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**Special Issue on Disability Studies**



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# *Intellectual Discourse*

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Volume 27

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2019

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## The Extra Costs of Having a Disability: The Case of IIUM

**Ruzita Mohd Amin\***  
**Nur Syuhada Md Adros\*\***

**Abstract:** The information on extra costs of disability among developing countries, including Malaysia, is lacking and the issue seems neglected. As a result, an appropriate amount of monetary assistance that should be provided to the disabled community in Malaysia could not be determined. This paper undertakes a preliminary analysis of the extra costs of having a disability, by taking the staff of International Islamic University Malaysia (IIUM) as the sample as to calculate the extra costs of having a disability. The standard of living approach is adopted, and the extra costs are calculated by dividing the estimated coefficient of disability variables by the estimated coefficient of income. This paper analyses the extra costs among households containing one person with disabilities, and also across different severity levels, types of disability, according to gender, and residential area (i.e. urban or rural). Overall, a household containing one person with disabilities accounted 27.5 per cent out of their monthly income to fulfil disability-related needs.

**Keywords:** persons with disabilities, disability, standard of living approach, extra costs of disability

**Abstrak:** Maklumat tentang kos tambahan ketidakupayaan di negara membangun, termasuk Malaysia, masih kurang didapati dan isu ini kelihatan seakan diabaikan. Oleh sebab itu, jumlah bantuan kewangan yang sepatutnya diberikan kepada golongan Orang Kurang Upaya (OKU) di Malaysia tidak dapat dipastikan. Kajian ini merupakan suatu kajian awalan untuk menganalisa kos tambahan ketidakupayaan dan pengiraannya, dengan kakitangan Universiti

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Islam Antarabangsa Malaysia diambil sebagai sampel kajian. Pendekatan yang diambil adalah pendekatan taraf hidup (*standard of living approach*) dan kos tambahan dikira dengan membahagikan anggaran angkali angkubah ketidakupayaan dengan anggaran angkali pendapatan (*dividing the estimated coefficient of disability variables by the estimated coefficient of income*). Kajian ini melihat kepada kos tambahan yang terpaksa ditanggung oleh isirumah yang mempunyai seorang OKU dan kajian ini juga dilaksanakan merentasi pelbagai tahap ketidakupayaan, jenis ketidakupayaan, jantina dan kawasan perumahan (samada bandar atau luar bandar). Pada keseluruhannya, isirumah yang mempunyai seorang OKU didapati perlu memperuntukkan 27.5 peratus dari pendapatan bulanan mereka bagi memenuhi keperluan yang berkaitan dengan ketidakupayaan ahli isirumah tersebut.

**Kata kunci:** orang kurang upaya, ketidakupayaan, pendekatan taraf hidup, kos tambahan ketidakupayaan

## INTRODUCTION

The issues related to the rights of persons with disabilities (PWDs) have become more prominent in Malaysia only in recent years. Numerous organisations representing persons with disabilities in Malaysia, such as Malaysian Federation of the Deaf, Society of the Orthopedically Handicapped Malaysia, and Society of the Disabled Women Malaysia, have voiced out the importance of the ratification of the United Nations Convention on the Rights of Persons with Disabilities (CRPD). It was finally signed in April 2008 and ratified in July 2010, as to provide equal opportunity, protection, and assistance in all circumstances to PWDs.

According to CRPD (2006), persons with disabilities are defined as “those who have long term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society,” and the same definition is also applied to Malaysia’s Persons with Disabilities Act 2008. The Department of Social Welfare (under the Ministry of Women, Family and Community Development) is the one that deals with the welfare issues of PWDs in Malaysia. The Department has classified PWDs into several types: hearing impairment, vision impairment, speech impairment, physical impairment, learning disabilities, mental disabilities, and multiple disabilities.

The most recent data shows that the number of PWDs who have registered with the Department of Social Welfare was 494,074 in 2013; and it doubled in five years' time. Still, the number is quite far from the 15 per cent estimation given in the 'World Report on Disability' presented by the World Health Organisation (WHO) (2011). Once registered, persons with disabilities are entitled to receive monetary assistance from the Department of Social Welfare. For example, '*Elaun Pekerja Cacat*' (Allowance for Workers with Disabilities) is given to those with disabilities, who are in the labour force, with a monthly income below RM1200. In any cases of bedridden or chronic conditions, the allowance given is at RM300 per month and is applicable to households with a monthly income lower than RM3000. As for PWDs who are not working, they are entitled to receive '*Bantuan OKU Tidak Bekerja*' (Assistance for Unemployed Persons with Disabilities) at the rate of RM150 per month.

