the African continent, community attitude towards disability and persons with disabilities are less than penchant and socioeconomic support and rehabilitation services are poor or non-existent (40, 41). These challenges persisted, and the numbers of PwDs are increasing – both globally and in developing countries – due to population growth, man-made and natural disasters, war, accidents and aging.

In Ethiopia, data on the proportion of PwDs is highly fragmented or sometimes misleading and contradictory. For example, the 2007 Population and Housing Census, Ethiopian Central Statistical Authority (2007) reported that there were less than 1 million Ethiopians with disability i.e. 1.2%.../Dr.Solomon Today/AppData/Dr.Solomon Today/AppData/Dr.Solomon Today/AppData/ICACBR/AppData/Local/Temp/Authority., -_ENREF_5. Conversely, WHO estimates the national prevalence of disability in Ethiopia around 17% (1) The in-congruence between the two disability statistics could be due to several factors. CSA's report was entirely based on self-identification of respondents as being disabled or not, which tend to underestimate prevalence rates (33). The WHO also explains how statistics on disability varies "according to the purpose and application of the data, the conception of disability, the aspects of disability examined, the definitions, question design, reporting sources, data collection methods, and expectations of

functioning” (1). Many (34, 35) have reported skepticism about the Census statistics on disability in Ethiopia that could have been affected by “under-reporting, the way the Census questions were formulated, lack of disability awareness among enumerators and data managers and use of a narrow definition of disability” in the Census. In fact, there are reports that persons with impairments tend to avoid reporting their conditions due to negative community attitude towards disability and persons with disabilities, which are prevalent in Ethiopia (34, 35, 39). In similar contexts, studies had identified institutional and cultural factors such as cost of treatment and stigma where there is significant underreporting (38). These reports show how Census reports actually underline the unreliability of statistics on PwDs in Ethiopia.

The significance of reliable disability statistics cannot be overstated. Having reliable statistics on disability informs better, policy making, planning and programming centered on inclusive and sustainable development. Data on the level of functioning in the population and the need for social and rehabilitation services will guide interventions to promote the equalization of opportunity and access to social resources such as education and health for PwDs. In recent years, national and global actors have used disability statistics to push the issue of disability to the center and front of policies, programming and service provision to ensure the effective inclusion of PwDs in development.

Empirical evidence on causes and impacts of disability on people are also relevant to prevention and rehabilitation policy making and programming. In Africa, studies identified the major causes of disability as communicable diseases, war, accidents, and inadequate prenatal and neonatal health-care services (36, 37). It has been reiterated that disability is strongly linked to underlying and basic problems of poverty, poor nutrition and restricted access to basic services such as health and schooling. These factors are also relevant to the Ethiopian context where the list of causes/factors include low standard of living, malnutrition, natural and man-made disasters, accidents, infectious and non-infectious diseases, intermittent wars and violence.

The challenges PwDs face – as we have noted above – emanate from unfavorable relationships between their impairments and their social environment. The outcomes of disability have more to do with the way disability is perceived and treated by communities than the degree and type of physical impairments. African communities harbor misconceptions that deter the inclusion of PwDs and expose them to debilitating stigma. For instance, traditional/rural African communities attribute impairments to such factors as supernatural forces – curse, demonic possession or wrath of god for a family’s mischiefs (42, 43). This scenario has, in turn, led to PwDs poor mental health and well-being.

But PwDs do not form a homogenous group. Despite inconsistencies, the literature and statistical reports on disability in Ethiopia identify mobility, visual and hearing impairments as the top-three most prevalent forms of disabilities, in that order. [The prevalence and types have also been reported to be similar in North Gondar Administrative Zone of the Amhara National Regional State \(ANRS\), Ethiopia.](#)

In addition to difference in the type of impairments (e.g. physical, psycho-social, sensory, intellectual, neurological), PwDs live in a variety of contexts with different intersecting identities. This includes gender, age, education status, employment and economic status, and, geographical location. How these contexts and different characteristics intersect lead to very different experiences of disability [15]. In Ethiopia, for instance, about 46% of PwDs are women who carry the double burden of stigma, discrimination and other challenges due to patriarchy and misgivings about disability. Age is also a factor whereby children with disabilities (CwDs) are less likely to attend schooling or access healthcare services leaving them vulnerable to poverty and poor health that substantially reduce their quality of life [17, 18]. As a group, without underplaying these variations within however, PwDs are still among the most disadvantaged segment of the society.

With the understanding that disability statistics and surveillance are necessary to assess and examine trends and conditions of PwDs to inform policies, strategies and programming, this study aims at filling the existing knowledge gap on disability – its prevalence, types and causes – in Ethiopia, specifically northwestern Ethiopia, and promote the effectiveness of services and interventions to meet the challenges of PwDs. It builds on the Dabat Health Surveillance System (DHSS) the University of Gondar (UoG) established in 1995 to collect, organized and disseminate regular and up-to-date information on the health conditions of the population (including PwDs) in Dabat district, northwestern Ethiopia. The justification for the DHSS lay in the complicated impact disability has on several social, economic and health indicators of nations as well as the growing challenge of providing long-term everyday care for PwDs on public health policy and programming in resource constrained settings like Ethiopia. Nonetheless, with the focus of DHSS being on general health and demographic indicators, its data on disability were not based on internationally-applicable and locally-validated measurement tools. As a result, the DHSS consistently reports low disability prevalence in the district. This study, hence, assesses the prevalence, types and causes of disability in Dabat district employing a disability measurement tool adapted from WHO Disability Assessment Schedule (WHODAS 2.0).

Methods

Study Area

This paper discusses the prevalence and major causes of disability in Dabat district, northwestern Ethiopia – the district covered by DHSS longitudinal study. Dabat town is the administrative center of Dabat district and it is located 60kms northwest of Gondar city. The Dabat district covers 1,199.15km² area and has an estimated population of 168,331 (male/female: 50%) (CSA 2013). It is administratively organized under 5 urban and 27 rural *Kebeles* – *the smallest administrative unit in Ethiopia* – with altitudes ranging between 1000 and 3000 meters above sea level (Dabat Rural Project Statistics, 2015).

