Iran. Econ. Rev. Vol. 23, No. 3, 2019. pp. 533-559

The Poverty and Mental Health Association in Iran

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Received: March 27, 2018 Accepted: May 21, 2018

Abstract

This study investigates the impact of poverty, which is the direct effect of recent economic changes, on Iranians mental health to shed more light on the poverty and mental health nexus in developing countries. For the purpose of this study, we examine the existence of a possible association between poverty and mental health in urban districts of Iran by applying a double hurdle approach for the period of 2012-2014. We split our sample into 12 age cohorts: 21-25 … 76-80 within 4 major age groups: 21-30, 31-40, 41-60, and 61-80. The results show that there is a negative relationship between poverty and mental health for all gender and age groups. Our analysis indicates that the impact of poverty on female's mental status is greater early in life but males mental health suffer from poverty at mid-life and end of life. We conclude that the economic burdens against Iranians, which has changed their poverty status, have also exacerbated their mental health status.

Keywords: Poverty, Mental Health, Double Hurdle.
JEL Classification: D11, I32, C25.

1. Introduction

During the last decade, the burden of mental disorders has increased approximately 40 percent in average (IHME[3], 2013). Rai et al. (2013) has shown that about 6-7 percent of population in developing countries have mental disorders.

Mental health in Iran is one of the most important public health issues that have been emphasized recently. Ministry of Health and Medical Education (MOHME) of Iran to take action in May 2014

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approved Iranian Health Evolution Plan. One of the most highlighted targets at this program was mental health status. Mohamadnejad and Ahmadi (2015) show that 6.63 and 6.1 percent of Iranian men and women are suffering from mental disorders. Another study administrated by MOHME shows that 23.3% of 15 to 64 year-old population of Iran suffers at least from one of the various mental disorders and almost 8.2% and 5.26% of Iranian males and females have experienced mental disorders respectively, which is mostly in the form of anxiety (Rahimi Moagar et al., 2010). According to the National Mental Health Survey (NMHS, 2010), 65.3% of Iranians who suffer from any kind of mental disorders have not gotten any psychiatry help (Rahimi Moagar et al., 2010). The results of another project done by World Health Organization (WHO) show that only 15-25% of diagnosed cases receive proper treatment (WHO, 2004).

Sanctions against Iran's nuclear activities and the 2010 subsidy reform have worsened Iranian household's economic situation. Thereafter Iran's GDP decreased by 20 percent, contributed to an unemployment rate of 10.3 percent, and cost $160 billion in lost oil revenue alone. Inflation increased by 40 percent. The unemployment rate might be as high as 20 percent. Economic mismanagement under former President Mahmoud Ahmadinejad, and more recently, falling oil prices also exacerbated the economic condition (Dizaji et al., 2016; Dizaji, 2018). Yet, based on available income distribution statistics, inequality has remained relatively high in the country. The latest Human Development Report (UNDP, 2015) gives a figure of 33.6 (on the scale of 0 to 100) for Iran's average Gini coefficient between 2005 and 2013—ranking it 46th among 142 countries (Dizaji, 2016). Over 70 percent of Iranians still live in poor conditions, while 30 percent were classified as absolute poor at the end of 2016.

Poverty and mental health could be associated with one another. There are some hypotheses that declare mental disorders could be higher among the poor. The social causation hypothesis indicates that poverty conditions, such as stress, may lead to mental disorders (Johnson et al., 1999; Miech et al., 1999), or it may lower the likelihood of getting proper treatment (WHO, 2001). Social drift or social selection hypothesis claims that the causation may run the other way, so people who are living with mental illness might drift into

poverty conditions such as increased health care expenditures, reduced income or lost employment (Bartel and Taubman, 1986; Dohrenwend et al., 1992; Saraceno et al., 2005; Miranda and Patel, 2005). Hanandita and Tampubolon (2014) find bidirectional causality between poverty and mental health.