There are views, however, that the monetary assistance needs to be increased in order to allow PWDs to cope with the increasing costs of living in Malaysia. As reported by Kaur (2014), this issue was brought up by Senator Bathmavathi Krishnan prior to the 2015 Budget Announcement; in which she suggested for an increase in budget allocation on both Allowance for Workers with Disabilities and general aid for persons with disabilities. Though there was an increment allocated for the monetary assistance, it was lower than suggested. It shows that the authorities are lacking information on the costs needed by PWDs, which make it difficult in deciding the appropriate amount of monetary assistance to be provided.

Information on the relationship between disability status, income, and the extra costs of disability is important to know before formulating policies that can effectively improve the standard of living of persons with disabilities in the country. As stated by Hoogeveen (2005) and Mont and Cuong (2011) in their studies, such information is limited especially in developing nations, including Malaysia. Vietnam is the only country in Southeast Asia that has done such a study. In fact, they have two studies on this matter: one that relates disability with poverty (Mont and Cuong, 2011) and another examined the economic costs of disability and its stigma (Institute for Social Development Studies [ISDS], 2011).

It is not too late for Malaysia to follow suit. Plus, there is no clear evidence on the extra costs of disability in Malaysia. Since this is perceived as a novel study, it is vital to do a preliminary study prior its execution at the national level— so as to get a rough idea on how it should be done. This paper undertakes a preliminary analysis of the extra costs of having a disability, by taking the staff of the International Islamic University Malaysia (IIUM) as the sample. Specifically, this paper tries to achieve these objectives:

- i) To estimate the extra costs of having a disability.
- ii) To find whether the extra costs of a disability differ across severity levels, types of disability, gender of PWDs, and residential areas of PWDs.
- iii) To suggest a few policy recommendations with regards to the monetary assistance for PWDs.

This paper is presented in six sections. Following this section, Section 2 reviews the available literature on the area of this research study. Section 3 gives details on the theory of the standard of living approach and it also provides the justification of choosing the approach. Section 4 describes the research design considerations including variables, sample characteristics, and data analysis procedure. Section 5 presents the data collection and empirical findings, as well as discussions on the findings. Last but not least, Section 6 provides the conclusion.

## **PREVIOUS RESEARCH STUDIES ON EXTRA COSTS OF HAVING A DISABILITY**

### **What are the Extra Costs of having a Disability?**

A lot of discussions have been done regarding this matter. The definition of ‘extra costs’ may vary from one study to another, due to the fact that different studies use different types of methods. Tibble (2005) explained that extra costs are, “The extra costs that arise from the extra needs those persons with disabilities have.” In other words, anything that involves an investment of money in order to fulfil the disability-related needs is considered as the extra costs of having a disability. Based on that definition, it is clear that both needs and costs are closely related. Hill, Thomson, & Cass (2011) explained that the needs of PWDs are intrinsic due to the fact that they have limited options to change the effects of



their disabilities. In general, Tibble (2005) classified needs into two: special needs and additional needs. Special needs, which are also known as ‘disabled-created’ needs, refer to goods and services required by PWDs. Whereas, additional needs refers to everyone’s needs but PWDs will require more of the same item.

### **Factors Affecting Disability-related Costs**

According to Pearce (2011), there are a few factors that need to be considered in measuring the extra costs of having a disability. One factor may give a prominent effect on the costs; while others may give only a slight change on the cost of living. The factors include: severity and types of disability, living arrangements, work status, and public resources and support. Apart from that, Tibble (2005) said that income and geographical factors should also be considered as factors affecting disability-related costs. Each of the factors is discussed in detail as follows:

- i) Severity and types of disability – Zaidi and Burchardt (2005); Saunders (2007); Cullinan, Gannon, and Lyons (2011); Loyalka, Liu, Chen, and Zheng (2013); and Vietnam ISDS (2013); found out that the cost incurred by a household would increase if the severity of the disability is higher. Cullinan et al. (2011) also found out that a large difference of extra costs incurred between severe and somewhat limited by disabilities would only be present in a short-run, rather than in a long run where the extra costs incurred were recorded to be similar between severe and somewhat limited by disabilities.
- ii) Living arrangements – Both Zaidi and Burchardt (2005) and Loyalka et al. (2013) concluded that the extra costs of having a disability are substantial when the number of members in the household increases.
- iii) Work status – Pearce (2011) suggested that it is better to assume that PWDs are also in the labour force so that the comparison with non-disabled counterparts could be made in order to distinguish the extra costs associated with one’s disability.
- iv) Public resources and support – Kuklys (2004) discussed public resources and support as one of the factors affecting disability-related costs, where he argued that the benefit received by the

persons with disabilities should be examined thoroughly as the amount seems unable to compensate the extra costs borne by the PWD. It shows that there are still unmet needs even when support is provided; let alone if the PWDs receive none of the support, it may make the situation even worse. As for Malaysia, such a remark was also highlighted by Kaur (2014).

