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COST OF MENTAL ILLNESS AND DEPRESSION IN DEVELOPING COUNTRIES: A CASE STUDY OF PAKISTAN

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ABSTRACT

Depression causes a substantial burden to persons, their beloved ones, and the nations as a whole. Major depression results in disability, high morbidity, high mortality, suicides, physical and mental impairment, and deteriorates the quality of life in a society. Depression is common in developing countries like Pakistan. This study analyzes the economic burden of depression and depressive disorders in Pakistan. The study was conducted in Pakistan's third largest city, Faisalabad. Respondents were selected using a multistage sampling technique. As a first step, hospitals were selected from both the public and private sectors. In step two, respondents were selected and interviewed using a well-structured and pre-tested questionnaire. Review of literature reveals that the largest share of the burden of depression and depressive disorders is in the form of indirect cost. Direct healthcare cost is mostly in the form of outpatient care, doctor fee, and medicine bills, etc. This study, therefore, estimated both types of costs using cost of illness (COI) analysis. In order to find out the level of depression in patients, the center of epidemiologic studies depression (CES-D) scale was used. Then the direct and indirect cost of depression was estimated. Additionally, multiple regression analysis was used to examine the determinants of health cost, including the level of depression. The direct and indirect costs of depression were 11,108 Pakistani Rupees (PKR) and 4,869 PKR per month, respectively. Results of regression analysis revealed that besides the level of depression, monthly income, age, education, and the number of visits to a doctor's clinic determine health cost, positively and statistically significant. Additionally, the occurrence of depression and anxiety was evident in adults more than other age groups. Females were suffering from this disorder comparatively more than male respondents. The economic burden related to depression is considerable, especially for those who belong to low-income group. Government should provide facilities for treatment for depression in public hospitals by keeping a special focus on less privileged groups of the population.

Keywords: Depression; Cost; Mental illness; Developing countries; Pakistan.

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INTRODUCTION

Depression is a very common and serious medical illness. It may affect people of all ages, from any walk of life. It may cause several physical and emotional problems, which decreases a person's ability to function properly at work, in their personal lives, and to perform daily based activities (Klein and Santiago, 2003). Depression also has an economic impact on its victims, their families, the organizations where they work, and societies as a whole. It can lead to reduced educational achievements, lower earning potential, and higher risks of unemployment. The health of depression victims is vulnerable due to depression's

comorbidity with many other mental and physical health issues (Moussavi et al., 2007). The consequences associated with this mental illness can be detrimental in many aspects. It might lead to severe life risks of diseases in the elderly, like heart disease, cancer, Alzheimer's, and stroke (Krishnan et al., 2002). Moreover, back pain, blood pressure, diabetes, stomach disorders, and hormonal imbalance also have an association with depression. Thus, depression may result in an unhealthy cycle of life. Because victims of depression might be unable or unwilling to take care of themselves, that's why the state of depression worsens, and health suffers.

The burden associated with depression is attributed to the direct and indirect costs of illness. Direct costs are attributed with the out-of-pocket expenses for the treatment of the disease, its include all medical costs, like doctor's fees, medication costs, hospitalizations costs, transportation costs etc., while indirect costs are attributed to the productivity loss, disability costs, non-working days, absence from working place, low productivity at the workplace. Further depression is also reason for students to lower their academic performance (Hysenbegasi et al., 2005). The systematic reviews of cost of illness (COI) studies showed that diagnostic costs and treatment costs ranged from USD 1345 to USD 2746 in Germany per year. Annual total medical health care costs, including morbidity costs, were around USD 152 in Russia, USD 7659 in United States, USD 244.09 in the United Kingdom, and USD 2488.52 in South Australia. These costs were about USD 1000 to USD 2500 higher than the medical health care used by non-depressed individuals. Research studies concluded that average annual direct costs ranged between USD 1000 to USD 2500. These variations in costs could be due to differences in sample size and publication year, age, different medical health care and provision of these services (Luppa et al., 2007). And costs associated with productivity lost and morbidity costs were around USD 52 in Russia, USD 913 US in Spain, USD 94.14 in the United States, and USD 8355.19 in South Australia, and costs related to mortality ranged between USD 108.88 in Sweden to USD 866.42 in the United States were estimated per year. These research studies concluded that around USD 2000 to USD 3700 morbidity and loss in productivity costs, and approximately 200 US dollar to 400 US dollar mortality costs were estimated annually (Luppa et al., 2007).