The district has 29 health posts, 3 health stations and 2 health centers. UoG established DHSS in 1995 to collect demographic, social and health data in 13 *Kebeles* (9 rural and 4 urban) of 32 *Kebeles* of the district. According to the 2014 Re-census Baseline Survey, DHSS collects data on 17,000 households, with 72,000 inhabitants, semi-annually.

Study Design

To identify the prevalence, causes and associated factors of disability at Dabat district, the study used a community-based cross-sectional design. Data were collected with enumerators and supervisors who visited all households in the DHSS catchment area and interviewed household heads between January and June 2018. This survey makes part of the add-on cross-sectional survey launched in 2016 to specifically address the gap in the DHSS data regarding the prevalence, types and causes of disability.

Study Population

This study covered members and permanent residents of 17,000 households found in 13 Kebeles of Dabat district. Thirty-three trained and experienced enumerators, overseen by 9 supervisors, interviewed household heads to collect data on health, social and demographic profiles of all household members and permanent residents.

Though this study collected data on the same population as the DHSS, it exclusively aimed at assessing the prevalence and causes of disability employing an adapted measurement tool from WHODAS 2.0.

Sample size and sampling procedures

Theoretically, this study included all members and permanent residents of 17,000 households as well as those on the streets in the 13 *Kebeles* within the Dabat district. It excluded those who were not permanent residents (less than 6 months, as per the CSA definition of 'household members') at the time of data collection.

Data collection: tools and procedure

The survey employed a structured and pre-tested questionnaire adapted from The World Health Organization Disability Assessment Schedule (WHODAS-2.0) and the International Classification of Functioning, Health and Disability (ICF). WHODAS-2.0 is a standardized and validated tool to assess health and disability status both at individual and community levels, and across cultures. As a generic tool, it effectively assesses disability induced limitations on activity and participation both in community and clinical set-up. Furthermore, it has been fruitfully deployed to measure the effectiveness of disability interventions. The survey questionnaire specifically adapted items from WHODAS-2.0 that measure the six domains of disability: learning and intellectual, mobility, self-care, getting along, life activities and participation. Furthermore, it included items from International Classification of Functioning, Health and Disability, Children & Youth version (ICF-CY) to assess disability, activity limitations and other outcomes among population under 18 years of age.

The questionnaire was designed in English first and then translated to Amharic – the official language of Ethiopia and spoken by residents of the Dabat district. The adaptation and validation of the questionnaire to the local context involved piloting, which was conducted in one *Kebele* – later excluded from the survey – and provided information to assess the relevance and appropriateness of its items and their wordings and sequencing. The pilot involved all enumerators, supervisors – who were trained for 5 days on research methods, interviewing and the questionnaire – and researchers who later engaged in critical reflection and integration of the piloting results to make the questionnaire, and the items wording, sequencing, etc., as relevant and appropriate as possible. Furthermore, the research team drew on their research and programing experiences on disability, community-based rehabilitation and inclusion in Dabat district to ensure the culture-appropriateness and scientific validity of the tool.

Enumerators asked household heads to provide information on household members with regard to impairment and/or disability by reading out a list of possible cases including hard of hearing or total loss, visual impairment or blind, speech impairment, loss of senses or limbs, paralysis, diagnoses insanity, etc. The information gathered on disability through the community survey did not necessarily account for mild or minor types of impairments that household heads were not aware of and/or decided to be insignificant.

The use of self-reporting rather than clinical diagnosis of household members to collect data on disability is identified as the limitation of this study. Whenever new cases of disability were identified during data collection, they were referred and/or linked to local Community-based Rehabilitation (CBR) fieldworkers.

Data analysis

Data were entered into the Household Registration System (v- 2.1) and the survey data was entered into and analyzed using STATA (v.12) software. Descriptive statistics – means, percentages, standard deviation, etc. – were employed to describe the characteristics of the study population. Table and figures were used to present aggregated and disaggregated, as appropriate, data. Binary logistic regression was fitted to test and identify factors significantly associated with disability. The bivariate analysis was carried out, and variables with p-values of <0.2 were entered into the multivariable logistic regression model. The crude odds ratio (COR) and finally, a

Logistic regression models were constructed on predictors of disability among the study population. The adjusted odds ratios with the corresponding 95% Confidence Interval (CI) were used to show the strength of association between independent variables (age, sex, place of residence, religious affiliation, educational attainment, occupation marital status) and disability. A P value of <0.05 was considered statistically significant.

Results

Respondents' Socio-demographic characteristics: As (Table 1) and shows survey data was collected on 71,673 members of 17,000 households in Dabat district. Among this, 33,304 (50.7%) were females, and 54,331 (75.77%) lived in rural areas. The Table also reports that 22,055 (30.78%) cannot read and write, while 22,093 (30.78 %) under 14years of age. Based on sex, 71.8% of female and 52.9% of male PwDs cannot read or write; and, females made up two-thirds of PwDs who cannot read or write.

Prevalence and types of disability: The overall prevalence of disability in Dabat district was 2.14% [95% CI: 2.03, 2.24] i.e. 1537 out of 71,916 people were reported to have one or more types of impairments listed on the questionnaire. Higher prevalence was noted among females (2.29%) than males (1.97%). As Table 2 and Figure 1 reveal, the prevalence of disability increased with increase in age, and reached the highest level among persons of 65 and above years old (10.18%). Conversely, without alluding causal attribution, the prevalence of disability declined with increase in educational status. For instance, the highest proportion of disability – 971 (63.2%) – was recorded among those who cannot read and write, and the difference is stark when we compare it to those with Grade 11/12 (0.72%) and Grade 12-plus (0.98%) education (Table 2 and 3) (figure 1).