- v) Income – Tibble (2005) said that the income factor must also be considered in measuring the extra costs of being disabled. The author explained that PWDs are less likely to be in the labour force and tend to have a lower income, which eventually will be one of the elements of the extra costs of being disabled since they have a lower income to begin with.
- vi) Geographical – Tibble (2005) claimed that different places would provide different accessibilities. Thus, if one lives in an area that is able to provide better accessibilities, for instance, the extra costs would differ with others who live in an area with fewer accessibilities.

### **Approaches of Measuring the Extra Costs of Disability**

In a review of existing research studies on the extra costs of disability done by Tibble (2005), the author listed all available methods of measuring the costs of having a disability and classified them into four broad approaches: subjective approach, comparative approach, standard of living approach, and budget standard approach. The four approaches, as well as their advantages and disadvantages, are explained as follows:

#### ***The Subjective Approach***

This approach is based on asking persons with disabilities how much they have to spend on particular disability-related items (e.g. disability equipment, diapers, medication), as well as how much they need to spend on regular items (e.g. food, clothes, fuel). Apart from that, it also asks them to speculate on their spending behaviour if they were not to have any disabilities. From their answers, estimates of the extra costs of having a disability were derived.

The advantages of this approach are: it is able to obtain data on income required by PWDs in order to fulfil their needs (Tibble, 2005), and it gives accurate estimates of spending on special items needed

by PWDs. However, it cannot provide accurate estimates of spending on regular items needed by both persons with and without disabilities (Vietnam ISDS, 2013). It is also quite difficult in recalling specific costs over a long period of time, dividing between disability-related expenditure and items required by all household members.

### ***The Comparative Approach***

Studies using this approach compares the spending behaviour between persons with and without disabilities; by asking both populations' spending pattern on individual items and a comparison is performed so as to identify where the spending differs.

Since it relies on actual spending rather than speculation (i.e.: as in the subjective approach), this approach is more accurate. This approach is also able to examine the extra costs of disability because it can identify where the spending between households with and without disabilities vary. The disadvantages of using this approach are that the data collection can be quite tedious because it needs lengthy and detailed information on a household's spending pattern, and the result obtained from this approach can be a bit complex to interpret (Vietnam ISDS, 2013). The reason for this is because it is difficult to determine whether the differences in the spending pattern are due to the difference in needs, available sources, or it is just the way in which the household distributes its resources.

### ***The Budget Standards Approach***

The budget standards approach involves developing detailed budgets for households with and without disabilities and the extra costs of disability is identified by finding the difference between these two budgets. Budgets can be derived either consensually—groups of people determine and agree on how much is needed to get a pre-determined standard of living; or normatively—experts will identify items needed in achieving the standard of living based on a series of case studies and then provide the costs for each item on the list.

The advantages of using this approach are: costs can be accurately evaluated and verified (Hill et al., 2011) and it specifically measures disability-related needs rather than spending patterns which usually depend on the income factor. However, according to Vietnam ISDS (2013), this approach is restricted because the budget itself must be

developed only for specific definitions of disability and both households with and without disabilities must correspond to the same standard of living.

### ***The Standard of Living Approach***

This approach is based on the assumption that households with disabilities experience a lower standard of living as compared to their able-bodied counterparts due to the diversion of financial resources for disability-related items. A range of standard of living indicators (must be unrelated to disability) is used; and the standard of living for both households are compared at the same level of income. The difference between standard of living of persons with and without disabilities is considered as the extra costs of having a disability (Tibble, 2005).

The advantages of the standard of living approach are that its standard of living indicators are not based solely on income—because households with disability incidences generally have a lower income in the first place; and it does not require estimates to be made of specific disability-related costs (Cullinan et al., 2011). However, it cannot calculate whether or not the disability-related needs are met, and the chosen indicators might also have no effect on the outcome.

## **STANDARD OF LIVING APPROACH: THE THEORY**

### **Adopting the Standard of Living Approach**

This study adopts the standard of living approach because it is deemed as the most appropriate approach to achieving the objective of the study, i.e. to estimate the extra costs of disability. This approach was suggested by Berthoud, Lakey, and McKay (1993) and had been applied on the 1985 survey data. The standard of living approach has one underlying assumption: with the same level of income, PWDs may experience a lower standard of living than persons without disabilities due to the diversion of money resources towards disability-related needs (Zaidi and Burchardt, 2005). It estimates the extra costs of living that PWDs incur as a result of their disability, such as transportation costs, special equipment, or personal assistance.

According to the theory, for a given income, the disability incidence will reduce the living standards of households by causing them to divert a portion of their financial resources to cater for disability-related costs.

The diversion can be quantified by taking other factors that affect the standard of living. Figure 1 shows the relationship between income, standard of living, and disability used in this approach.

