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Disabilities and Care Needs among Older People: Evidence from Vietnam

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Abstract

In this study, we study disability among older people (aged 60 or older) using the 2016 Viet Nam National Disability Survey. We find that 31% and 12% of older people are living with low and high disabilities, respectively. These rates are remarkably higher than the disability rate identified by local authorities. Disability is found to be more prevalent in older people and women. There is a strong and negative association between education and disability, as well as between wealth and disability. Next, we analyze the need for care among older people with disabilities. We find that around 10% of older people need care, which is equivalent to around 1.2 million people. The proportion of people in need of care is 29% for older people with disabilities and 53.8% for older people with severe disabilities.

Keywords: Disability, older people, care need, unmet care, Vietnam

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1. Introduction

Along with economic development and medicine, human health and longevity have been greatly improved. At the same time, fertility rate has been decreased. Over the last 50 years the total fertility rate (births per women) of the world has halved, to 2.4 in 2017 (World Bank, 2018). Increased life expectancy and declining birth rates have increased the trend of population aging in the world. According to forecast from United Nations (2019), the proportion of people aged 65 and over will be increased from 9% in 2019 to 16% in 2050. In 2018, for the first time in history, the number of people aged 65 and over was higher than the number of children under 5. A large number of studies discuss the social-economic consequences of population aging (e.g., Lee, 2014; Yenilmez, 2015; Otsu and Shibayama, 2016; Otsu and Shibayama, 2016). One of the main problems with population aging is how to provide health care for the elderly, especially those with disability.

Viet Nam is among the most rapidly ageing countries in the world. According to GSO (2019), the aging index, which is equal to the ratio of the number of people from 60 to the number of children below 15 (measured in percent), has increased over time. The aging index increased by 13.3 percentage points from 35.5% in 2009 to 48.8% in 2019. Estimates from the 2019 Vietnam Population and Housing Census, there are nearly 12 million people aged 60 and over in Vietnam, accounting for 12.2% of the total population. It is predicted that Viet Nam is expected to have an aged population with 20% of the total population are older people aged 60 and above by 2035 (World Bank, 2018). Vietnam is also a country with around 9% of adults (aged from 15) having disabilities (GSO, 2018). The results from the 2016 Vietnam National Disability Survey shows that almost 80 per cent of people living with disabilities (PLWD) in Viet Nam are older people aged 60 and above. High disability rate among older persons also calls for special attention to care.

In this study, we examine the disability prevalence and care needs for older people, especially those with disabilities using the 2016 Vietnam National Disability Survey. Our study has two main objectives. Firstly, it provides evidence on disabilities among older persons, including prevalence, trend and situation of older persons living with disabilities (henceforth referred to as OPLWD). Secondly, it examines the care needs and access to health care and social protection of older people and OPLWD in Vietnam. The analysis is disaggregated by sex, age, rural-urban, region, employment status, marital status, education,

ethnicity, welfare level (wealth index). This study is expected to provide useful information for the government to take immediate actions to ensure better support and access for older people in Viet Nam toward healthy, active and fulfilling lives.

Several studies examine disability using household surveys in Vietnam. Mont and Nguyen (2011) use the 2006 Vietnam Household Living Standard Survey to explore correlation between disability and poverty in Vietnam. They find a strong correlation between disability and poverty, and this disability-poverty link is associated with lower educational attainment. Also using this data set, Mont and Nguyen (2013) find a negative effect of parental disability on education of their children. Minh et al. (2015) use a survey in 8 provinces in 2011 and estimate the extra cost of living with disability in Vietnam. The cost is estimated at around 8.8–9.5% of annual household income, equivalent to US$200–218. Recently GSO (2018) use the 2016 Vietnam National Disability Survey to estimate the prevalence of disability in Vietnam and characteristics of households with members living with disabilities. Our study differs from the previous study by looking at disability of older people.

The care needs of older people in Vietnam have been also studied. Bang et al. (2017) examine health status and the demand for health care of older people in a case study of a district in Hanoi. Hoi et al. (2012) assess the willingness to pay for nursing services using a sample of 2,240 households conducted in Ha Tay province in 2007. Perhaps, Hoi et al. (2011) is a study which is the most related to the care needs of older people in Vietnam. Using the same data set as Hoi et al. (2012), Hoi et al. (2011) assess needed support in activities of daily living (henceforth referred to as ADLs) of older people. It finds that most older people do not need helps. The proportion of older people with help needs is highest for intellectual ADLs (13-32%), followed by instrumental ADLs (3-13%), and basic ADLs (3-8%). Three-fifths of older people who need help receive supports. Children and grandchildren are the main caregivers for these people. This finding implies that two-fifths of older people have unmet needs. In this study, due to data limitation, we cannot estimate the unmet needs. Instead, we focus on the care needs among older people and those with disabilities. The main advantage of our study is the use of more recent and nationally representative data set. The 2016 Vietnam National Disability Survey can be representative at the national level, urban/rural and 6 geographical regions of Vietnam. By using this data set, we can provide

more updated and detailed information on disability and care needs of older people in Vietnam.

This report is structured into 5 sections. The second section presents the data set and methodology to measure disability and care needs of older people. The third section presents analysis of disability among older people in Vietnam. The forth section examines the care needs and access to health care and social protection of older people and OPLWD in Vietnam. Finally, the fifth section summarizes the main finding of this study and suggests several policy recommendations.

2. Measurement of disability and care needs of older people

2.1. Data set

This study relies on data from the Viet Nam National Disability Survey (henceforth referred to as VNDS), which was conducted by General Statistics Office in late 2016 and early 2017. The sample frame of the survey is the Intercensal Population and Housing Survey 2014. The 2016 VNDS follows a two-step stratified sampling. 1,074 enumeration areas were first sampled from 126 strata (urban/rural and provinces), then 33 households were randomly selected from each enumeration area (more details on the sampling method can be found in GSO, 2018). This survey covers 35,442 households from 1,074 enumeration areas in 1,074 communes and wards in 658 throughout the country.[1] The response rate is 98.8%. Thus, the final sample of households for analysis is 35,029. This sample is representative at the national level, urban and rural areas, and 6 geographic regions (Red River Delta, North Midland and Mountain, North Central and Central Coast, Central Highlands, South East, and Mekong River Delta).

In this study, we focus on people from 60, who are defined as older people according to the 2009 Vietnam Law on the Elderly. In the 2016 VNDS, there are 11,072 households which have at least one older member. The sample size of individuals aged from 60 is 15,372. In this study, we mainly use this sample for analysis.

[1] There are 63 provinces and provincial-level cities in Vietnam. Each province is split into districts, and each district is split further into communes and wards. Communes and wards are the smallest administrative divisions in Vietnam. In 2016, there were 713 districts and 11,162 communes and wards.

The 2016 VNDS contains both household-level and individual-level data. Household-level data include information on housing conditions and durable ownership. There are no data on income or consumption. There are more detailed individual-level data including demography, education, health care, labor and social inclusion of individuals. Especially, there are detailed data on disability and functional limitations of individuals.

2.2. Measurement of disability

Disability is a complex phenomenon and can be measured various ways. Recently, disability has been measured by the level of difficulties people have performing various activities (Mont 2007a, b; Mont and Nguyen, 2011). The Washington Group on Disability Statistics (henceforth referred to as WGDS) recommends using the presence of difficulties in a core set of basic activities including sight, hearing, walking, cognition, communication, and self-care as an operational proxy for a person at risk of being disabled (Washington Group on Disability Statistics, 2010).[2] For the case of Vietnam, several household surveys including the 2006 Vietnam Household Living Standard Surveys, the 2009 Population and Housing Census, and the 2016 VNDS also use this approach to collect data and measure disabilities. Recently, GSO (2018) also employs this approach and the 2016 VNDS to analyse disability in Vietnam.