More than 8% of households had a member with disability (1411 in 17,000 households). Table 1 also reports that the prevalence of disability was high among those with 'separated' (63 (10.21%)) and widowed (176 (9.33%)) marital statuses as well as the unemployed (5.42%). There was marginal variation between urban (2.08%) and rural (2.15%) *Kebeles* of Dabat district in terms of the number of persons affected by disability (Table 2).

Eight percent of the PwDs had more than one type of disability. In terms of single-disabilities, 51% had visual impairment, while 22.3% had mobility impairment and 22.3% were hard of hearing. there was a marked increase in hearing and visual impairments among ageing respondents (Table 3 & Figure 2, 3).

On the other hand, only 253 (16.5%) PwDs attended any form of formal education. In fact, as educational level increases, the proportion of PwDs who attended higher grade-levels fell significantly with less than 1% completing secondary education (Table 4).

With regard to occupation, small proportions of PwDs were government employees in urban (2.03%) and rural (0.35%) areas. More men (urban, 20.2%; rural, 52.8%) than women (urban, 14.8%; rural, 47.1%) worked on the farm, and farming was the main occupation for residents in urban (17%) and rural (49.8%) areas (Table 5). Conversely, more women (urban, 24.1% vs. 14.6%; rural, 17.8% vs. 7.9%) were household servants, while more men (urban, 12.3% vs. 8.1%; rural, 11.1% vs. 1.3%) were engaged in private works compared to their women counterparts (Table 5).

The survey identified the most frequent causes of disability as illness (36.93%), followed by accidents (17.81%), unknown (11.57%), congenital (10.86%) and ageing (5.2%). In other words, more than 83% of the reported immediate causes of impairments could have been prevented from causing functional limitations if they were identified and treated early (Table 6 and Figure 4). This argument is congruent to studies in other African and Latin American settings where families and persons with impairments are more likely to avoid early treatment (44), seek the services of traditional healers than modern medicine (40) or suffer from the inadequacy of primary health care services for screening and treatment (30).

Factors associated with disability: Multivariate logistic regression model was constructed to predict the occurrence of disability in the study population from data on respondents' age, educational attainment and marital status. The model found age [AOR= 1.0; 95% CI: 1.03, 1.04], educational attainment [AOR=1.15;95% CI: 1.57, 2.13], and marital status i.e. being single [AOR: 1.39; 95% CI: 185,2.47] and separated [AOR: 2.78; 95% CI: 4.14,6.19] as significant predictors of disability in the study population (Table 7).

Discussion

This study found that though the general prevalence of disability was 2.14%, it significantly affects older persons in the community. The proportion of households with members with disability i.e. 8.3% was high when compared to previous studies on the study area. As questionable they were in reliability, representativeness or timeliness, CSA and Chala reported 1.82% and 1.09%, respectively, disability prevalence for Dabat district, which were significantly lower than the 2.14% reported in this study. However, 2.14% is still significantly lower than an estimated 17.6% national disability prevalence rate in Ethiopia that WHO and WB (2011) reported.

There are several possible explanations why different sources provide different reports on the prevalence of disability. For one, WHO conceptualize disability broadly and include various factors and types, such chronic illnesses as diabetics as well as moderate and minor impairments, within the rubric of 'disability.' However, limited resources for rehabilitation services and supporting PwDs in developing countries may have dictated a narrower operationalization of disability. In other words, pragmatic conceptualization of disability would set realistic expectations and recommendations for policy formulation and social work practice. For another, this study relied on responses household heads provided to estimate the prevalence of disability in the district. By its design, the quality of data could be affected by respondents' lack of knowledge on the nature and degree of one's and household members' disability, and negative attitude towards disability and PwDs, among other. Hence, lack of understanding on disability, stigma attached to disability in the district and respondents' inability to identify all types and degrees of disability may have lowered reports on disability in the study area.

In terms of type of disability, this study reported similar results as the same team's previous study in Dabat district. Both studies found that visual impairment affects the highest proportion of PwDs; but while the current study found that mobility and hearing impairments are second and third in the number of persons they affect, their relative proportion was reversed three years earlier.

A small fraction of PwDs attended formal education; and more importantly, with advance in educational level, their progression to higher grades decreases significantly. This result was consistent with the Handicap International report that indicated a small fraction (3%) of the estimated 2.4 to 4.8 million school-age CwDs went to school. CwDs' low school attendance and participation are due to underlying reasons that include stigma against CwDs, school inaccessibility, rigid teaching practice, poorly trained teachers to accommodate children with special needs and lack of adaptive hearing resources. Another study in South Africa documented how PwDs and their families live with stigma and social exclusion that affect their personal development and community participation. Other studies also report CwDs are less likely to attend schooling and access health care, and they are more vulnerable to poverty which may result in substantial decline in their quality of life.

This study reported that the majority of disabilities were due to modifiable illnesses, injuries, etc.; and the causes and impacts of disability are multifaceted. Concurrent to these findings, studies have documented that the majority of disabilities in Africa result from illness, injury, and accidents – causes that are preventable (5, 45, 46). In Ethiopia, diseases like measles, poliomyelitis, etc. as well as accidents and injuries cause illnesses to many people that – if identified and treated early or on time – may not necessarily amount to serious functional and activity limitations. Similarly, a study on causes of visual disability in nine Latin American countries categorized 80% of the cases as avoidable with early detect and treatment [30]. Most disabilities and their causes can be linked to poverty, and restricted access to basic services. As this study reported, most PwDs were poor – both in urban and rural areas – and a significant majority of them were involved in small-scale farming with strained livelihoods. Besides, inadequate health care services were also significant contributors to the disability problem on the continent, which is the same in the Dabat district.