Figure 1. The standard of living approach

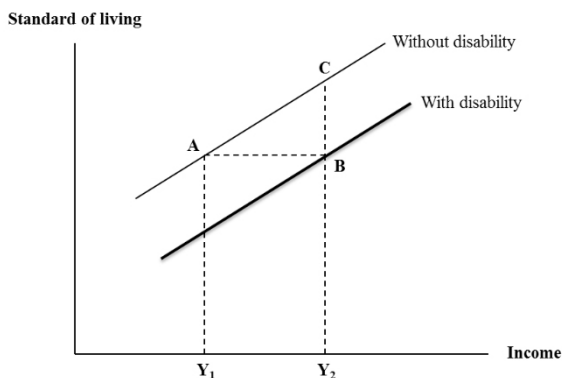


Figure 1 illustrates the simple case where the disability-related costs are assumed to be in a fixed amount, independent of income level, and the relationship between income and standard of living is assumed to be linear. The upward sloping line AC reflects the assumption of a positive relationship between income and standard of living. If there is an incidence of a disability, it will cause the line (which represents the relationship between standard of living and income) to shift downwards; so much so that it passes through point B.

In other words, households with incidences of disability require a greater amount of income ( $Y_2$  instead of  $Y_1$ ) in order to be at a par with the standard of living of a household without disability incidences. Thus, with the same level of standard of living, the extra costs of having a disability are denoted by the distance between AB. By obtaining the information on the slope of line AC and the vertical distance BC, the extra costs (which is denoted by the horizontal line AB) can be estimated since the slope of AC = BC/AB.

The general econometric equation is as follows:

$$S = k + \alpha \ln(Y) + \beta D + \gamma X + \varepsilon$$

Where  $S$  is an indicator of the standard of living,  $Y$  is the household's total monthly income,  $D$  is a dummy variable representing disability

status, and  $X$  is a vector of other characteristics. The coefficients that need to be estimated are denoted by  $\alpha$ ,  $\beta$ , and  $\gamma$ , and  $k$  is a constant.

Referring to Figure 1, the distance BC is denoted by  $\beta$  in the above equation; whereas the slope of AC is denoted by  $\alpha$ . The extra costs of having a disability are shown by line AB and can be calculated by dividing BC with slope AC, or can be written as:

$$\text{Extra costs of disability, } E = -\beta/\alpha$$

## DATA AND METHODOLOGY

### Samples and Sampling Method

Most studies (Zaidi and Burchardt (2005) in UK, Loyalka et al. (2013) in China, and ISDS (2013) in Vietnam) that adopted the standard of living approach obtained their data from the national data survey; thus, the number of samples was large and the studies were able to obtain information on the nation itself. Unfortunately, such information is unavailable in Malaysia; in fact, a survey on disabilities has never been performed before. Due to this, only a small-scale survey is carried out to collect data for this study. The optimum sample size is then determined using the formula introduced by Krejcie and Morgan (1970).

$$s = \frac{X^2 NP(1-P)}{d^2 (N-1) + X^2 P(1-P)}$$

Where  $s$  = sample size required

$X^2$  = value of Chi-Square

$N$  = population size

$P$  = population proportion (assumed to be 0.5)

$d$  = degree of accuracy (expressed as a proportion, assumed to be 0.05)

At 95% confidence level,  $X = 1.96$ ,  $N = 2310$ ,  $P = 0.5$ , and  $d = 0.05$ ,

$$s = \frac{(1.96)^2 (2310)(0.5)(1-0.5)}{(0.05)^2 (2310-1) + (1.96)^2 (0.5)(1-0.5)}$$

$$s = \frac{2218.524}{5.7725 + 0.9604}$$

$$s = 329.50 \approx 330$$

Based on the above calculation, this study needs at least 330 respondents in order to be representative of the population. The sampling method used in this study is the random selection method as to prevent any bias from occurring. The random sampling is performed based on the list of all staff in IIUM. The questionnaires have been sent to the respondents via email and it adapts the questions from the study done by Vietnam's ISDS (2013).

### **Dependent Variables Construction**

As mentioned earlier, the dependent variable would be the standard of living indicator. According to Zaidi and Burchardt (2005), there are a few important criteria that need to be taken into account when considering a standard of living indicator: it is not simply a statement of income, it should consist of goods and services that are not systematically related to the disability status, and it should be elastic with respect to income.

Berthoud et al. (1993) found that a combined indicator based on the ownership of seven consumer durables and five questions about budgeting would fit well to the criteria. Meanwhile, Zaidi and Burchardt (2005) incorporated both a variable on 'any savings' and an index of consumer durables as their standard of living indicator. According to two studies in Vietnam, Mont and Cuong (2011) used 11 household assets in constructing the standard of living indicator; while ISDS (2013) used 20 household assets for the same purpose.

In this study, the questionnaire collects information on various items possessed in the respondents' household, which subsequently were used as proxies of the standard of living. Logit regression was done to each and every item, by finding its relationship to income (must be significant) and disability incidence (must be no relationship). From 32 items listed, only 25 items<sup>1</sup> were fit to be included in the standard of living indicator. A score of 1 was given if respondents had any of the listed items in their possession. The summation of the total score for each household was then calculated to represent the standard of living indicator.