In this study, we also follow the approach from the WGDS to measure disability among older people in Vietnam. We first start with the definition of disability based on the six main functional domains: seeing, hearing, walking, cognition, communication, and self-care. Data are collected using a so-called the Washington Group Short Set questions. Respondents are asked about the difficulty level that they may have when doing certain activities related to the 6 domains, e.g., "Do you have difficulty seeing even if wearing glasses?". Interviewees can choose one of the four options: a. No difficulty; b. Some difficulty; c. A lot of difficulty; and d. Cannot do at all. A person is considered as one with disability if she or he has "a lot of difficulty" or "cannot do at all" in at least one functional domain. Table A.1 in Appendix presents the main questions to identify difficulty in the six domains.

[2] The approach is similar to the model that underlies the International Classification of Functioning, Disability, and Health, which focuses on people's ability to take certain activities in their current environment (WHO 2011; Altman 2001).

A limitation of the WGSS is that it does not consider psychological issues and upper body mobility. Thus, the WGDS extends the short set to include domains of psychological issues and upper body mobility. The extended set questions of the WGDS include additional questions on the six domains as the WGDS short set and also new questions on domains of psychological issues and upper body mobility. The WGDS extended set consists of 8 functional domains. A person is considered as one with disability if she or he has "a lot of difficulty" or "cannot do at all" in at least one functional domain, or in case of the psychological issues she or he have problems with both a high frequency and intensity (a lot of difficulty on a daily basis).

In this study, we measure disability of older people using both the short and extended set definitions. This approach is also used in GSO (2018). In addition, we measure high disability level by using the WGDS extended set definition. A person is considered as one with high disability if she or he has "cannot do at all" in at least one functional domain, or in case of the psychological issues she or he have problems with both a high frequency and intensity (a lot of difficulty on a daily basis).

2.3. Care needs among older people

Older people have more frequent and complicated care needs than younger ones due to disability and other health problems (Herr et al. 2013). The concept of need is important for understanding of how social policies and programs are designed and provided for older people, especially those with disabilities (Vlachantoni, 2019). The effectiveness of the public services is assessed by the extent to which the care needs of older people are met. The definition and measurement of care needs are also useful to determine eligibility criteria for older people to receive public services and assistances (Vlachantoni et al., 2011).

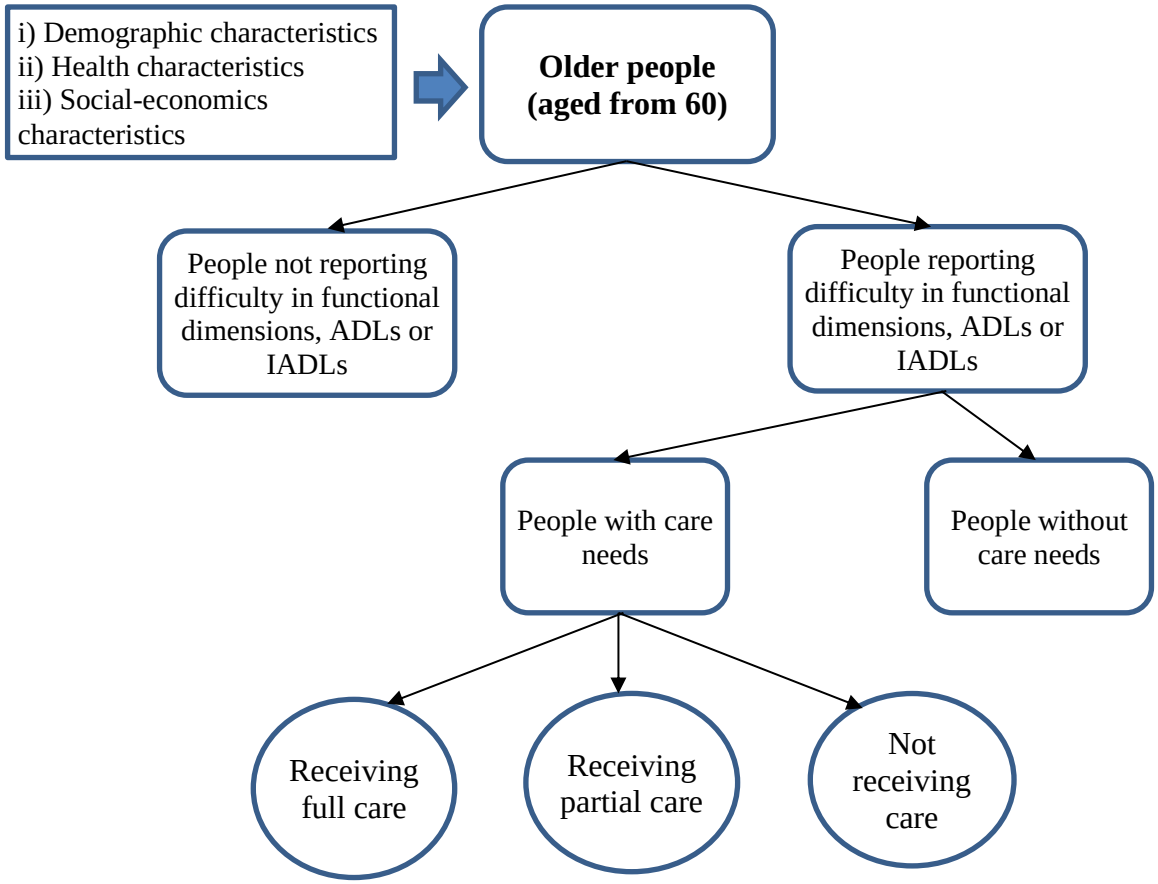
Several studies distinguish between more objective needs such as normative and clinical needs, which are identified by experts, and subjective needs which are expressed and assessed by people themselves (Bradshaw, 1972; Allin et al., 2010). Care needs can be also assessed from the perspective of care givers (Miranda-Castillo et al., 2013). Recent studies have discussed the care needs in the link with people's difficulty in functional domains or conducting daily activities (e.g., Vlachantoni et al., 2011; Allen et al., 2015; Kingston et al.,

2018). Care needs of older people are driven when they face difficulties in daily activities and cannot live independently.

A common framework to measure care risks among older people are activities of daily living (ADLs) and instrumental activities of daily living (IADLs) (Spector et al., 1987; Williams et al., 1997). Katz and Akpom (1976) develop a set of measure of limitations in basic daily activities such as bathing, dressing, toileting, moving from bed, eating, and continence. The long-term care might be estimated for people who experience number of ADL limitations (Williams et al., 1997). IADLs measure the ability to perform periodic activities such as transportation, shopping, meal preparation, and chores (Williams et al., 1997). ADLs are necessary for self-care of individuals in everyday life, while IADLs are important to function in their households as well as community (Gill et al., 2004). Individuals with difficulty in ADLs need care and assistance from others, either from formal and informal providers. When help and assistance are not available or insufficient for these people, unmet need occurs (Williams et al., 1997). Long-term unmet need can have serious consequences for older people such as hospitalizations, psychological distress, more severe health problems and mortality (e.g., see Allen and Mor, 1997; LaPlante et al., 2004; Gureje et al., 2006; Quail et al., 2011; Momtaz et al., 2012).

We adopt and extend the framework from Vlachantoni (2019) to illustrate the relation between disability and care needs in Figure 1. Older people are classified into those with and without difficulty in functional domains, ADLs or IADLs. Among people with difficulty, some people need care and supports from formal and informal care providers. People with care needs can receive either full or partial care. People with unmet needs are those who receive partial or do not receive needed care.

Figure 1. Conceptualization of care needs among older people



Source: Authors' preparations based on Vlachantoni (2019).