Disability causes serious bad health outcomes, and the provision of long-term care for PwDs in resource limited settings is a major public health problem. Disability is especially a concern for developing countries where prevention approach and health service services are inadequate or very scarce (40, 47). Moreover, stigma and stereotypes limit educational and employment opportunities for PwDs thereby creating dependency and exclusion for PwDs and this study underlines these facts.

When it comes to women with disabilities, they carry the double burden of stigma and discrimination and economic problem due to their gender-roles and disability. Disability and poverty exacerbate their socioeconomic wellbeing and their general quality of life.

Strengths and Limitations

The study aimed at exploring the prevalence and causes of disability in low resource setting i.e. Dabat district, Northwestern Ethiopia. Large size samples were drawn to collect representative empirical data about the population. Literature review revealed that there is dearth of scientific, empirical information to understand the trend and changes on the prevalence and magnitude of disability and its effects in Ethiopia. It has also established the evident fact that there is low community and governmental attention on disability and the empowerment of PwDs in developing countries such as Ethiopia. Therefore, by identifying contributing factors to disability and its prevalence and impacts on peoples' lives in northwest Ethiopia, this study will promote disability awareness and inclusive society as well as inform the agenda for disability research, policy and practice in the district and beyond.

The two main limitations of this study emanate from drawing on the reports of household heads to identify PwDs at the household level, and the focus on severe/extreme difficulties rather than the whole range of disabilities. The researchers attempted to address the first limitation to a certain extent by listing possible types of impairments/disabilities to households that provides them with a framework and/or prompt their response. The second limitation of the study explains, partly why disability prevalence in the district was significantly lower than the WHO estimation for low- and middle-income countries.

Conclusion

This study found the proportion of reported disability per household to be high. Vision and mobility disability were the most frequently observed types of disability, and most immediate causes of disability were modifiable. This conclusion, however, does not apply to underlying structural factors to disability such as poverty, aging, inaccessibility of health services, etc. that require programmatic interventions at national, regional and local levels. On the other hand, this study indicated that the prevalence of disability increased among the ageing-groups. As educational level increase, the proportion of PwDs attending school decreases, and most PwDs do not complete secondary education. Similarly, a small proportion of PwDs were government employees, and the majority were engaged in farming.

Early intervention and appropriate medication will prevent the burden of disability. To this end, *appropriate attention should be given to improve quality of healthcare facilities and services to reduce the burden of disability on families, communities and the health care system.* Moreover, community awareness creation and enhancing inclusive education will improve education opportunity for PwDs. With improve in educational level and skills, PwDs will be able to find and/or create jobs thereby promoting their independence and better quality of life. Further qualitative research is recommended to examine contextual factors that influence the social participation and quality of life of PwDs in the context of Dabat district.

Abbreviations

ANRS: Amhara National Regional State

CBR: Community-based Rehabilitation

CSA: Central Statistical Agency

CwDs: Children with Disabilities

DHSS: Demographic Health Surveillance System

ICF: International Classification of Functioning, Health and Disability

ICF-CY: Health and Disability, Children & Youth version

NGZ: North Gondar Zone

PwDs: Persons with Disabilities

WB: World Bank

WHO: The World Health Organization

WHODAS 2.0: World Health Organization Disability Assessment Schedule

Declarations

Ethics approval and consent to participate

The University of Gondar's Institutional Review Board (UoG-IRB) cleared the research for meeting required and appropriate ethical standards. Two support letters - from the Vice President's Office for Research and Community Services and the College of Medicine and Health Sciences – were submitted to Dabat District Administrator. Letter of information describing the purpose and objectives of the study, and written informed consent was obtained from the study participant (household head), and consent forms were given or read to study participants prior to the commencement of the interview. Participants were granted the right to terminate their participation in the study at any point if and when they chose to.

Once in the field, researchers and DHSS staff put their maximum efforts in assuring all ethical and scientific standards are maintained. Participants' privacy and confidentiality were respected during and after interviews. Once data was collected, each questionnaire was coded, and personal identifiers were removed to maintain anonymity and confidentiality of participants. All data was entered and saved on a computer with a strong password which was only accessible by the research team. Participants who reported disability or were found ill during data collection were either linked to UoG-CBR fieldworkers or health centers for better care.

Consent for publication: "Not applicable"

Availability of data and material: Since the data presented in this report are the part of the large DHSS survey data, we have to abide by the data sharing policy of University of Gondar; nonetheless, we have included all important information regarding data presented on the tables and figures (No additional data are available).

Competing interests: The authors declare no financial and non-financial competing interests

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Authors' contributions

SMA, MB, MB, SF, AN, MA, Z, WW, AF, designed the study;

SMA, performed the analysis and interpretation of data; and,

SMA, MB, MB, SF, AN, MA, Z, WW, AF, drafted and finalized the write-up of the paper.

All authors prepared the draft manuscript, read and approved the final manuscript.

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Authors' Information

We confirm that the manuscript has been read and approved by all named authors,

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Tables

Table 1: Socio-demographic characteristics of the study population (n=71,916) at Dabat district