## **Key Explanatory Variables Construction**

### ***Income***

Zaidi and Burchardt (2005) explained that the income indicator should represent the resources that can be disposed of in relation to the needs and preferences of the household, which reflects that disposable income is used as an explanatory variable in their study. Saunders (2007), Cullinan et al. (2011), and Vietnam ISDS (2013) also used the net disposable household income in logarithm expression as one of their key explanatory variables. In short, these examples justify the need of net disposable income as one of the key variables in measuring disability-related costs. Thus, the log of net disposable monthly household income is included in this study.

### ***Disability Status***

As for disability status, this study has collected information on both type and severity levels of a disability. Cullinan et al. (2007) and Vietnam ISDS (2013) classified disability status according to its severity level, while Loyalka et al. (2013) classified disability status according to the number of PWDs in one household. In this study, the initial measure of disability is included in the survey based on the responses to the question, "What is your disability status?" To capture the severity level, respondents who classified themselves (or one of their household members) as a 'person with disabilities' were asked to rate the disability severity level (severely limited in daily activities, limited to some extent in daily activities, or not limited in daily activities).

### ***Other Explanatory Variables Selection***

As for other explanatory variables, it depends on the hypotheses about their importance towards the relationship between standard of living, income, and disability. Age, gender, number and ages of each member in the household are examples of other important variables (Zaidi & Burchardt, 2005). In other studies, like Saunders (2007) and Vietnam ISDS (2013), they included education level, housing tenure, marital status, labour force status, and geographical location. Basically, any relevant variable can be included during data collection; but some may be excluded during the final model specification which would be determined by empirical tests. Table 5 summarised all dependent and



explanatory variables included in the final models after conducting the diagnostic tests for every model.

*Table 5. Variable definitions*

Variable	Definition
<i>Dependent Variable</i>	
Standard of living	Standard of living indicator in integer values (max = 25)
<i>Key Explanatory Variables</i>	
Ln income	Natural log of disposable household income
Disability incidence	= 1 if household has an individual with a disability; = 0 otherwise
Severity level	Three severity level dummy variables (severely limited, limited to some extent, and not limited at all)
Types of disabilities	Six types of disabilities dummy variables (vision impairment, hearing impairment, physical impairment, learning disabilities, mental disabilities, and multiple disabilities)
PWD gender	= 1 if male; = 0 if female
PWD residential area	= 1 if stays in urban area; 0 = if stays in rural area
<i>Other Explanatory Variables</i>	
Housing ownership	= 1 if own house; 0 = otherwise
Residential area	= 1 if stays in urban area; 0 = if stays in rural area
Household size	Number of persons in the household
Number of children	Total number of children in the household

### **Modelling Approach**

The main objective of this study is to quantify how income is related to a standard of living indicator and how disability reduces the standard of living—by shifting the income curve downwards. This study adapted studies done by Loyalka et al. (2013) and Vietnam ISDS (2013). A multiple modelling approach was adopted to analyse the underlying

relationship between standard of living, income, and other explanatory variables. It was done according to: disability incidence in a household, severity level of disability, types of disabilities, residential areas, and gender of the person with disabilities. In order to control the household size and its composition, the number of children was included in the model—which is similar to what had been done by Zaidi and Burchardt (2005) and Loyalka et al. (2013). Several diagnostic tests were done in order to ensure the robustness of the models. The estimates were derived by the ordinary least squares (OLS) method using the EViews 7 software.

## RESULTS AND DISCUSSION

### Household Profile

The first section of the questionnaire collects about the demographic profile of the respondents. It includes gender and disability status of the respondents, household size, household composition, and residential area. The number of respondents participated in the survey was 422 persons. In total, there were 290 female respondents (68.7%) and 132 male respondents (31.3%). Only 12 respondents (3%) with disabilities participated in the survey, while the rest were the ones without any disability.

Table 6 shows the number of households with and without disabilities. It is also broken down according to their residential areas, i.e. urban or rural area. There were 51 households, or 12.1% of the households, which contained at least one person with disabilities. This percentage is close to the estimation by the World Health Organisation, where 15% of the world's population appear to have some form of disability, showing that the sample was quite representative.

In terms of residential areas, 361 of the respondents (85.5%) answered they are living in urban areas, while only 61 of the respondents (14.5%) said they are living in rural areas. It shows that a majority of the respondents are living in urban areas rather than the rural areas.

*Table 6. Presence of persons with disabilities in different households and residential areas*

Residential areas	Households		Total
	With at least one person with disabilities	Have no person with disabilities	
<b>Urban</b>	44	317	361
<b>Rural</b>	7	54	61
<b>Total</b>	51	371	<b>422</b>

Apart from that, the survey also collected information on the heads of the households. As expected, 389 of the respondents (92.2%) answered they have a male household head, representing the husbands or the fathers. Whereas, the remaining 33 of the respondents (8.0%) answered they have a female household head. These are most probably representing the single parent cases.