The 2016 VNDS is designed to measure disability instead of ADLs or IADLs. Among the functional domains which are used to measure disability according to Washington Group on Disability Statistics, there is a self-care domain. It asks respondents whether they have difficulty in self-care such as washing all over or dressing. The self-care is more related to ADLs. However, the information on self-care from the 2016 VNDS cannot fully capture the measurement of ADLs as well as IADLs. Thus, in this study, we focus on the care needs among older people with disabilities instead of older people with difficulties in ADLs or IADLs.

There is no enough information from the 2016 VNDS to measure unmet needs of older people. In this study, we are only able to measure care needs of older people with disabilities. There is a question on the 2016 VNDS, which ask respondents whether they need

someone to provide care and assistance for their daily activities such as eating, bathing, toileting and mobility. Respondents who give answer 'Yes' are defined as those need care help.

3. Disability among older people

3.1. Prevalence of disability in Vietnam

Health care and supports for the elderly and people with disabilities has received attention from policy makers in Vietnam. The Vietnam Law on the Elderly was promulgated by the National Assembly in 2009, defining the rights and obligations of the elderly as well as the responsibilities of the State and social agencies for the care of the elderly. The government has implemented the National Program of Action on the elderly population of Vietnam for the period 2012-2020 (Decision No.1781/QĐ-TTg on 11/22/2012) to improve the access to health care for the older people. Regarding disability, Vietnam passed the Law on People with Disabilities in 2010 and related decisions to implement this law. People with disabilities and older people can receive reduction in fees of several public services such as transportation and health care (Government of Vietnam, 2012). The most important supports for people with high disabilities and people aged 80 and older are free health insurance and monthly social allowances.

According to the Law on the Elderly, older people are defined as those from 60 years and above. In this study, we use this definition to identify older people in the data set. In the 2016 VNDS, there are 12.9% of individuals aged from 60 and over. Individuals below 60 are dropped from the analysis.

As mentioned in section 2.2, we measure disability among older people using both WGDS short and extended sets of functional domains. In addition, we define high disability using the WGDS extended set. A person is considered as one with high disability if she or he has "cannot do at all" in at least one functional domain, or in case of the psychological issues she or he have problems with both a high frequency and intensity (a lot of difficulty on a daily basis).

We start with descriptive analysis of the proportion of older people with difficulty in different domains (Table 1). 6.8% and 5.4% of older people have difficulty in seeing and

hearing, respectively. The proportion of older people who reported "cannot do at all" in seeing and hearing is 0.7% and 0.5%, respectively.

There are more older people with difficulty in low mobility (walking), at 14.6%. In the WGDS extended set, there are more sub-questions on low mobility and a person is defined as having disability if she or he have difficulty in each sub-domain of the low mobility domain (see Table A.1 in Appendix). As a result, the prevalence of older people with difficulty in low mobility using the WGDS extended set is higher than using the WGDS short set, at 25.7%. The share of older people with high difficulty in low mobility is 6.6%. There is a significantly lower proportion of older people with difficult in high mobility. 12.4% of older people have difficult and 5.8% of older people have high difficulty in high mobility.

The proportion of older people with cognitive disabilities using the short set definition is 8.2%. When the extended set is used, this rate is slightly higher, at 9.6%. There are 2.8% of older people who have difficulty in communication. There is also a small proportion of older people with spycho-social disabilities, at 1.5%.

As mentioned, self-care is more related to ADLs than other functional domains. There are 6.9% of older people who have difficulty in self-care (around 820 thousand people). The proportion of older people with high difficult in self-care is 3.9% (around 460 thousand people).

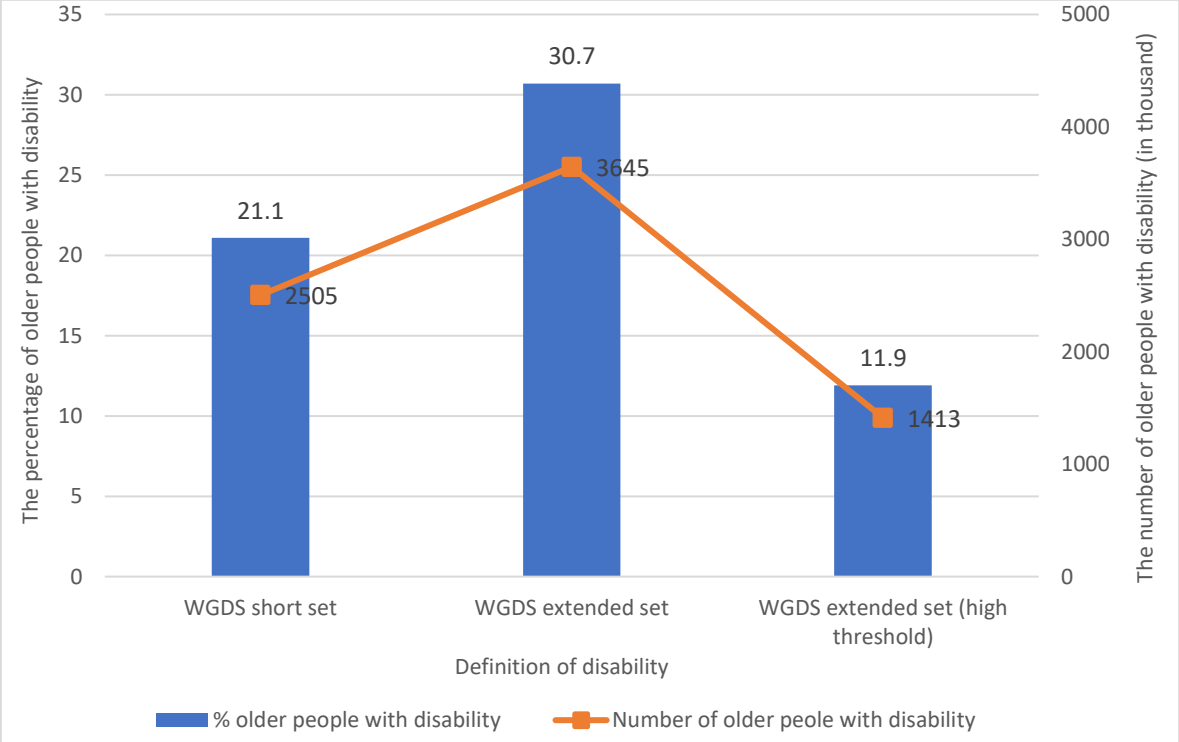
A person is defined as living with disabilities if she or he has difficulty in at least one functional domain. According to GSO (2018) which also use the same data set as this study, the national rate of disability is estimated at 5.72% using the WGDS short set and 8.64% using the WGDS extended set. Figure 2 shows the proportion of older people with disabilities: 21.1% using the WGDS short set and 30.7% using the WGDS extended set. The number of older people with disabilities using these two definitions is estimated at 2.51 million and 3.65 million. When the high threshold of difficulty is used, 11.9% of older people are found to have high difficulty in at least one functional domain (around 1.4 million people).

Table 1. Proportion and number of older people with difficulty in functional domains

Functional domains	Disability using short set of WGDS		Disability using extended set of WGDS		Disability using extended set of WGDS (High threshold)	
	% people with difficulty	Number of people (thousand)	% people with difficulty	Number of people (thousand)	% people with difficulty	Number of people (thousand)
Vision	6.8	807.3	6.8	807.3	0.7	83.1
Hearing	5.4	641.1	5.4	641.1	0.5	59.4
Low mobility	14.6	1733.3	25.7	3051.1	6.6	783.6
High mobility	n.a.	n.a.	12.4	1472.1	5.8	688.6
Cognitive	8.2	973.5	9.6	1139.7	5.6	664.8
Communication	2.8	332.4	2.8	332.4	0.6	71.2
Self-care	6.9	819.2	6.9	819.2	3.9	463.0
Spycho-social	n.a.	n.a.	1.5	178.1	1.5	178.1

Source: Estimation from the 2016 VNDS.