Increasing burden of mental disorders need to be centered. WHO (2012) report shows that mental illness could reduce individuals' ability to function and often lead to suicide and disabilities. From the economic perspective, mental disorder imposes economic costs through productivity (Bir and Frank, 2001) and income loose (Lund et al., 2013) on society, so the debate is also quite important in this regard.

The correlation between poverty and mental health could be debated in a competent perspective; middle-income individuals with mild mental disorders could access proper treatments in high-income countries but the poor in middle or lower income countries would not access those treatments. This different level of access to treatment could lead to a correlation between poverty and mental status. The negative association between poverty and mental health has mostly been addressed in developed and high-income countries (Saraceno and Barbui, 1997; Saraceno et al., 2005; Hanandita and Tampubolon, 2014a, b; Lund, 2014; Purtell and Gershoff 2016) but there is not enough evidence from developing countries.

Das et al. (2007) argue that the association may be weaker in developing countries due to the more flexible nature of employment in informal sector, but if mental disorders make it difficult to work during working hours, it would be expected that decreased income related to less working hours would lead to higher correlation between poverty and mental health. By measuring poverty via per capita household expenditure and controlling for physical health in their samples, they find a weak and positive relationship between low consumption and mental disorder in Bosnia and Mexico but they could not find any significant relationship for India and Indonesia. Therefore, they conclude there is not particular association between mental health and poverty in developing countries.

Purtell and Gershoff (2016) provide a preview of the association between mental disorders and poverty. They argue that the risk of

mental illness in form of anxiety, depression and substance abuse is higher for the people who have experienced the consumption poverty. Their study emphasizes on the critical role of stress and the role of mental disorders in employment and income. Hanandita and Tampubolon (2014) using precipitation anomaly in two climatological seasons across 440 districts in Indonesia, show that income distribution could have a significant influence on mental health. Their findings imply that more equitable economic policy can enhance individual's mental health.

The relationship between poor mental health and social behaviors is also highlighted in the literature. Roux and Mair (2010), Sampson and Morenoff (2005) and Sampson and Raudenbush (1999) clearly link social behaviors to suicide, smoking, anxiety, and numerous other illnesses. They emphasize that poor economic condition could lead to undesirable social behaviors such as various crimes, which are mainly caused due to the mental disorders.

Sampson (2008) articulates an important conceptual framework for understanding the mechanisms by which neighborhoods and social condition effect individuals (Sampson, 2008). First, he considers the socio-economic conditions as the situational context of family and individual life. Second, he emphasizes on early life socio-economic conditions which shapes their long-term behavior and health throughout their neighborhood, social or economic stability (Sampson, 2008).

In Iran, we expect the association between mental disorders, poverty and crime to be stronger because of the recent stagflation and the dominant role of government in economy and its strong reliance on oil revenues. The economic performance in Iran has been under the heavy influence of oil exports and direct government expenditures derived from oil revenues. Oil revenues are the main source of financing government expenditures and its huge amount of subsidies on energy and comestible goods (Dizaji and Bergeijk, 2013; Dizaji, 2014; Dizaji, 2019). A negative relationship between natural resource rents and income inequality and poverty has also been highlighted in the literature (e.g., Leamer, et al., 1999; Torvik, 2002; Gylfason and Zoega, 2003; Ross, 2007; Goderis and Malone, 2009; Fum and Hodler, 2009; Dizaji, 2016).

According to theoretical framework and contradicting empirical evidence on the relationship between consumption poverty and mental health especially in the developing countries, this paper tries to establish this association in urban areas of Iran using Iranian Household Budget Survey (IHBS) micro dataset. Mixed results may arise from methodological biases, lack of the other important socio-economic variables in the mental health models and the bias related to self-reported mental health surveys; so this paper tries to apply a different approach to study this association.[1]To fulfill our purpose, mental health index is made as a binary variable and double hurdle approach is applied to clarify the association between poverty and mental health in urban districts of Iran. Moreover, in order to avoid the miss-specification problems we take other important socio-economic variables such as income level, employment, marital and education statues and so on into account.