Prevalence of depression is also high in Pakistan, it's around 34 percent, particularly in women, 29 to 66 percent, and in men, 10 to 33 percent; several studies have been conducted to indicate the association between depression and socio-economic conditions, problems in relationships, and lack of support (Mirza and Jenkins, 2004). In Pakistan, 44 percent of the entire population is effected by depression, its prevalence is increased in women around 57.5 percent and 25 percent in men; in Pakistan, about 50 million population suffer from these mental health disorders, from which 15 to 35 million are adults, and around 20 million population need attention for their mental health status (WHO, 2017). According to WHO, 16 percent of general population of Pakistan is suffering from mild to moderate level of psychiatric diseases, and 1 percent population is suffering from severe mental illness. Pakistan is a developing country and suffering from a higher prevalence of depression due to social adversities, miserable health conditions, political instabilities, terrorism, economic problems, and security and safety concerns. That provides a ground fertile to become depressed, and depression takes almost 1st position among psychiatric disorders (Gadit and Mugford, 2007). In different localities of Pakistan, many studies conducted in the past ten years provide results of prevalence rates of anxiety and depression around 22 to 60 percent; according to these rates, there is a need to spread awareness and take considerable measures to address the mental health issues in Pakistan (Ahmed et al., 2016). Although previous studies had been conducted to analyze the prevalence and risk factors of depression (Mirza and Jerkins, 2004; Gadit and Mugford, 2007; Rahman et al., 2009; Husain et al., 2014; Ahmed et al., 2016) however, still its economic aspect needs more consideration. Hence

this paper aims to identify the economic impact of having depression and analysis the direct or indirect cost of being depressed in Faisalabad, Pakistan.

METHODOGOLOGY

Study Area and Sampling

The research was conducted in Faisalabad. The study area was selected given the fact that it is the third biggest city in Pakistan and second largest city of Punjab province. Sample data was collected through multistage sampling from 203 respondents. The sample size was selected by using the following sample size formula (Kotrlik and Higgins, 2001).

$$n = z^2 * pq/e^2 \quad (1)$$

where,

n = estimated sample size

z^2 = critical value of z distribution $\alpha/2$ with a confidence interval of 95 percent, α is 0.05, the critical value is 1.96

p = proportion of the sample

q = 1-p

e^2 = is the bounded error or acceptable margin of error

Ahmed et al., 2016 provided the range of anxiety and depression about 22 to 60 percent in Pakistan. The sample proportion was taken 53.4 percent, which was the prevalence rate of depression in Lahore, Punjab (Gadit and Mugford, 2007), as Lahore is near Faisalabad, so we utilized that proportion for sampling purposes. Hence our sample proportion also fall in the limit of 22 to 60 percent. The margin level of error was taken at 7 percent due to financial and time constraints.

Mental Health Assessment

A well-structured questionnaire was used for the data collection from the respondents. And for the mental health assessment CES-D (Radloff, 1977) was used. CES-D is one of the most widely used scale to evaluate the depressive condition of an individual (Beekman et al., 1997; Geerlings et al., 1999; Diehr et al., 2006; Qin et al., 2018; Ouyang and Sun, 2019). It consists of 20 questions about the feelings of a person that how often they experienced those feelings. The choice for each question in scale has an index of 0, 1, 2 and 3. '0' for none of the time, '1' for sometimes or rarely, '2' for moderate amount of time, and '3' for all the time, which in total provide the range of 0 to 60. According to CES-D scale, there is a cut score of 16; if a person scores 0 to 15, then that person considers mentally healthy and not depressed, while if a person scores 16 or more than 16 points, then that person is considered depressed; the higher the score indicated the severity level of being depressed.

Theoretical Framework

Theoretical framework has been summarized in Figure 1. Socio-economic status plays an important role in an individual's mental stability and condition of depression. Low socio-economic status may lead to the prevalence of anxiety and depression. If a person has a low income and lacks access to education and health facilities, this might lead to a high chance of psychiatric disorders (Lorant et al., 2003). Gender disparity, and issues occurring in married couple and those couple having certain relationships may lead to their depression (Kessler, 2012; Sajjadi et al., 2013). Depression emerges as an important factor for health problems and it is leading cause burden of disease worldwide. It often becomes the reason for comorbidities with other chronic diseases, and then it can worsen the health outcomes associated with them (Moussavi et al., 2007). Therefore, to evaluate the economic impacts of being depressed, this paper,

as a first step it was analyzed how depression associated with an individual's socio-economic and risk factors. As a step two economic costs of depression were measured.