Figure 2. The percentage and the number of older people with disabilities

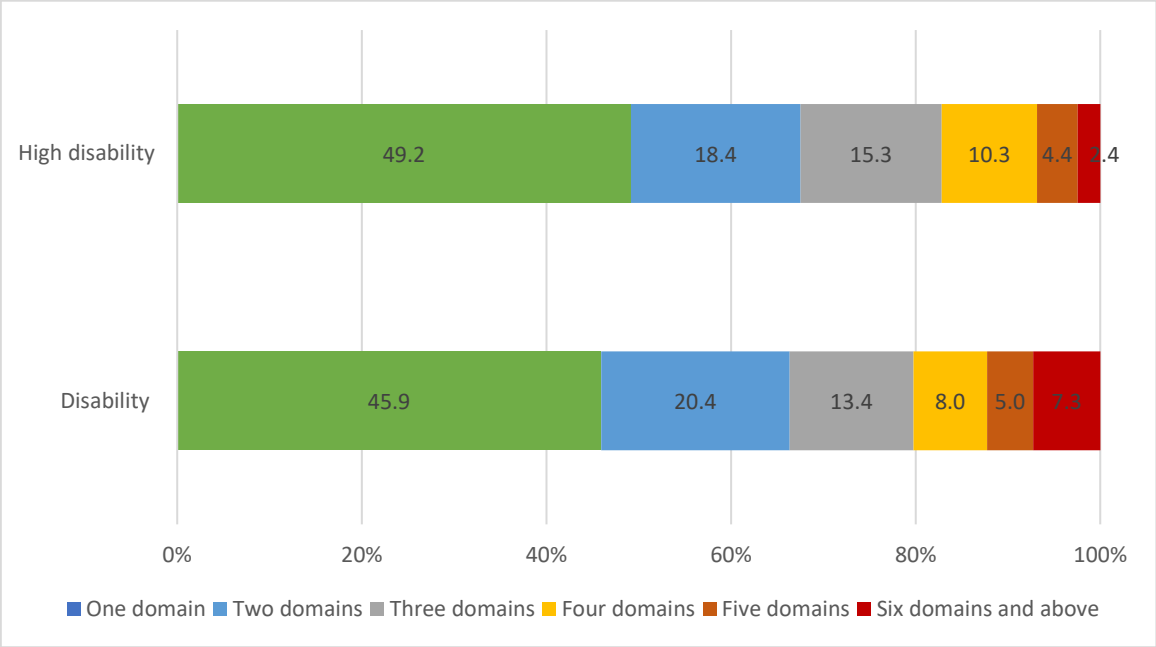


Source: Estimation from the 2016 VNDS.

The severity of disability can be examined in the number of functional limitations of older people with disabilities. For people with disabilities defined by the WGDS extended set, the average number of functional limitations is 2.31. For people with high disability, this

number is 2.1. Figure 3 shows the distribution of older people with disabilities by the number of domains that they have difficulty. 45.9% of older people with disabilities have difficulty in on domain, 20.4% having difficulty in two domains, and 13.4% having difficulty in three domains. 7.3% of older people with disabilities have difficulty in 6 domains and above. Among older people with high disability, there are 2.4% of them having difficulty in 6 domains and above.

Figure 3. The percentage and the number of older people with disabilities



Source: Estimation from the 2016 VNDS.

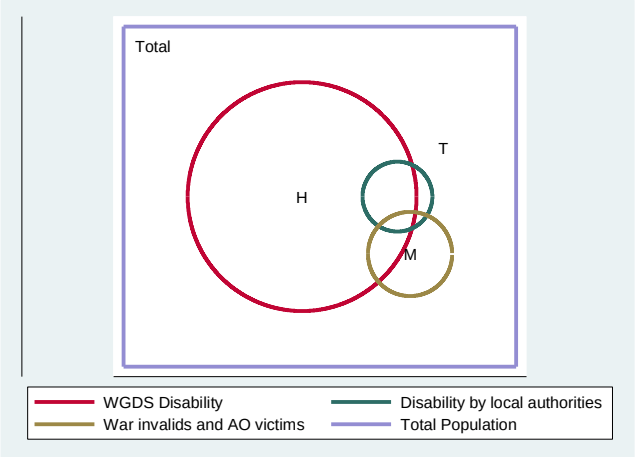
To receive supports, people must be identified as disabled by local authorities. The government has provided regulations on the determination of disability levels by a local council. The 2016 VNDS contains information on disabilities classified by local authorities. Around 3% of older people are identified as disabled by local authorities. These people have disability certificates, which is provided by local authorities certifying the type and extent of holder's disability. It should be noted that these people do not include people with disabilities caused by wars. There are two additional groups of older people with disabilities including war invalids (accounting for 3.8% of older people) and victims of agent orange (1.2%). There is very small overlap between the three groups. The proportion of older people who are war invalids, victims of agent orange or disabled is 6.8%. This rate is remarkably lower than the

rate of disability measured by the WGDS approach. This means that there is a large proportion of older people living with disabilities but not receiving supports or assistances for disabled, since they are not identified as disabled by the government.

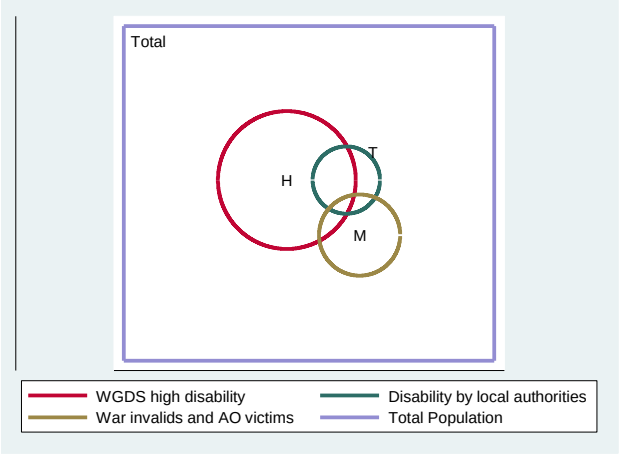
Figure 4 shows the overlap between disability defined by the WGDS extended set and disability identified by local authorities, war invalids and agent orange victims. For simplicity, we combine the war invalids and agent orange victims into one group. There is a relatively large overlap between disability defined by the WGDS extended set and disability identified by local authorities. However, there are a large proportion of older people with disabilities (identified by the WGDS extended set) but not classified as disabled or the war invalids or agent orange victims by local authorities. On the other hand, there is a proportion of older people who are identified as disabled or the war invalids or agent orange victims by local authorities but are not found as disabled by the WGDS approach. This raises a concern about the coverage and leakage of the identification of disability by local authorities in Vietnam.

Figure 4. Overlap between WGDS disability and disability identified by local authorities

Panel A. Overlap between WGDS disability and disability identified by local authorities



Panel B. Overlap between WGDS high disability and disability identified by local authorities



Source: Estimation from the 2016 VNDS.

3.2. Disability prevalence by different groups

In this section, the analysis of the disability prevalence is disaggregated by demographic and social-economic characteristics of older people. We measure disability by WGDS short and

extended sets. We define people with disabilities as those who have difficulty in at least one functional domain. In addition, we also look at people who face difficulty in at least two functional domains.

Regardless of disability measures, older people and women have higher rates of disability than younger people and men. There is a relatively large gap in the life expectancy between men and women in Vietnam. Women have a higher average age than men, and as a result they are more likely to have disability than men. Ethnic minorities have a higher rate of disability than Kinh. However, this gap is small and not statistically significant at the 5% level. Rural older people have a higher rate of disability than urban ones.