Variable	Disability Yes # (%)	Total # (%)
Age in years		
<i>0 to 14 Years</i>	194 (0.88)	22133 (30.78)
<i>15 to 24 Years</i>	194 (1.11)	17424 (24.23)
<i>25 to 34 Years</i>	175 (1.58)	11050 (15.37)
<i>35 to 44 years</i>	184 (2.36)	7781 (10.82)
<i>45 to 54 years</i>	179 (3.24)	5523 (7.68)
<i>55 to 64 years</i>	201 (5.06)	3976 (5.53)
<i>65 and above years</i>	410 (10.18)	4029 (5.6)
Sex		
<i>Female</i>	837 (2.3)	36462 (50.7)
<i>Male</i>	700 (1.97)	35454 (49.3)
Residency		
<i>Urban</i>	363 (2.08)	17427 (24.23)
<i>Rural</i>	1174 (2.15)	54489 (75.77)
Religion		
<i>Orthodox Christianity</i>	1312 (1.87)	69357 (96.71)
<i>Islam</i>	25 (1.01)	2343 (3.27)
Educational Status		
<i>Under age (07 years)</i>	153(0.79)	19449 (27.04)
<i>Unable to read and write</i>	971 (4.36)	22274 (30.97)
<i>Able to read and writ</i>	130 (2.95)	4413 (6.14)
<i>Grade 1 to 3</i>	88 (1.08)	8163 (11.35)
<i>Grade 4 to 6</i>	57 (1.27)	4500 (6.26)
<i>Grade 7 to 8</i>	36 (1.55)	2323 (3.23)
<i>Grade 9 to 10</i>	41 (1.32)	3097 (4.31)
<i>Grade 11 to 12</i>	11 (0.95)	1161 (1.61)
<i>Above grade 12</i>	15 (1.47)	1020 (1.42)
<i>Unknown</i>	35 (0.63)	5515 (7.67)
Marital Status		
		Total
<i>Underage (Less than 15 years old)</i>	209 (0.79)	26394 (36.7)
<i>Married</i>	664 (3.01)	22044 (30.65)
<i>Single</i>	287 (1.98)	14530 (20.2)
<i>Divorced</i>	104 (4.49)	2314 (3.22)
<i>Widowed</i>	176 (9.33)	1887 (2.62)
<i>Separate</i>	63 (10.21)	617 (0.89)
<i>Cohabited</i>	0 (0.00)	45 (0.06)
<i>Unknown</i>	25 (0.61)	4076 (5.67)

Variable	Disability Yes # (%)	Total # (%)
Occupation		
<i>Underage (Less than 10 years)</i>	286 (0.98)	29258 (40.68)
<i>Farmer</i>	408 (3.77)	10832 (15.06)
<i>Merchant</i>	71 (1.45)	4884 (6.76)
<i>Private employee</i>	35 (2.35)	1489 (2.07)
<i>Government employee</i>	12 (2.47)	485 (0.67)
<i>Daily laborer</i>	31 (3.78)	820 (1.14)
<i>Housewife</i>	68 (3.69)	1845 (2.57)
<i>Shepherd</i>	228 (3.34)	6867 (9.54)
<i>Student</i>	151 (2.3)	6567 (9.13)
<i>Home-made servant</i>	162 (2.75)	5883 (8.18)
<i>Unemployed</i>	28 (5.42)	517 (0.72)
<i>Others</i>	37 (1.51)	2449 (3.41)

Table 2: Distribution and types of disability by age (n=1537) at Dabat district

Age in year	Hearing	Vision	Mental	Speech	Learning	Motor	Other	Total
0 to 14	0.09	0.22	0.15	0.10	0.06	0.28	0.01	0.92
15 to 24	0.23	0.28	0.19	0.09	0.09	0.305	0.02	1.22
25 to 34	0.30	0.40	0.30	0.09	0.08	0.35	0	1.53
35 to 44	0.49	0.73	0.27	0.13	0.05	0.55	0.05	2.28
45 to 54	0.58	1.29	0.36	0.183	0.10	0.64	0.05	3.22
55 to 64	0.88	3.01	0.25	0.13	0.05	0.76	0.05	5.14
64 and above	2.27	6.88	0.28	0.13	0	1.21	0.05	10.82
Total								

Table 3: Educational attainment by sex among PwDs in Dabat district

Educational attainment	Female, n (%)	Male, n (%)	Total, n (%)
Under age (07years)	83 (9.92)	100 (14.3)	183 (11.9)
Unable to read and write	601 (71.8)	370 (52.9)	971 (63.2)
Able to read and writ	18 (2.15)	112 (16)	130 (8.46)
Grades 1 to 3	56 (6.69)	33 (4.71)	89 (5.79)
Grades 4 to 6	25 (2.99)	34 (4.86)	59 (3.84)
Grades 7 to 8	20 (2.39)	17 (2.43)	37 (2.41)
Grades 9 to 10	21 (2.51)	21 (3)	42 (2.73)
Grades 11 to 12	5 (0.6)	6 (0.86)	11 (0.72)
Grades 12+	8 (0.96)	7 (1)	15 (0.98)
Total	837 (54)	700 (46)	1537 (100)

Table 4: Occupation by sex and residential area among PwDs in Dabat district

Variable Occupation	Urban			Rural		
	Female	Male	Total	Female	Male	Total
<i>Under age</i>	55 (23.3)	41 (25.9)	96 (24.4)	127 (21.1)	75 (13.8)	202 (17.7)
<i>Farmer</i>	35 (14.8)	32 (20.2)	67 (17.0)	283 (47.1)	286 (52.8)	569 (49.8)
<i>Private employment</i>	19 (8.05)	19 (12.03)	38 (9.64)	8 (1.33)	60 (11.1)	68 (5.95)
<i>Government employed</i>	4 (1.69)	4 (2.53)	8 (2.03)	2 (0.33)	2 (0.37)	4 (0.35)
<i>Daily laborer</i>	11 (4.66)	12 (7.59)	23 (5.84)	2 (0.33)	6 (1.11)	8 (0.70)
<i>Home Made</i>	57 (24.1)	23 (14.6)	80 (20.3)	107 (17.8)	43 (7.93)	150 (13.1)
<i>Student</i>	44 (18.6)	22 (13.9)	66 (16.7)	50 (8.32)	47 (8.67)	97 (8.49)
<i>Unemployed</i>	11 (4.66)	5 (3.16)	16 (4.06)	22 (3.66)	23 (4.24)	45 (3.94)

(Source: Survey 2018)

Table 5: Distribution of perceived causes and types of disability among the study population in Dabat district