When comparing according to the age of the head of the households, 380 of the respondents (90.0%) categorised their head of the household as non-elderly, or specifically aged below 60 years old. Only 42 of the respondents (10.0%) categorised their head of the household as elderly, which specifically refers to ones who are aged 60 years old and above. It means a majority of the households in the sample have a non-elderly head of households.

An important piece of information collected in the survey is the households' composition, which includes the size of the households, the number of adults, children, and elderly in the households. According to the answers collected, the households may have a range from one to twelve members. In this study, anyone aged 12 years old and below is considered as a child and anyone aged 60 years old and above is considered as elderly person<sup>2</sup>. As for those who are neither a child nor an elderly person, he or she is automatically considered as an adult. Only three categories are used in order to avoid any confusion.

Some of the households may comprise members of all ages (children, adult, and elderly) while some may have only children and adults, children and elderly, or adults only. 269 of the respondents (63.7%) have a family of four to six persons, whereas only four of the respondents have a family of 10 to 12 persons. In terms of the

households' composition, 293 of the respondents (69.4%) have a family comprising children and adults, while only seven of the respondents have a family comprising children and elderly.

As for home ownership, the respondents were asked about their home ownership status, whether they owned the house or otherwise. 303 of the respondents (71.8%) answered they are living in their own house, whereas 119 of the respondents (28.2%) answered it as otherwise. As for the answers for 'Otherwise', they include respondents who are renting the house or living with their family.

### Disability Profile

Out of 422 respondents, 51 respondents answered that they have, at least, one PWD living in their households. In the case of more than one person with disabilities living in the same household, the respondents were asked to identify the member who has the most severe condition.

After recognising the incidence of disability in households, the severity level of the person was classified. Ten respondents classified the household member with disabilities who was 'severely limited in doing daily activities', while 34 and 7 respondents classified the household member with disabilities as 'limited to some extent in doing daily activities' and 'no limitation in doing daily activities', respectively. The respondents also need to classify the type of disabilities that the person has. Persons with physical impairment were recorded the most as compared to other types of disabilities. The survey, however, did not capture all types of disability across different severity level (except for physical difficulty) since the sample population itself was small to begin with. Table 7 summarises the condition of the PWD captured by the survey according to severity level and types.

*Table 7. Disability - number of incidences by severity level and types of disability*

Types of disability	Severity level of disability		
	Severely limited	Limited to some extent	Not limited in doing daily activities
Hearing impairment	-	2	3
Physical impairment	5	14	2

Speech impairment	-	-	-
Vision impairment	-	2	-
Learning disabilities	-	6	2
Mental disabilities	-	4	-
Multiple disabilities	5	6	-
Total	10	34	7

### The Extra Costs of Disability

In each model, the dependent variable was the pre-determined standard of living indicator and the explanatory variables were the disability variables, the natural logarithm of monthly income of the household, and other relevant variables.

Table 8 shows the extra costs for households that have a PWD, regardless of their disability types and severity levels. The coefficient on the disability incidence in a household was estimated at -0.272 and the coefficient on log income was 0.990. Both coefficients were found to be statistically different from zero, and the negative sign reflects that households having at least a person with disabilities do have a lower standard of living as compared to households without one. The extra costs of disability were calculated as 27.5%. Residential area, home ownership, household size, and number of children were included in the model as control variables. From the regression, only residential areas and home ownership were found to be statistically significant and both of the variables have a positive relationship to the standard of living indicator.

*Table 8. Extra costs of households containing a member with disabilities*

Variables	Parameter estimates
Constant	8.715***
Household monthly income, log	0.990***
Disability incidence	-0.272**
Residential area	1.085**
Home ownership	1.118***
Household size	0.046
Number of children	0.153

Adjusted R <sup>2</sup>	0.122
No of observations	422
<b>Extra costs (as % of income):</b>	<b>(0.272/0.990)% = 27.5%</b>

Note: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 9 presents the results of the model for disability-related costs across the severity levels of the disability. There were three severity levels in the analysis: severely limited, limited to some extent, and not limited at all in doing daily activities. The analyses were done separately using a binary indicator for each severity level. Households with a person who is severely affected and a person who is limited to some extent in doing daily activities need an extra cost of 45.9% and 40.0% from their monthly income respectively. Surprisingly, the figures were not statistically significant, most probably due to the small sample size. Whereas, the extra costs of disability for households with a person who is not limited in doing daily activities were calculated as 5.9% of their monthly income and it was statistically significant at the 5% level. Residential area, home ownership, household size, and number of children in the household were included in the model as control variables. Only residential areas and home ownership were found to be statistically significant and both of them have a positive relationship to the standard of living indicator.