Older people are disaggregated by current marital status. Widowed people have the highest rate of disability. This is because this group is older than the other group. Unmarried people have a higher rate of disability than married and divorced people. Possibly, this is the result of the inverse causality: people with disabilities find it more difficult to get married.

People living alone have a higher rate of disability than others. For example, 44.9% of alone people have difficulty in at least one domain of the WGDS extended set, while this rate for people not living alone is 30.8%. The main reason is that alone people are older than other people and more likely to be widowed. This finding is consistent with findings that single people have a higher rate of disability than married ones.

There are data on income or consumption the 2016 VNDS. To measure the welfare level of households, we use the principal components approach of Filmer and Pritchett (2001) and construct a wealth index for households. An aggregate asset index is constructed as the first principal component of a vector of assets of households, including durables goods, housing characteristics, and access to utilities.[3] Using the estimated wealth index, we classify households by wealth quintiles.

[3] The principal component approach defines a wealth index in terms of the first principal component of the variables used (Filmer and Scott, 2008; Kolenikov et al., 2009). The wealth index, denoted by A_j, for household *j* is computed as follows: $A_j = \sum_p a_p \left(\frac{x_{pj} - \bar{x}_p}{s_p} \right)$, where x_p denotes the asset *p*, and $\bar{x}$ denote a mean of households in the sample. *s* is a standard deviation of asset x_p, and the *p*-domainal vector of weight

Table 2. Proportion of older people with disabilities by demographic characteristics

Population groups	Disability definition using WGDS short set		Disability definition using WGDS extended set		Disability definition using WGDS extended set and high threshold	
	Difficulty in at least one domain	Difficulty in at least two domains	Difficulty in at least one domain	Difficulty in at least two domains	Difficulty in at least one domain	Difficulty in at least two domains
All older people	21.1	11.0	30.7	16.6	11.9	6.1
Age groups						
60-64	7.0	2.4	12.1	4.0	3.9	1.2
65-69	12.9	5.3	21.8	8.5	7.3	2.9
70-74	19.2	9.0	29.9	13.7	9.1	4.4
75-79	29.1	13.5	42.6	21.5	13.9	6.0
80+	53.3	33.9	69.1	48.7	33.2	20.2
Gender						
Female	23.1	12.3	34.2	18.7	13.5	7.0
Male	18.2	9.3	25.9	13.7	9.9	4.8
Urban/rural						
Rural	23.8	12.5	34.6	18.9	13.1	6.5
Urban	15.7	8.3	23.1	12.1	9.7	5.2
Ethnicity						
Ethnic minorities	22.6	12.5	30.7	18.4	13.8	5.5
Kinh	20.9	10.9	30.7	16.4	11.7	6.1
Marital status						
Single	25.2	16.3	32.6	19.9	16.8	9.6
Married	15.3	6.9	23.4	10.8	8.0	3.6
Widowed	32.5	19.0	45.5	28.1	19.4	10.7
Divorced or separate	15.7	8.5	23.1	11.9	9.1	5.8
Living						
Living alone	30.9	16.2	44.9	25.3	16.3	7.1
Living with dependants (child or older)	20.9	9.8	30.8	15.6	11.5	5.3
Living with at least a member 15-59	19.8	10.8	28.7	15.8	11.5	6.2
Wealth index quintile						
Poorest	33.3	18.0	46.5	26.9	18.2	9.2
Near poorest	21.2	10.6	31.9	16.1	12.0	5.8
Middle	18.3	9.5	27.6	14.1	10.2	5.2
Near richest	15.2	7.5	22.7	12.1	8.6	4.8
Richest	11.0	6.2	16.4	8.8	7.5	3.9

Source: Estimation from the 2016 VNDS.

a is chosen to maximize the sample variance of *A*, subject to $\sum_p a_p^2 = 1$. The weight *a* is also called the vector of scores of asset variables, which can be estimated using principal component analysis. The asset index is standardized to have zero mean and standard deviation of one. Using this asset index, we classify households by quintile from the group with the lowest asset index to the group with the highest asset index.

Consistent with previous studies on disabilities in Vietnam such as Mont and Nguyen (2011) and GSO (2018), we find that poor people and people in low expenditure quintiles have higher rates of disability than nonpoor people and people in high expenditure quintiles. For example, the disability rate, which is based one domain of difficulty and the WGDS extended set, is 50.4% for poor and 28.5% for non-poor. Older people in the lowest wealth quintile has the disability rate of 46.5%, while those in the highest wealth quintile has the disability rate of 16.8%. Older people who are both poor and disabled are very vulnerable, and they should receive supports from the government.

3.3. Regression analysis

An important determinant of disability is age. Age is correlated with many social-economic characteristics of older people. As a result, the correlation between disability and social-economic characteristics might be driven by age. The previous descriptive analysis cannot capture this issue. In this section, we use regression to get more insight into the correlation between social-economic characteristics and disability among older people.

We regress the dummy variable indicating disability of older people on explanatory variables. For simplicity, we do not use all the six definitions of disability as in the previous section. We use the WGDS extended set to define an older person as one living with disability if she or he has difficulty in at least one domain. In addition, an older person is defined as high disability if she or he reported the highest difficulty (cannot do at all) in at least one domain.

The explanatory variables include demographic, socio-economic characteristics of older people, urban and regional dummies. Table A.2 in the Appendix summarizes the basic statistics of the dependent and explanatory variables.

Since the dependent variables are binary, we use probit and logit models. We present results from both the models. For interpretation, we compute the marginal effect of explanatory variables in the probit model and odds ratio in the logit model.[4] In this report,

[4] Overall, both logit and probit models produce very similar results. Researchers from different fields might be more familiar with one of the two models. For example, economists are more familiar with the interpretation from the probit model, while medical researchers are more familiar with the interpretation from the logit model.

we use the estimates of the marginal effect from the probit model for interpretation. It should be noted that a positive marginal effect of an explanatory variable means a positive correlation between this explanatory variable and the probability of having disability. In this case, the odds ratio is larger than 1. On the other hand, negative marginal effects in the probit model means odds ratios below 1.

It should be noted that the regression analysis is only to reveal the association between disability and social-economic characteristics. We cannot estimate the causal effect of the social-economic characteristics on disability because of reverse causality and omitted variable issue. Disability can affect social-economic outcomes of people. In addition, there can be many variables that we cannot observe and control in the regression model, but they can be correlated with both disability and the explanatory variables in the model. As a result, it is very difficult to estimate the cause effect of the explanatory variables, especially the social-economic variables, on the probability of disability of older people.

There is a U-shaped relation between disability and age. As age increases, the probability of disability increases with an increasing rate. This is consistent with descriptive analysis that the disability rate increases substantially for people aged from 80.

The variable 'male' is negative and significant in the regression of disability (column 1 in Table 3). The probability of disability is 0.0237 lower for men than women. Using the logit result (column 3), we can interpret that the odds of disability for men is equal to 0.89 of that for women. Disability is more common among women than men even age and other observed variables are controlled for. This finding is consistent with previous studies in both low- and high-income countries (see review from Leveille et al. 2000). Possible reasons are higher prevalence of non-fatal chronic conditions and constitutional factors such as lower muscle strength and lower bone density (Leveille et al. 2000). For the case of Vietnam, Mont and Nguyen (2011) and GSO (2018) also document a higher rate of disability among women than men. However, the effect of 'male' is not statically significant in regression of high disability. The difference in the high disability rate between men and women is negligible once observed characteristics of older people are controlled for.

There are no significant differences in the disability rate between Kinh and ethnic minorities. Although the descriptive analysis shows a higher rate of disability among ethnic

minorities, the difference disappears after observed characteristics of older people are controlled for.

Married people are less likely to have disability than other groups. The widowed, divorces and separate people have a lower probability of disability than the single group (the reference group). This can be a result of reserve causality. People with disabilities might be more difficult in getting married. As a result, the rate of disability among this group is higher than among other groups.