2. Poverty and Crime in Iran

Experts have debated the philosophical foundations of poverty but it is a different matter to apply philosophies to data and implement concepts. The world of poverty measurement in practice is complex2. With a food poverty line in hand, we use inverse Engel coefficient to measure Iranians' poverty status. The ratio of food consumption to total expenditures gives Engel coefficient. Once the appropriate Engel coefficient obtained, the overall poverty line could be attained by multiplying the food poverty line by the inverse of the Engel coefficient (Ravallion and Bidani, 1994).

Applying the CPI[3] to update prices for food basket and using in hand dataset, the inverse Engel coefficients for 2012, 2013 and 2014

1. It is worth mentioning that choosing this approach is partly because of the lack of information about Iranians' mental health status.
2. There are many indicators of poverty, which they could be categorized in two major groups: monetary and non-monetary indicators. Health and nutrition poverty, education poverty and composite indexes of wealth are non-monetary indicators. The monetary indicators mostly are based on income and consumption (Coudouel et al., 1997). This study focuses on consumption poverty because: 1-There are some in-efficiencies with income poverty measurement, which are widely discussed in Coudouel et al., 1997. 2-Information about nutrition, wealth and other non-monetary indicators are not available at IHBS. Therefore, potentially it is not possible to debate on other poverty indicators.
3. consumer price index

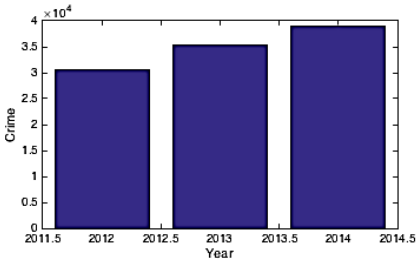
are calculated. Table 1 shows the percentage of poor people among their age groups. The last row shows the weighted mean of each column. The age-specific trend we see throughout table 1 implies the increasing poverty among Iranians during 2012- 2014.

Table 1: The Percentage of Poor Individuals in Iran's Urban Districts for Different Age Groups

Age cohort	2012%	2013%	2014%
<25	78	79	87
25-35	79	81	87
35-45	79	82	86
45-55	75	79.5	82
>55	75	80	84
Total	77.6	80.3	85.4

Source: Authors' calculation.
Note: The numbers represent the percentage of poor individuals for each age group.

We also depict crime and suicide status as a proxy for bad social behavior in figure 1. Figure 1a shows the number of criminals who were captured by the law during the representative year and figure 1b illustrates the number of suicide attempts, which were occurred in 2012, 2013 and 2014. According to Sampson (2008), bad social behaviors such as suicide or various criminal activities are the consequence of society's socio-economic status. In Iran, suicide is an act of crime. According to figure 1, crime had been increased during 2012-2014.



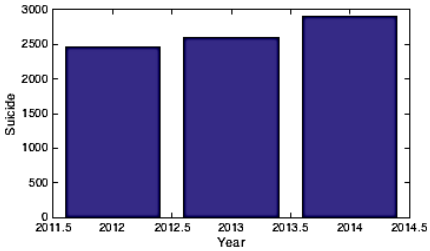


Figure 1a: Number of Criminals Captured by the Law
Figure 1b: Number of Individuals Who Commit
Source: Statistical Center of Iran

3. Data and Variables

This study uses IHBS data to measure the association between Iranians' mental health and poverty status. IHBS is a multi-purpose longitudinal household survey that has been gathering household's socio-demographic and economic information since 1984. The data have been collected by interviewing and respondents are informed about the very importance of gathered information. This survey conducts in rural and urban areas of Iran. The publicity of the data has been informed and can be accessed by the website of Statistical Center of Iran (SCI).[1] The sample, which is used at this study, includes 67786 individuals that gathered information for 2304 of them was not available from some aspects. This study focuses on 2012, 2013 and 2014 waves and uses data from urban areas. Table 2 presents sample characteristics of the variables.