Variable	Hearing		Vision		Physical disability		Mental		Speech		Lea
	Yes	Total	Yes	Total	Yes	Total	Yes	Total	Yes	Total	
<i>Congenital</i>	54 (15.7)	167 (10.9)	29 (3.7)	167 (10.8)	48 (12.9)	167 (10.9)	35 (17.8)	167 (10.9)	38 (36.5)	167 (10.9)	29 (42.6)
<i>Grievance</i>	7 (2.04)	67 (4.36)	49 (6.25)	67 (4.36)	14 (3.73)	67 (4.36)	9 (4.57)	67 (4.36)	3 (2.88)	67 (4.36)	1 (1.47)
<i>Injury</i>	38 (11.08)	274 (17.8)	126 (16.1)	274 (17.8)	113 (30.3)	274 (17.8)	18 (9.14)	274 (17.8)	8 (7.69)	266 (18.6)	5 (7.35)
<i>Meseal</i>	8 (2.33)	20 (1.3)	12 (1.53)	20 (1.3)	3 (0.8)	20 (1.3)	0 (0.00)	20 (1.3)	0 (0.00)	20 (1.3)	0 (0.00)
<i>Old age</i>	30 (8.75)	80 (5.2)	64 (8.16)	80 (5.2)	9 (2.41)	80 (5.2)	3 (1.52)	80 (5.2)	2 (1.92)	80 (5.2)	1 (1.47)
<i>Spontaneously</i>	16 (4.66)	51 (3.32)	23 (2.93)	51 (3.32)	2 (0.54)	51 (3.32)	10 (5.08)	51 (3.32)	8 (7.69)	51 (3.32)	4 (5.88)
<i>Unknown</i>	38 (11.08)	177 (11.5)	91 (11.6)	177 (11.5)	38 (10.2)	177 (11.5)	20 (10.15)	177 (11.5)	21 (20.2)	177 (11.5)	8 (11.76)
<i>Alcohol</i>	7 (2.04)	24 (1.56)	20 (2.55)	24 (1.56)	2 (0.54)	24 (1.56)	0 (0.00)	24 (1.56)	0 (0.00)	24 (1.56)	0 (0.00)
<i>Contamination</i>	15 (4.37)	109 (7.09)	26 (3.32)	109 (7.09)	45 (12.1)	109 (7.09)	36 (18.3)	109 (7.09)	6 (5.77)	109 (7.09)	9 (13.2)
<i>Illness</i>	130 (37.9)	568 (36.9)	344 (43.9)	568 (36.9)	99 (26.5)	568 (36.9)	66 (33.5)	568 (36.9)	18 (17.3)	568 (36.9)	11 (16.2)

Survey 2018)

Table 6: Associated factors of disability among the study population in Dabat district

Variable	Disability, Yes=n (%)	COR [95% CI:]	AOR [95% CI:]	AOR P-value
Age (in year)		1.04 [1.037, 1.042]	1.04 [1.03,1.04]	<0.001
Gender				
Male	700 (1.97)	1.00	1.00	
Female	837 (2.30)	2.49 [0.23, 27.5]	1.06 [0.94, 1.18]	0.362
Educational attainment				
Under age (≤7years)	153 (0.78)	1.00	1.00	
Unable to read and write	971 (4.36)	5.74 [4.84, 6.82]	1.57 [1.15, 1.15]	0.004
Able to read and write	130 (2.95)	3.82 [3.02, 4.84]	1.10 [0.77, 1.57]	0.588
Grade 1 to 3	88 (1.08)	1.37 [1.06, 1.79]	0.64 [0.45, 0.90]	0.01
Grade 4 to 6	57 (1.27)	1.61 [1.19, 2.19]	0.58 [0.39, 0.87]	0.009
Grade 7 to 8	36 (1.55)	1.98 [1.38, 2.86]	0.69 [0.44, 1.09]	0.112
Grade 9 to 10	41 (1.32)	1.69 [1.19, 2.39]	0.60 [0.39, 0.94]	0.025
Grade 11 to 12	11 (0.95)	1.21 [0.65, 2.23]	0.35 [0.18, 0.69]	0.002
Above 12	15 (1.47)	1.88 [1.10, 3.21]	0.54 [0.29, 0.99]	0.047
Unknown	35 (0.65)	0.81 [0.56, 1.16]	0.44 [0.23, 0.84]	0.012
Marital Status				
Under age ≤10 years	209 (0.79)	1.00	1.00	
Married	664 (3.01)	3.89 [3.32, 4.55]	0.79 [0.58, 1.07]	0.136
Single	287(1.98)	2.52 [2.11, 3.02]	1.86 [1.39, 2.48]	<0.001
Divorced	104 (4.49)	5.89 [4.64, 7.49]	1.02 [0.71, 1.46]	0.931
Widowed	176 (9.33)	12.9 [10.48, 15.8]	1.17 [0.81, 1.69]	0.396
Separated	63 (10.21)	14 [10.6, 19.12]	4.15 [2.78, 6.19]	<0.001
Unknown	25 (0.61)	0.77 [0.51, 1.17]	2.88 [1.52, 5.49]	0.001
Place of Residence				
Urban	367 (2.08)	1.00	1.00	
Rural	1174 (2.15)	1.26 [1.10, 1.45]	0.98 [0.86, 1.12]	0.8