There is a strong and negative association between education and disability. This is also can be a result of reserve causality. People with disabilities are more difficult to attend schools and learn, and as a result they have a lower chance to have high education.

There is no significant association between household size and disability. However, older people who are living alone have a lower probability of disability than other people. This is because people with disabilities need care and are more likely to live with care providers such as children and grandchildren.

As expected, there is a negative correlation between disability and wealth. Older people in higher wealth quintiles have a lower probability of disability as well as high disability than those in lower quintiles. Richer people have better nutrition and health care and as a result lower disability than poorer ones. At the same time, people with disabilities have lower labor productivity and employment opportunity and income than other peoples.

Older people in urban areas are less likely to have disability than those in rural areas. However, the probability of high disability does not differ between urban and rural areas. The probability of disability varies across regions. Central Coast has the highest probability of disability than other regions even after social-economic variables are controlled. Possibly, this region has been more affected by storms and people's health is more likely to be affected by natural disasters. In addition, Palmer et al. (2019) show a long-term effect of wars on disability in Vietnam, and Central Coast is the most affected region.

Table 3. Regression of disability

Explanatory variables	Marginal effect from Probit		Odds ratio from Logit	
	Dependent variable is disability using WGDS extended set	Dependent variable is high disability using WGDS extended set	Dependent variable is disability using WGDS extended set	Dependent variable is high disability using WGDS extended set
	(1)	(2)	(3)	(4)
Age	0.0042	-0.0105**	1.0417	0.9610
Age squared	0.0001**	0.0001***	1.0005	1.0009***
Male (male=1; female=0)	-0.0237**	-0.0014	0.8920**	0.9764
Kinh (Kinh=1, ethnic minorities=0)	0.0848***	0.0127	1.6016***	1.1689
Single	*Reference*			
Married	-0.1125***	-0.0993***	0.5609***	0.3404***
Widowed	-0.1044***	-0.0527***	0.5504***	0.4337***
Divorced or separate	-0.0852***	-0.0627***	0.6303***	0.4349***
Less than primary education	*Reference*			
Primary education	-0.0635***	-0.0211***	0.7208***	0.7811***
Lower-secondary education	-0.0778***	-0.0260***	0.6567***	0.7226***
Upper-secondary education	-0.1030***	-0.0350***	0.5453***	0.6157**
Post secondary education	-0.1087***	-0.0276**	0.5344***	0.7101
Living with a member aged 15-59	*Reference*			
Living alone	-0.0660***	-0.0344***	0.6947***	0.6198***
Living with only children and/or elderly	-0.0059	0.0073	0.9776	1.0842
Household size	-0.0048	-0.0001	0.9767	0.9976
Poorest wealth quintile	*Reference*			
Near-poorest wealth quintile	-0.0933***	-0.0266***	0.6091***	0.7248***
Middle wealth quintile	-0.1265***	-0.0424***	0.4921***	0.5747***
Near-richest wealth quintile	-0.1499***	-0.0505***	0.4182***	0.4960***
Richest wealth quintile	-0.1893***	-0.0553***	0.3088***	0.4601***
Urban areas (urban=1, rural=0)	-0.0285*	0.0019	0.8586*	1.0099
Red River Delta	*Reference*			
Northern Mountain	0.0350	0.0235	1.2017	1.2776
Central Coast	0.0813***	0.0143	1.5286***	1.1881
Central Highland	0.0167	-0.0103	1.1176	0.8855
Southeast	0.0634***	0.0326**	1.3959***	1.4546***
Mekong River Delta	0.0530**	0.0046	1.3320***	1.0811
Constant			0.0049***	0.0667
Observations	15,372	15,372	15,372	15,372
Pseudo R-squared	0.215	0.162	0.215	0.162

Robust standard errors are corrected for sampling weight and intra-cluster correlation. To avoid lengthy results, this table does not report standard errors.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Estimation from the 2016 VNDS.

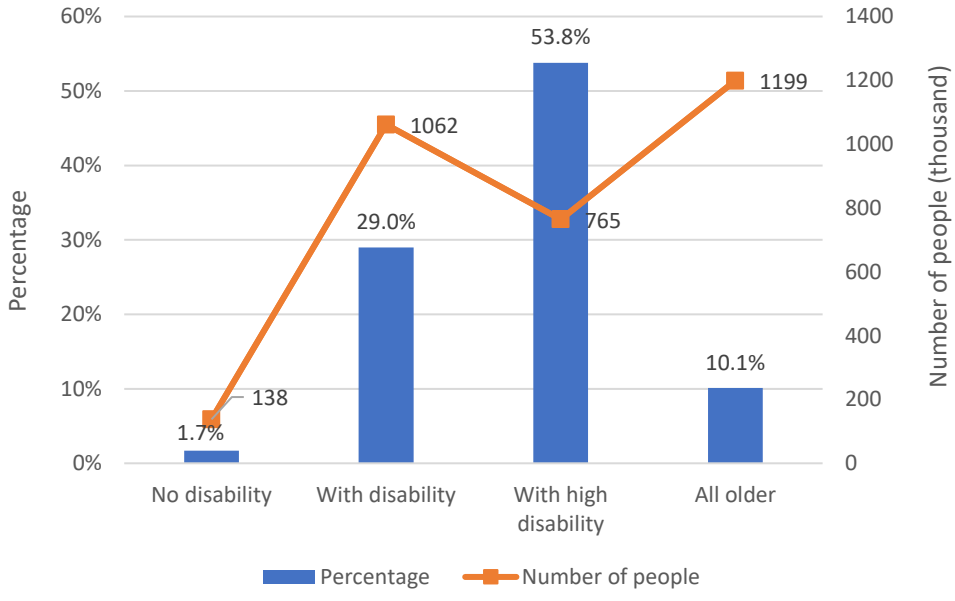
4. Needs for care of older people with disabilities

4.1. Needs for care

In this section, we examine the care needs among older people, especially those with disability. For simplicity, we use only one definition of disability, which is based on the WGDS extended set (a person is defined as living with disabilities if having difficulty in at least one out of 8 functional domains). In addition to overall disability, we also use high disability which is also based on the WGDS extended set with the threshold 'cannot do it at all' in defining the difficult level in each functional domain.

People who need daily care are defined based on the following question in the 2016 VNDS "Due to health problems, do you need someone to take care or support daily activities such as eating, bathing and walking?". Results from the 2016 VNDS show that 10.1% of older people need care, equivalent to around 1.2 million people. The proportion of older people with care needs is much higher among those with disability. 1.7% of older people without disability need care, while this rate among older people with disabilities is up to 29%. For older people with high disability, the proportion of people needing care is 53.8%.