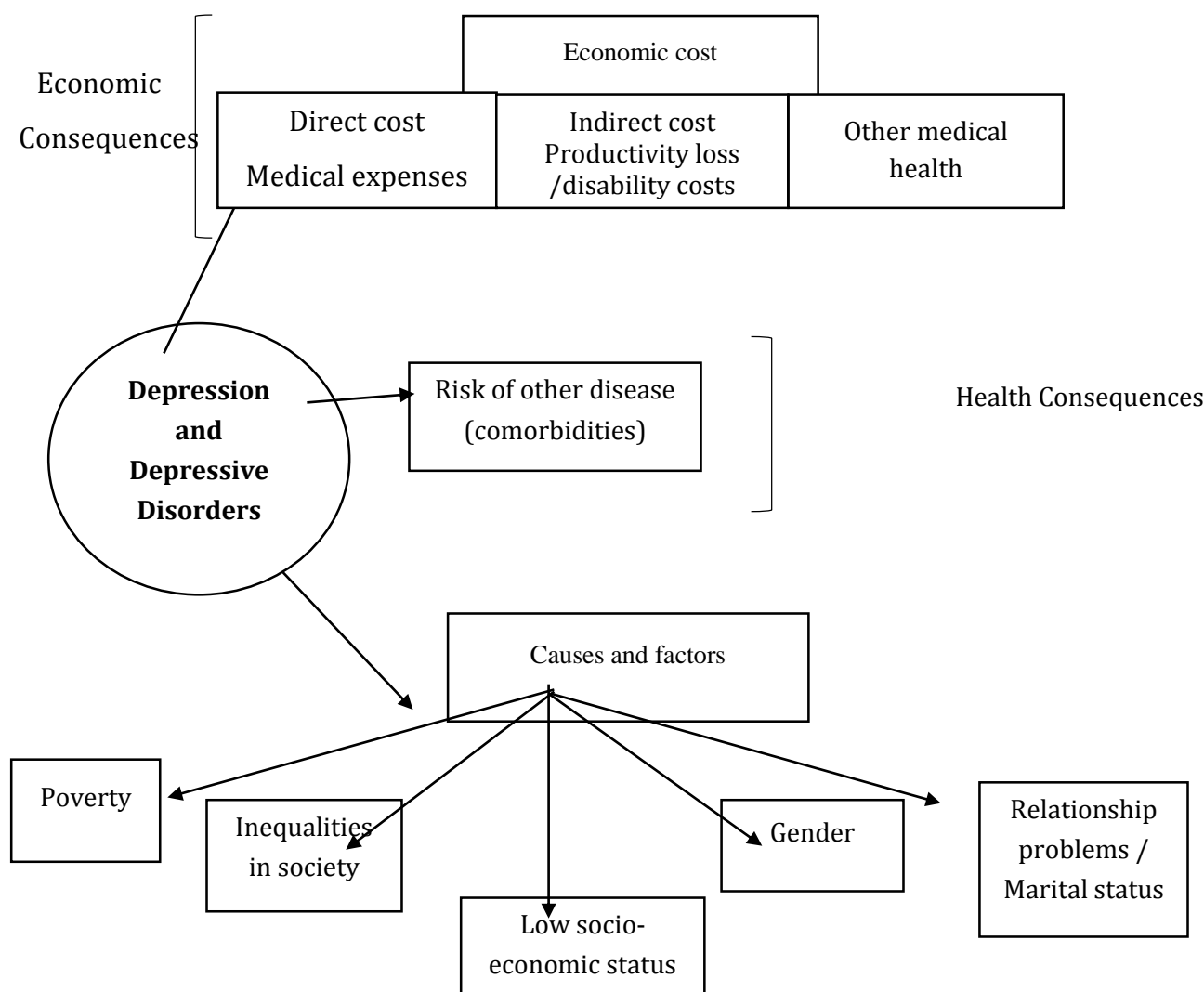


Figure 1. Theoretical framework of the study.