Figures

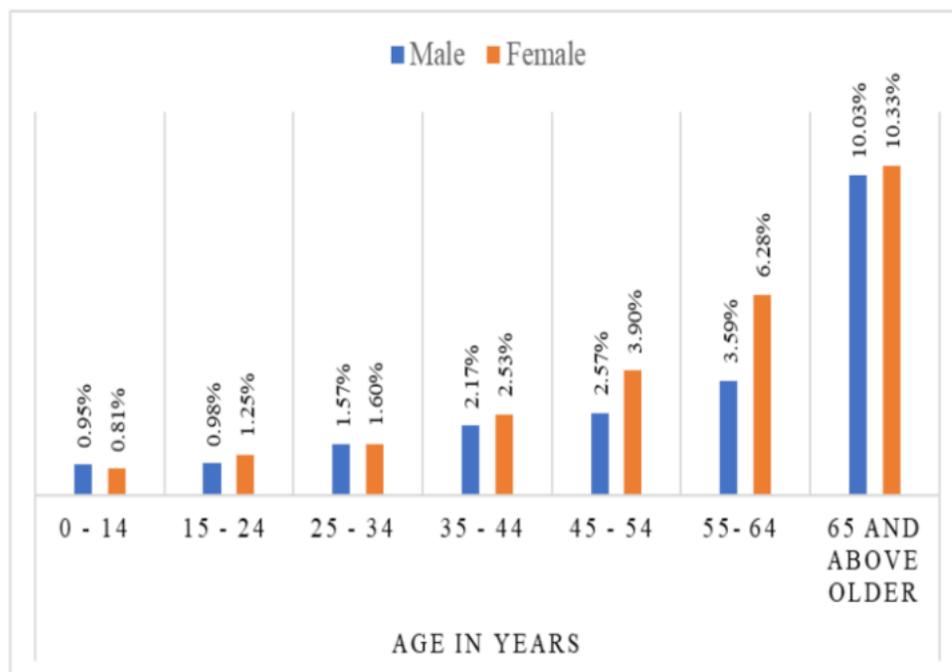


Figure 1

Magnitude of disability by sex and age in Dabat district (Source: Survey 2018)

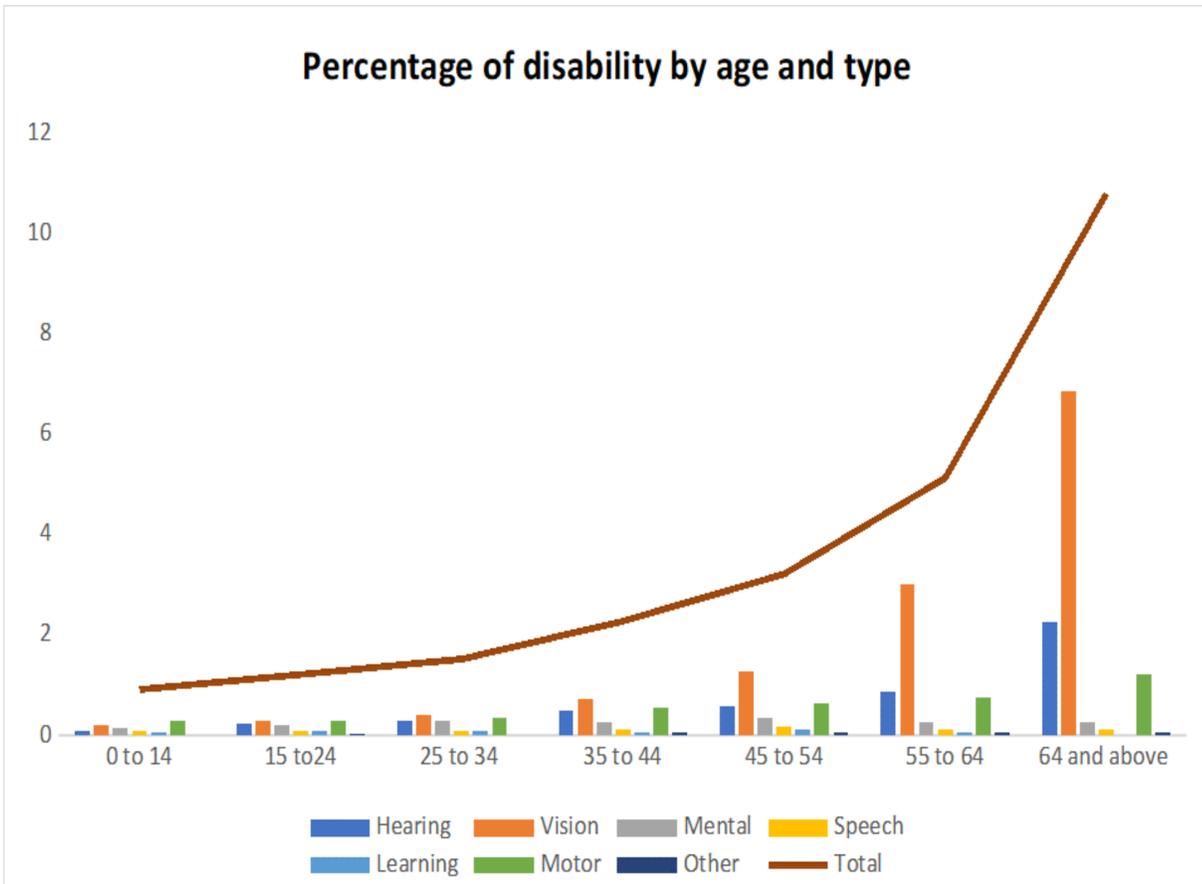


Figure 2

Distribution and type of disability by age among PwDs in Dabat district (Source: Survey 2018)