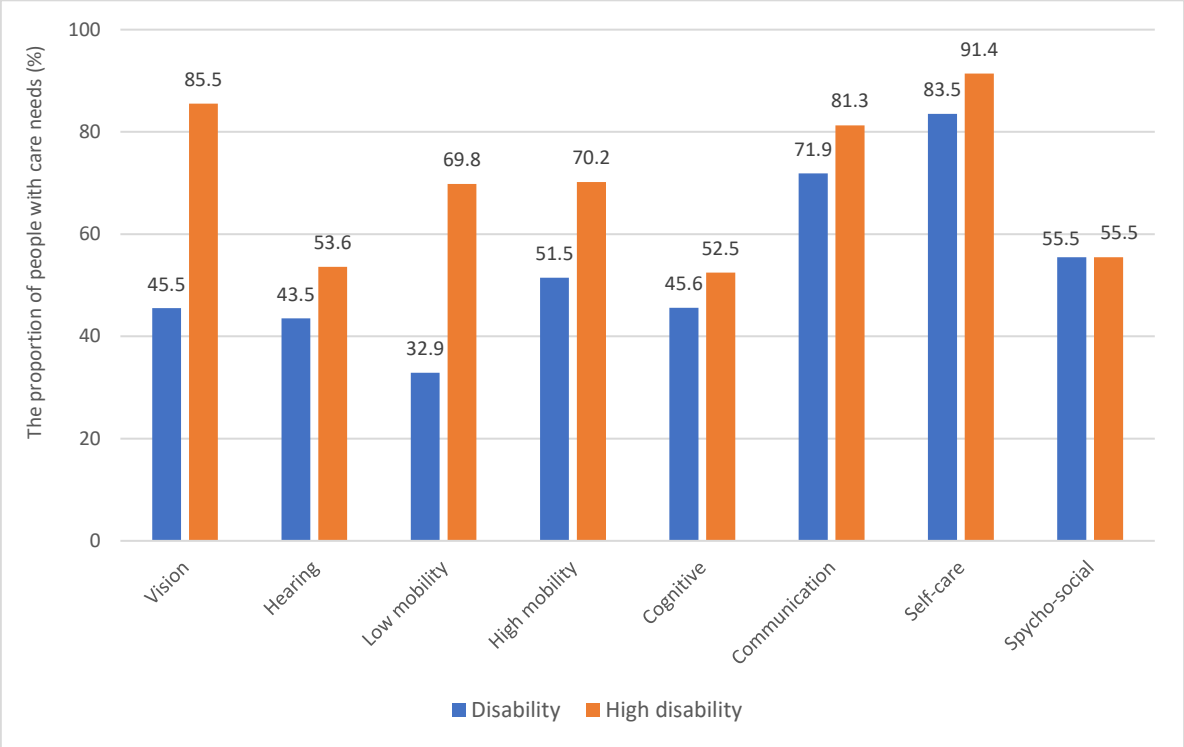
Figure 5. The proportion and the number of people who need care



Source: Estimation from the 2016 VNDS.

Figure 6 examines which functional limitations are more correlated with care needs. Older people with difficult in self-care need daily care the most. 83.5% of older people with self-care limitation need care. Older people with low-mobility difficulty are less likely to need care: 32.9% of them need care.

Figure 6. The proportion of older people with care needs by disability in functional domains



Source: Estimation from the 2016 VNDS.

Table 4 presents the proportion and number of older people who need daily care by disability status and different demographic and socio-economic characteristics. Older people need care more than younger people. 30% of older people from 80 years need care, while this rate for people aged 60-64 is only 2.7%. Even among people with disabilities or high disability, the proportion of people with care needs is increased substantially as age increases. In total, around 667 thousand people aged from 80 need daily care, of them 63 thousand people have disability and 463 thousand people have high disability.

Females tend to need more care than males, since they are older and more likely to have disability. The proportion of older people with care needs is similar between Kinh and ethnic minorities. However, the proportion of older people with high disability needing care

is higher among Kinh than ethnic minorities. Kinh account for 85% of the total population. Thus the number of older people needing care is much higher for Kinh than for ethnic minorities.

Widowed people have a higher rate of care needs. Possibly, this is because they are older than other people. Older people who living with at least with an adult aged 15-59 have a higher rate of care needs.

Table 4. The proportion and the number of older people who need care

Groups	Without disability	With disability	With high disability	All older people
Age groups				
60-64	0.8	16.3	36.3	2.7
65-69	1.0	20.1	45.5	5.2
70-74	2.7	20.7	47.8	8.1
75-79	2.6	23.3	45.3	11.4
80+	5.3	41.3	63.1	30.2
Gender				
Female	1.7	28.5	53.0	10.8
Male	1.7	30.0	55.2	9.0
Urban/rural				
Rural	1.9	27.7	53.2	10.9
Urban	1.3	32.7	55.2	8.6
Ethnicity				
Ethnic minorities	3.3	28.6	46.2	11.1
Kinh	1.5	29.1	54.7	10.0
Marital status				
Single	0.8	32.9	50.4	11.3
Married	1.4	22.1	47.6	6.2
Widowed	2.5	36.0	58.9	17.7
Divorced or separate	1.4	24.4	59.8	6.7
Living				
Living alone	2.7	27.9	46.8	14.0
Living with only children and/or elderly	1.3	23.4	48.4	8.1
Living with at least a member 15-59	1.7	31.3	56.9	10.2
Wealth index quintile				
Poorest	2.3	26.2	48.0	13.4
Near poorest	1.5	28.6	53.3	10.1
Middle	1.7	31.7	62.2	10.0
Near richest	1.6	31.2	60.8	8.3
Richest	1.3	34.7	55.5	6.8

Source: Estimation from the 2016 VNDS.

Older people in lower wealth quintiles are more likely to need daily care than those in higher wealth quintiles. The main reason is the higher rate of disability among the lower

wealth quintiles than the higher wealth ones. When we consider only older people with disabilities or high disability, we find an opposite finding. The rate of care needs is higher for older people in higher wealth quintiles than those in lower wealth quintiles.

4.2. Regression analysis

To understand factors associated with care needs of older people, we run multivariate regression of the dummy variable 'care needs'. We estimate both probit and logit models. We report the marginal effect from the probit and odds ratio from the logit model. As known, the strongest predictor of care needs of older people is their disability status. We start with a small model in which the explanatory variables consist of age, gender and dummy variables indicating functional limitations. Then we extend this model to include additional explanatory variables of social-economic characteristics of older people.

The effect of functional limitations on care needs is very similar in the small and large models. Self-care difficulty is the most correlated with care needs. Having difficulty in self-care increases the probability of care needs by 0.41 (column 1 and 2 in Table 5). The odds of care needs of older people with self-care difficulty is around 18 times as high as that of older people without self-care difficulty. Older people with difficulty in mobility and communication are also more likely to need daily cares. Difficult in cognitive domain is not statistically significantly associated with care needs. Interestingly, older people with difficulty in hearing is less likely to need daily cares than those without difficulty in hearing. Further studies should be conducted to understand reason for this finding.

Table 5. Regression of 'older people with care needs'

Explanatory variables	Marginal effect from Probit		Odds ratio from Logit	
	Small model	Large model	Small model	Large model
	(1)	(2)	(1)	(2)
Age	0.0023	0.0014	1.0745	1.0477
Age squared	0.0000	0.0000	0.9999	1.0000
Male (male=1; female=0)	0.0075*	0.0156***	1.1781*	1.4317***
Having difficulty in vision	0.0157	0.0133	1.2956*	1.2656
Having difficulty in hearing	-0.0170**	-0.0151**	0.6378**	0.6660**
Having difficulty in low mobility	0.0878***	0.0835***	4.3621***	4.2707***
Having difficulty in high mobility	0.0354***	0.0363***	1.7253***	1.7962***
Having difficulty in cognitive	0.0087	0.0077	1.1653	1.1543
Having difficulty in communication	0.0652***	0.0579**	2.6089***	2.4581***
Having difficulty in self-care	0.4126***	0.4091***	17.7472***	18.2119***
Having difficulty in spycho-social domain	0.0375	0.0407*	1.7469**	1.8378**
Kinh (Kinh=1, ethnic minorities=0)		-0.0246*		0.6309**
Single	*Reference*			
Married		-0.0210		0.6078*
Widowed		-0.0282***		0.3845*
Divorced or separate		-0.0055		0.8813
Less than primary education	*Reference*			
Primary education		-0.0052		0.9301
Lower-secondary education		-0.0157***		0.6788**
Upper-secondary education		-0.0077		0.8542
Post secondary education		-0.0041		0.8522
Living with a member aged 15-59	*Reference*			
Living alone		0.0205*		1.4868**
Living with only children and/or elderly		0.0069		1.1922
Household size		0.0026*		1.0659*
Poorest wealth quintile	*Reference*			
Near-poorest wealth quintile		0.0076		1.2035
Middle wealth quintile		0.0122		1.3288*
Near-richest wealth quintile		0.0103		1.2779
Richest wealth quintile		0.0051		1.1572
Urban areas (urban=1, rural=0)		-0.0022		0.9932
Red River Delta	*Reference*			
Northern Mountain		-0.0103		0.7754
Central Coast		0.0044		1.0922
Central Highland		-0.0106		0.7421
Southeast		0.0125		1.2650
Mekong River Delta		0.0098		1.2731
Constant			0.0003***	0.0012**
Observations	15,372	15,372	15,372	15,372
Pseudo R-squared	0.464	0.471	0.462	0.469

Robust standard errors are corrected for sampling weight and intra-cluster correlation. To avoid lengthy results, this table does not report standard errors.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Estimation from the 2016 VNDS.