Cost of Illness Analysis

Cost of illness (COI) was the 1st technique that had been used in the health economics field for the economic evaluation of disease. COI is a descriptive study that provides the required information to support the process of health care studies. The core objective of this technique is to measure the economic burden of the specific illness (Tarricone, 2006). Cost of illness studies had widely used to assist the cost of depression with the purpose of betterment in health policy decisions. These kinds of studies are widely used by the World health organization and World Bank (Lopez et al., 2006). COI studies generally aimed to estimate the cost of a disease and how much society and individuals spend on that particular illness. Total costs were further classified as direct and indirect costs.

Direct Cost: Direct costs of a disease are those costs which is directly incurred by the patient and their families, it is direct out of pocket cost. This costs further classified as direct medical costs and direct non-medical costs. Direct medical costs included doctor's fee, medication costs, and diagnosis or lab tests costs,

hospitalization costs and if there is any comorbidities, then expenses on other health problems. And non-medical costs are referred to as transportation costs which a sufferer have to pay when they are taking treatment (see equation 2 and equation 3).

$$DC = DMC + DNMC \quad (2)$$

$$DC = DF + MC + D/LTC + HpC + OHDC + DNMC \quad (3)$$

where,

Direct medical cost (DMC) in PKRs = Doctors' fees per visit (DF) + Medication Cost per month(MC) + Diagnosis or Lab test cost (D/LTC) + Hospitalization Costs (HpC) + Other health Disease costs per month (HDC) and DNMC =Direct non-medical costs (Transportation costs per visit).

Indirect cost: Indirect costs are those costs which a sufferer had to bear in term of their loss in productivity and loss in their earning income (equation 4). These losses in income could be direct by the patient due to their decrease efficiency and productivity at work or sometimes patients had to bear the complete loss of their portion of earning income; these costs referred to as disability costs. Disability costs are those costs when patients are unable to continue their personal and professional activities due to illness; these costs are likely to be more expensive for patients and their families. Because firstly, patients were unable to perform their activities, and secondly, their families had to bear the disability costs; moreover, they also had to spend money on the treatment of these patients. Indirect costs also include the loss of caregivers to the patient, if they are employed, so that these losses in terms of monetary values.

$$IDC = PL/DC + CGL \quad (4)$$

Indirect costs in PKRs = Productivity loss / disability costs + Care giver Salary loss

Socioeconomic Factors and Statistical Analysis

Descriptive statistics were used for the examine the socio-economic characteristics of the respondents. Multiple regression was used for examine the relationship between health care cost and socio-economic characteristics.

Multiple regression equation for this study is presented in equation 5, as given below;

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \mu \quad (5)$$

Where,

HC = f (monthly household income, age, education, gender, CES-D score, number of visits to doctor per month)

Y= Health cost of depression, X1= Monthly household Income, X2= Age, X3= Education in years

X4= Gender, X5= CES-D Score, X6= Number of visits per month.

RESULTS AND DISCUSSION

Descriptive Statistics of Socioeconomic Characteristics

The main characteristics of the study are listed in Table 1. The mean age of the respondents was 33 years. The majority of the respondents, 61.1 percent, were female in 33 percent were housewives and had no monetary source of income. About 62.2 percent of respondents were married, and 46.6 percent belonged to the low-income group, with a mean household income of almost 23 thousand PKR per month. About 64 percent of respondents were suffering from a moderate level of depression, and 66.5 percent of respondents reported that depression was a chronic disease. While about 72.4 percent of respondents had

anxiety attacks, 79.8 percent of patients had muscular pains, headaches, and chronic pain, 16.7 percent of respondents were suffering from blood pressure, 16.9 percent of them diabetes, 24.1 percent had behavioral issues, 20.5 percent proportion had stomach disorders, 3.4 percent respondents had memory problems, 1.5 percent of them had psychological problems, and 1.5 percent proportion had heart disease recorded. A large proportion of respondents (almost 76 percent) reported that their personal and professional lives were disturbed because of the disease and its effects on life.

Table 1. Descriptive statistics of socioeconomic characteristics.