Table 10 shows the parameter estimates by types of disabilities. Since none of the respondents recorded the presence of speech impairment, the extra costs were only calculated for six types of disabilities (as shown in the Table 10) only. The highest extra costs, 23.4% of monthly income, were calculated for households with a person who has multiple disabilities. The least extra costs, 14.0% of monthly income, were calculated for households with a person who has hearing impairment. The coefficients for hearing impairment, physical impairment, vision impairment, and multiple disabilities were statistically significant at the 5% level. Residential area, home ownership, household size, and the number of children in the household were included in the model as control variables. Only residential areas and home ownership were found to be statistically significant and both of them have a positive relationship to the standard of living indicator.

Table 9. Extra costs according to severity level of disability

Intercept/ Variables	Parameter estimates		
	Severely affected	Limited to some extent	Not limited
Constant	8.130***	8.032***	8.871***
Household monthly income, log	1.045***	1.065***	0.953***
Severity level	-0.480	-0.426	-0.056**
Residential area	1.021**	1.066**	1.135**
Home ownership	1.212***	1.109***	1.158***
Household size	0.036	0.033	0.057
Number of children	0.161	0.157	0.127
Adjusted R <sup>2</sup> No of observations = 422	0.112	0.112	0.117
<b>Extra costs (as % of income):</b>	<b>(0.480/1.045)% = 45.9%</b>	<b>(0.426/1.065)% = 40.0%</b>	<b>(0.056/0.953)% = 5.9%</b>

Note: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 10. Extra costs according to types of disability

Intercept/ Variables	Parameter estimates					
	Hearing impairment	Physical impairment	Vision impairment	Learning disabilities	Mental disabilities	Multiple disabilities
Constant	7.919***	8.667***	8.176***	7.934***	7.854***	7.904***
Household monthly income, log	1.069***	0.994***	1.044***	1.066***	1.078***	1.070***
Types of disability	-0.150**	-0.211**	-0.168**	-0.161*	-0.246*	-0.250**
Residential area	1.048**	1.088**	1.080**	1.054**	1.066**	1.032**
Home ownership	1.170***	1.117***	1.197***	1.165***	1.147***	1.160***
Household size	0.033	0.020	0.022	0.034	0.032	0.051

Number of children	0.154	0.186	0.151	0.155	0.156	0.141
Adjusted R <sup>2</sup>	0.107	0.119	0.111	0.108	0.109	0.111
No. of obs. = 422 Extra costs (as % of income):	14.0%	21.5%	16.1%	15.1%	22.8%	23.4%

Note: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 11 reports the parameter estimates by the gender of the persons with disabilities. However, the differences were not statistically significant—reflecting that the person’s gender would not affect the extra costs of having a disability. The residential area, home ownership, household size, and number of children in the household were included in the model as control variables. Only residential areas and home ownership were found to be statistically significant and both have a positive relationship to the standard of living indicator.

*Table 11. Extra costs according to gender of persons with disabilities*

Intercept/Variables	Parameter estimates	
	Male	Female
Constant	8.020***	8.929***
Household monthly income, log	1.060***	0.958***
Gender of PWD	-0.141	-0.171
Residential area	1.057**	1.080**
Home ownership	1.157***	1.133***
Household size	0.036	0.047
Number of children	0.152	8.929
Adjusted R <sup>2</sup>	0.108	0.128
No. of obs. = 422 Extra costs (as % of income):	(0.141/1.060)% = 13.3%	(0.171/0.958)% = 17.8%

Note: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 12 presents the parameter estimates according to the residential area of the persons with disabilities. The extra costs as a percentage of income were higher among rural households compared



to urban households, which were 26.7% and 19.6%, respectively. The coefficients on income and disability variables were significantly different from zero, even at the 1% significance level. The variable of residential area for the whole population was excluded so as to avoid redundancy.

Table 12. Extra costs according to residential area of persons with disabilities

Intercept/Variables	Parameter estimates	
	Urban	Rural
Constant	7.907***	9.640***
Household monthly income, log	1.155***	0.969***
Residential area of PWD	-0.226***	-0.259***
Home ownership	1.192***	1.129***
Household size	0.062	0.082
Number of children	0.136	0.156
Adjusted R <sup>2</sup>	0.199	0.214
No. of obs. = 422 Extra costs (as % of income):	<b>(0.226/1.155)% = 19.6%</b>	<b>(0.259/0.969)% = 26.7%</b>

Note: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

## Discussion

Zaidi and Burchardt (2003) found that the extra costs of living with a disability in the UK ranged from 11% to 69 % of one's income. A study in Australia, which was done by Saunders (2007), estimated the costs of having a disability to be at 29% of the household income. In Vietnam, Mont and Cuong (2011) and Vietnam's ISDS (2013) found that the extra costs of having a disability would be at 11.5% of household income and would range from 8.8% to 9.5% of annual household income, respectively. Meanwhile, in China, Loyalka et al. (2013) found that the extra costs would range from 17.5% to 31.1% of the income for children with any disabilities, whereas for adults with any disabilities, the extra costs of having a disability would range between 8.0% and 43.2 % of one's income.