There are only a few social-economic variables that are correlated with care needs, since the most important variables that affect the care needs are controlled for, i.e. the disability variables. Most variables of education, wealth quintiles, urban areas and regions are of small magnitudes and not statistically significant at the conventional level. Age is the most important predictor of disability. It can be also strongly correlated with care needs (as seen in Table 9). However, when disability variables are controlled in the regression, age is not correlated with care needs. Gender is still correlated with care needs. Men are more likely to need daily care than women even after other explanatory variables are controlled for. According to the large model, the probability of care needs of men is 0.0156 higher than women (column 2). Put it differently, the odds of care needs of men is 1.4317 times that of women (column 4).

The variable 'widowed' is negative and significant at the 1% level (column 2). Compared with single older people (the reference group), widowed older people are less likely to need daily care. Alone older people have a higher probability of care needs than others. Living in larger households is also associated with the higher probability of care needs.

5. Conclusions

Although life expectancy has been increasing in Vietnam, a large proportion of older people live with disabilities. In this study, we examine the prevalence of disability among older people (aged 60 or older) using the WGDS approach and data from the 2016 VNDS. A person is defined as living with disabilities if she or he has difficulty in at least one functional domain out of eight functional domains. We find that 30.7% of older people are living with disabilities, which is equivalent to around 3.65 million people. When the high threshold of difficulty is used, 11.9% of older people are found to have high difficulty in at least one functional domain (around 1.4 million people).

There is a large difference in the disability rate between the WGDS approach and the identification of local authorities in Vietnam. The official disability rate is remarkably lower than the rate of disability measured by the WGDS approach. There is a large proportion of older people with disabilities (identified by the WGDS approach) who are not classified as disabled by local authorities. On the other hand, there is a proportion of older people who are

identified as disabled by local authorities but are not found to be disabled by the WGDS approach. This raises a concern about the coverage and leakage of the identification of disability by local authorities in Vietnam.

We use multivariate probit and logit regression to understand factors correlated with disability. There is a very strong effect of age on disability. The disability rate among people aged 60–64 is 12.1%, while this rate among people aged sability. There is a very strong effect of age on disability. The disability rate among people aged 60–64 is 12.1%, while this rate among people aged 80–plus is 69.1%. Disability is more common among women than men, even when age and other observed variables are controlled for. There are no significant differences in the disability rate between Kinh and ethnic minorities. However, better-off people tend to have a lower probability of disability than worse-off ones. There is a strong and negative association between education and disability, as well as between wealth and disability.

The second objective of this study is to examine the care needs of older people, especially those with disabilities. Around 10% of older people need care, which is equivalent to around 1.2 million people. Care needs are represented by 29% of older people with disabilities and 53.8% of older people with severe disabilities.We also estimate both probit and logit models to understand factors associated with the care needs of older people. Self-care difficulty is most closely correlated with care needs. The odds that older people with self-care difficulty will have care needs are around 18 times higher than those of older people without self-care difficulty. Older people with difficulties in mobility and communication are also more likely to need daily care. Difficulty in the cognitive domain is not statistically significantly associated with care needs. Interestingly, older people with difficulty hearing are less likely to need daily care than those without difficulty hearing. Further studies should be conducted to understand the reason for this finding.

Vietnam is one of the world's fastest-aging countries. The number of older people has been increasing. There are also more older people with disabilities who need daily care. The current social protection system in Vietnam covers a small proportion of older people. A large number of older people with disabilities do not receive subsidies. This requires the government to make preparations for extending the support and health care systems for older people in the years to come.

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Appendix

Table A.1. Questions to measure disability by WGDS

The next questions ask about difficulties you may have doing certain activities (each question has four response categories, which are read after each question)
1. Do you have difficulty seeing, even if wearing glasses? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all
2. Do you have difficulty hearing, even if using a hearing aid? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all
3. Do you have difficulty walking or climbing steps? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all
4. Do you have difficulty remembering or concentrating? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all
5. Do you have difficulty (with self-care) such as washing all over or dressing? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all
6. Using your usual language, do you have difficulty communicating? a. No, no difficulty b. Yes, some difficulty c. Yes, a lot of difficulty d. Cannot do it at all

Table A.2. Summary statistics of variables

Variable	Type	Mean	Std. Dev.	Min	Max
Dependent variables					
Disability using WGDS extended set	Binary	0.307	0.461	0	1
High disability using WGDS extended set	Binary	0.119	0.324	0	1
Older people with care needs	Binary	0.101	0.301	0	1
Older people with disabilities and care needs	Binary	0.089	0.285	0	1
Older people with high disabilities and care needs	Binary	0.064	0.245	0	1
Explanatory variables					
Having difficulty in vision	Binary	0.068	0.252	0	1
Having difficulty in hearing	Binary	0.054	0.226	0	1
Having difficulty in low mobility	Binary	0.257	0.437	0	1
Having difficulty in high mobility	Binary	0.124	0.329	0	1
Having difficulty in cognitive	Binary	0.096	0.295	0	1
Having difficulty in communication	Binary	0.028	0.165	0	1
Having difficulty in self-care	Binary	0.069	0.253	0	1
Having difficulty in spycho-social domain	Binary	0.015	0.121	0	1
Age	Discrete	70.422	8.945	60	109
Male (male=1; female=0)	Binary	0.420	0.494	0	1
Kinh (Kinh=1, ethnic minorities=0)	Binary	0.902	0.298	0	1
Single	Binary	0.028	0.164	0	1
Married	Binary	0.636	0.481	0	1
Widowed	Binary	0.320	0.467	0	1
Divorced or separate	Binary	0.016	0.125	0	1
Less than primary education	Binary	0.388	0.487	0	1
Primary education	Binary	0.252	0.434	0	1
Lower-secondary education	Binary	0.208	0.406	0	1
Upper-secondary education	Binary	0.099	0.299	0	1
Post secondary education	Binary	0.052	0.222	0	1
Living alone	Binary	0.093	0.290	0	1
Living with only children and/or elderly	Binary	0.231	0.421	0	1
Household size	Discrete	3.725	1.949	1	17
Poorest wealth quintile	Binary	0.255	0.436	0	1
Near-poorest wealth quintile	Binary	0.230	0.421	0	1
Middle wealth quintile	Binary	0.183	0.387	0	1
Near-richest wealth quintile	Binary	0.166	0.372	0	1
Richest wealth quintile	Binary	0.166	0.372	0	1
Urban areas (urban=1, rural=0)	Binary	0.340	0.474	0	1
Red River Delta	Binary	0.271	0.445	0	1
Northern Mountain	Binary	0.107	0.309	0	1
Central Coast	Binary	0.247	0.431	0	1
Central Highland	Binary	0.040	0.196	0	1
Southeast	Binary	0.140	0.347	0	1
Mekong River Delta	Binary	0.195	0.396	0	1
Observations		15,372			

Source: Estimation from the 2016 VNDS.