Socioeconomic characteristics	N	percent	Mean	S.D
<i>Age categories</i>				
15 to 30	102	50.2	22.794	4.623
31 to 45	66	32.5	38.439	4.406
46 to 60	25	12.3	53.360	4.357
Above 60	10	4.9	67.900	4.067
Total	203	100.0	33.867	13.893
<i>Gender</i>				
Male	76	37.4	-	-
Female	127	62.2	-	-
<i>Education level in years</i>				
Illiterate	52	25.6	-	-
1 to 5	25	12.3	-	-
6 to 10	58	28.6	-	-
11 to 14	50	24.9	-	-
15 to above	18	8.9	-	-
Total	203	100	-	-
<i>Monthly household Income</i>				
10000 to 30000	95	46.8	22947.368	5495.391
31000 to 50000	54	26.6	45148.148	5780.276
51000 to 70000	29	14.3	63637.931	5156.300
Above 70000	25	12.3	97800.000	17623.374
Total	203	100.0	43884.24	26187.304
<i>CES-D score</i>				
Mild 16 to 30	36	17.7	-	-
Moderate 31 to 45	129	63.5	-	-
Severe 46 to 60	38	18.7	-	-
Total	203	100.0	-	-

Estimated Cost of Depression

By using equations 2-4, health cost was estimated as follows:

$$HC = DC + IDC$$

$$HC = 11108.57 + 4869.9469$$

$$HC = \text{PKR } 15978.516$$

where,

HC = Health cost of depression which includes both DC = direct costs and IDC = Indirect costs.

Total estimated mean health cost was 15,978 PKR (USD 99) per month which is the sum of direct and indirect mean costs of depression.

Direct cost was estimated using equations 2 and 3 that included direct medical cost and direct non-medical cost.

$$DC = DF + MC + D/LTC + HpC + OHDC + DNMC$$

$$DC = 735.96 + 6227.54 + 1805.07 + 1096.06 + 146.80 + 1097.14$$

Direct cost = PKR 11108.57

Estimated direct mean cost per month was 11,108 PKR (USD 69) which included all direct medical and direct non-medical costs that were classified as doctor's fee to visit doctor per month, medication costs per month, diagnosis and lab tests costs, hospitalization costs, other health disease costs per month, and transportation costs to visit to doctor per month. While minimum mean direct cost was 38 PKR and maximum mean direct cost was 15,100 PKR was estimated.

For estimating indirect cost (IDC), equation 4 was used, as given below:

$$IDC = PL/DC + CGL$$

$$IDC = 4283.74 + 586.2069$$

Indirect cost = PKR 4869.9469

Estimated indirect mean cost was 4,869 PKR (USD 30) per month which attributed as productivity loss / disability costs incurred by the patient and also care giver salary loss in term of monetary values. And minimum mean indirect cost was 0 and maximum mean indirect cost was 42,500 PKR estimated per month.

Table 2. Results of multiple regression model.

Independent Variables	Unstandardized Coefficients	Std. Error	Standardized Coefficients	T-value	P-Value
Monthly household Income	.096	.020	.275	4.824	.000
Age	54.206	34.855	.082	1.555	.122
Education (In years)	243.985	100.118	.150	2.437	.016
Gender	-4441.985	977.198	-.238	-4.546	.000
CES-D Score	117.438	59.189	.113	1.984	.049
No. of visits per month	2185.553	413.710	.298	5.283	.000
(Constant)	4.853	2465.546		.002	.998
R- square	0.494				
F- value	31.880 (0.000)				

Dependent variable: Health cost

In Table 2 multiple regression model, presents the results how these independent variables effect the health cost of depression. According to results of this multiple regression analysis value of R-square is 0.494, which indicated that 49 percent variations in the health cost were explained by these independent variables such as monthly household income, education, age, gender, CES-D score and number of visits per month. And the F-value of the model is 31.880 which shows that model is highly significant and overall a good fit.

The results of the model show that monthly household income is positively related to health cost which stated that people with higher income tends to spend more money on their health care for depression, and people with lower income unable to take better treatment due to lack of resources. Monthly income is highly significant at a 5 percent level of significance. The relationship between education and health cost also found positive with the regression coefficient of 247.532, which indicate that increase in educational level by one year lead to an increase is health cost. Hence the hypothesis that educated people are more flexible and concerned about their health, so they spend more money on their health problems is accepted. And education is also significant at a 5 percent level of significance with the p-value of 0.016. There is a negative relationship found between gender and the health cost of depression. This is because, according to study results, depression is more prevalent in female, but the higher costs of depression are associated with male because they had also disability costs and productivity losses in terms of monetary values. Although there is a negative relationship between gender and health cost however at 5 percent level of significance it is found statistically significant. The relationship between CES-D score and health cost is also positive and it is also significant at a 5 percent level of significance. The number of visits also is positively related with the health costs of depression, and it is found to be highly significant at a 5 percent level of significance.