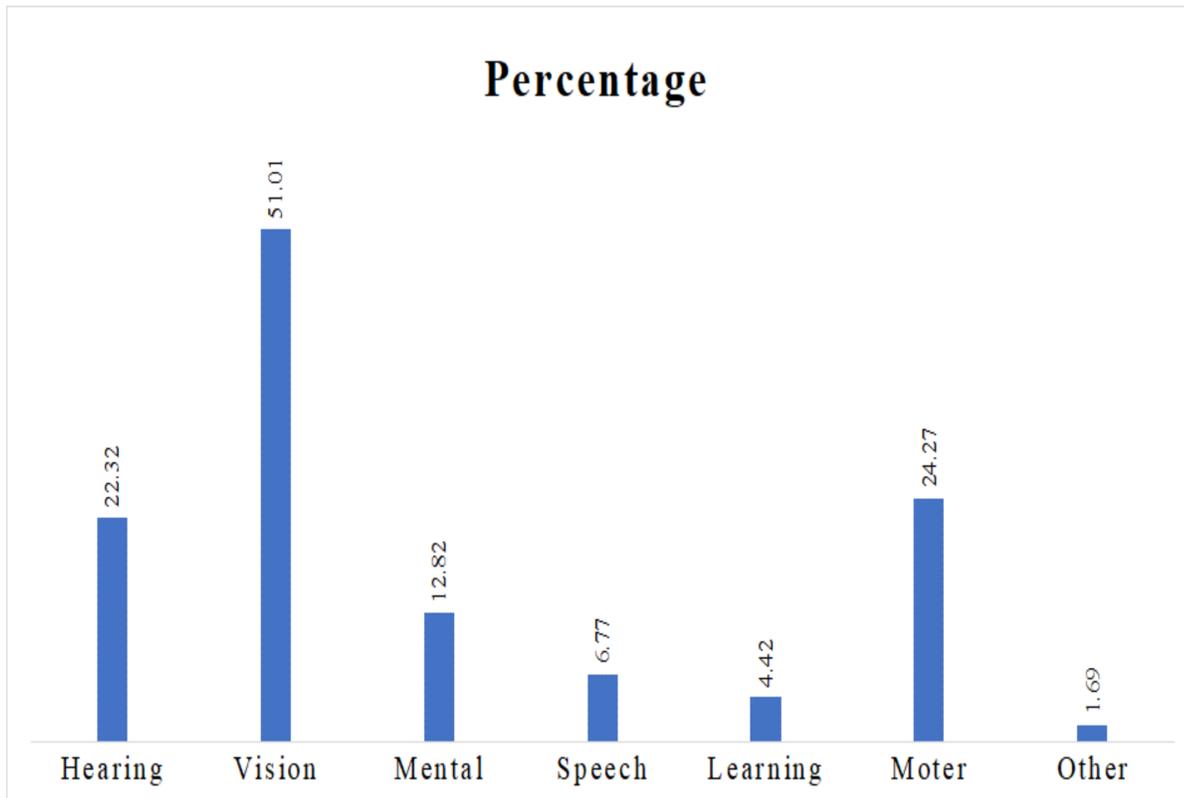


Figure 3

Types of disability among PwDs in Dabat district (Source: Survey 2018)

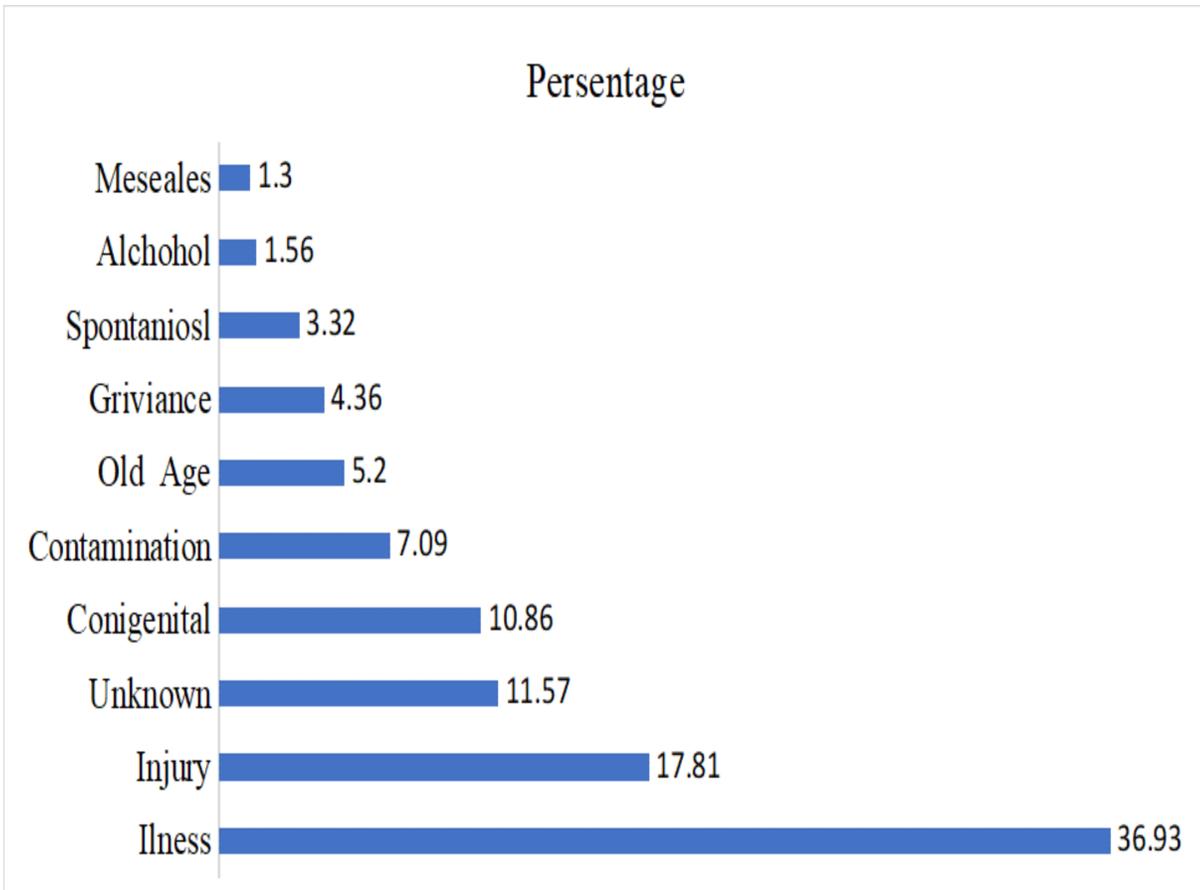


Figure 4

Perceived causes of disability among PwDs in Dabat district (Source: Survey, 2018).

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