In general, this study conforms to previous studies; since it found a negative relationship between the standard of living indicator and

disability variables. The extra costs of the disability for households containing at least one person with disabilities, as for the IIUM's case, is calculated as 27.5% of monthly income. Thus, households having PWDs are more likely to face economic disadvantages. It conforms to the theory of the standard of living, which stands on the assumption that households containing PWDs would require more income in order to reach the same living standards as households without disability incidences because a portion of their income would be diverted to fulfil disability-related needs.

In terms of severity level, the estimation showed that the extra costs of disability for persons who have no limitation in doing daily activities is relatively low, which was calculated as 5.9% of the monthly income. It may be due to fewer special equipment or assistance needed since they can do most of the daily activities on their own. As highlighted by Vietnam's ISDS (2013), the extra costs of having a disability increases when the condition of the affected person becomes more severe. Thus, persons who have no limitation in doing daily activities would need relatively lower costs to meet their needs. In this study, however, it was found that households having at least a person with more severe disabilities do not significantly experience any extra costs, contrary to findings in other countries.

The study also found that the extra costs of disability varies by types of impairments. Households with a member who have multiple disabilities show the highest extra costs: 23.4% of their monthly income; most probably because persons with multiple disabilities need to cater different requirements at a time, hence the highest extra costs as compared to other types of disabilities. Apart from that, persons with mental disabilities and physical difficulties need extra costs of 22.8% and 21.5% of monthly income, respectively. Whereas, households with at least a person who has vision or hearing impairment need extra costs of 16.1% and 14.0% of monthly income, respectively. As expected, in general, persons who are affected physically would always need more extra costs than the ones who have vision or hearing impairment. This is most probably because they do not only require special equipment (such as wheelchairs and walking aids), but they also may need to do some renovation in their house just to make sure it is disabled-friendly.

Apart from that, it also shows that the extra costs would not have any differences across the gender of persons with disabilities. The same result is also obtained by Vietnam's ISDS (2013), where they found that there is no significant difference in the extra costs between a male and a female person with disabilities.

As for residential areas, households with disability incidence who live in rural areas would need higher extra costs (26.7% of monthly income) compared to those who lived in urban areas (19.6% of monthly income). It is perhaps due to the prices of the facilities and special equipment that are far more expensive in rural areas, or maybe because they have to compensate for logistic inefficiency. The results however, are in contrast to what has been found by Loyalka et al. (2013) and Vietnam's ISDS (2013). In their studies, the persons with disabilities living in the rural areas would need lesser extra costs as compared to the ones who live in the urban areas. According to them, due to the lack of accessibility, most of the households living with PWDs in rural areas would choose not to spend their money on disability-related needs in the first place. Thus, they would not require any extra costs even when the disability is present.

## **Conclusions**

The findings from this study would have important policy implications, especially in Malaysia. Such empirical study have never been conducted in Malaysia and this can give some ideas to the corresponding authorities in estimating the ample amount of monetary assistance to be provided.

In conclusion, this study manages to achieve its objectives. It has applied the standard of living approach in estimating the extra costs of having a disability among staff of the IIUM. Though it is considerably a small-scaled survey, which is the main limitation of this study, yet it acts as an initiator in the area since the extra costs of having a disability in Malaysia, at the moment, is not yet explored. It provides a general framework on how to investigate the costs of living among PWDs. The standard of living approach helps in giving a rough idea about the extra costs of having disability, but it is unable to detail out the costs. It is found that households with at least one PWD needs the extra cost of 27.5% out of the household monthly income in order to fulfil the disability-related needs. The extra costs are statistically significant across the different types of disability and residential areas.

The study also indicates the importance for policy makers to take into account a few factors in order to improve the affirmative action towards persons with disabilities. Such factors include: the severity level and types of disabilities, and also the residential area of the persons with disabilities. Despite the limitations, this preliminary study serves as a starting point for further assessments on the same area with a bigger sample and better research methods. Hopefully, a better picture about the extra costs of disability in a nation-wide survey can be done in future.

(Endnotes)

<sup>1</sup> The items included in the standard of living indicator are: air-conditioner, baking oven, bicycle, blender, bookshelf, car, desktop computer, electric kettle, electric mixer, internet access, kitchen stove, laptop computer, microwave oven, motorcycle, radio, satellite/digital TV, smartphone, sofa, telephone, toaster, vacuum cleaner, and VCD/DVD player.

<sup>2</sup> Based on the definition given by the Department of Social Welfare.

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