This study mainly focuses on estimating the cost of depression and highlighting the important factors of its prevalence. According to the results, we found that depression is more prevalent in females, that is because of social pressure and personal problems in their families and relationships; these results of this study resemble the results of (Mirza and Jerkin, 2004) which stated that the prevalence rate in women was 45.5 percent in women and 21.7 percent in men. Also stated (Alvi and Safdar, 2017) found that depressive symptoms were found more in females as compare to men. The adult population was more effected by depression. In this study estimated mean age recorded was 33.80 years, and this was close to the results of (Gadit and Mugford, 2007) which presented that mean age of sufferers were about 36.8 years. And depression was found more prevalent in married respondents in this study where figures were about 62 percent, and similar results were also found in a study by (Alvi and Safdar, 2017), in which the ratio of married respondents were 72.7 percent. Also this study supports the fact that the population with low income tends to be more depressed then others, similar to the finding of the study (Carvalhais et al., 2008), which stated that the prevalence of depression is higher in a low-income group which was 43.9 percent, and in this study, this percentage was 46.8 percent.

The total health cost of depression for an individual was estimated around 16 thousand PKR (USD 99) per month. Results from the past studies (Cuijpers et al., 2007; Luppá et al., 2007; Tomonaga et al., 2013) showed higher total costs or depression than the present study. This may be due to cultural and methodological changes between countries and also in developed countries; the major component of total costs was higher indirect costs. This might be because of the fact that in most developed countries, there is a high employment level, so their loss in terms of income and productivity losses is higher as compared to an underdeveloped country like Pakistan. It was found that as compared to developed countries in Pakistan, the main component of health cost is related to the direct cost; the estimated direct mean cost per month was 11 thousand PKR (USD 69). The depression-related cost was USD 42 per month, estimated for the depressed individual (Kleine-Budde et al., 2013). These costs are lower as compared to present direct costs, which may be due to the fact that the quality of medical facilities in our country is not comparable with Germany as Germany is developed country; also it may be because of methodological and component differences which are included in the direct cost of depression. Gadit, 2004 also reported the cost of health expenditures, including transportation cost was 3133 PKR in 2004, which is lower than the present cost

because of with the passage of time, there is a continuous increase in the inflation rate in our country, that's why present costs are higher than their costs.

And in regression model there was found positive relationship between monthly income and health cost of depression. This is because of the fact that people from low income group are unable to take better treatment because of the lack of resources, and individuals with the higher income tend to spend more for their health concerns. Moreover age is also have positive relationship with health cost of depression which indicated that one more year lived with depression lead to increase in health cost; these results also similar to the results that higher age associated with increased health care cost (Bock et al., 2016). Education also exhibits a positive relationship with a health cost, and this relationship is also found in (Bock et al., 2016) that higher total cost, is positively related with medium education level as compared to the lowest educational level. And the negative relationship between gender and health cost of depression which was found in this study also supported by (Kleine-Budde et al., 2013) that men generated more health cost than women. The relationship between CES-D score and health cost was found positive and also significant at a 5 percent level of significance. And this same positive relationship between health care cost and more depressive symptoms were found in (Bock et al., 2017), and also higher level of depression had a positive relationship with health cost (Bock et al., 2016).

CONCLUSIONS

In this paper from the findings of this research study, it was concluded that depression is a serious and most prevalent psychiatric disorder. It is a mental disorder that creates numerous concerns in many aspects of the sufferer's life. The disabling moods of depression damage a person's marriage, family relationships, friendships, job performance, and health. The longer depression persists, the more widespread the damage. Major depression results in people shutting themselves off from the support of friends and family. Depression is found the major reason of the disturbance in personal and professional life of the victim. Moreover, it is more prevalent in individuals with low socioeconomic status and also in female as compared to men. And depression has also been found to be associated with a substantial economic burden for the victim and their families, especially for the poor people who don't have many income resources. The major component of this economic burden was health care services used by the depressed individual; also, the loss of income contributes to the increase of that economic burden. There is need of public health efforts to spread awareness about the disease and its adverse economic and health consequences and also provide early treatment, detection, and prevention of depression. Without specific investment for better mental health status, the burden associated with it will never be reduced.

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