In addition to the poverty, many studies have documented the impact of other factors affecting individual's mental health. According to the literature, marital status (Afifi et al., 2006), gender (Das et al., 2007, 2009; Noorbala et al., 2004; Patel et al., 1999), employment status (Mumford et al., 2000; 1997; 1996), income (Wade and Pevalin, 2004) and education (Bromet et al., 2011) are the most common factors affecting the mental health at the individual level.

Age is a continuous variable and it takes values between 21 and 80. Gender is treated as a binary variable (1: male; 0: female). Marital status is also considered as a binary variable (1: married; 0: widowed, divorced and never married). The variable which represents education, takes the values 1, 2 and 3 which refer to secondary school or less, high school, and college or higher, respectively. A dummy variable is also defined to describe poverty status. We use inverse Engel coefficient to measure Iranians' poverty status (1: individuals who their Engel coefficients are less than the mean of Engel coefficients described in table 1; 0: otherwise)

In this study, individual's expenditure on visiting a psychologist or psychotherapist is used to construct the dependent variable (mental health status). IHBS does not provide information on individual's mental status; therefore, we made this variable according to

1. http://www.amar.org.ir

expenditure on these kinds of treatments. This variable takes 1 if the reference individual's treatment expenditure is not zero and it takes zero otherwise. It should be noted that all expenditures are expressed in real terms by deflating current values using the CPI.

Table 2: Sample Characteristics and Bivariate Analysis

Variable	Mean (SD) or %	Correlation with Mental status	Missing%
Mental status:			0.02
Mentally ill (=1)	0.249%		
Healthy(=0)	99.7%		
Age	43.31(12)	-30.149***	0.03
Gender:		98.482***	0.03
Male (=1)	91.74%		
Female (=0)	8.23%		
Marital status:		-32.788***	17.67
Married (=1)	50.95%		
Divorced(=0)	0.8%		
Widowed(=0)	3.54%		
Never married(=0)	29.04%		
Education:		-3.247***	1.52
Secondary school or less(=1)	48.50%		
High School(=2)	35.48%		
College or more(=3)	16%		
Household characteristics:		-5.683***	0.03
Home owner (=1)	71.5%		
Individual's exp	3330557(2568733)	-17.686***	0.012
Observation	67786		

Source: Authors' calculation *** p<0.01, ** p<0.05, * p<0.1

4. Statistical Method and Empirical Results

In our context, the problem is that all observed zero expenditures on mental disorder treatments doesn't refer to the healthy people, because it is possible that they just weren't aware of their mental illness or they simply didn't want to accept their bad mental status, also it is

possible that the individual couldn't afford treatment expenditures. Since it is implausible that all zero observations arise from standard corner solution, we have to model these zeroes to gain a more efficient estimation of coefficients. To deal with this problem, the Double Hurdle (DH) approach is applied.

The presence of zero expenditure in the dependent variable poses difficulties when we analyze micro-data. Least squares estimation of coefficients would be biased, because the estimated regression line simply fits the scattered points and does not take into account the fact that the data is censored. The bias would be especially severe when the dependent variable is zero for a substantial proportion of the population. There are mostly two reasons given in the literature for zero observations (see Newman et al, 2003); corner solutions and non-participation in the market. Corner solutions specify that a household chooses not to purchase a product at the given price and income. Non-participation in the market occurs if a household chooses not to purchase a product due to reasons that are independent of prices and income.

In the DH model, some zeros refer to abstention, some others refer to corner solution, and this study aims to distinguish between these zeros. To fulfill the purpose of this study, we try to apply the DH approach which proposed by Cragg (1971) to separate these hurdles. Yen and Jones (1996) have emphasized on the inaccuracy of Tobit model that was proposed by Tobin (1958). According to Yen and Jones (1996), Tobit model cannot account for differences between zero observations. In the context of mental health (as we proposed), the first hurdle involves the decision of whether or not to visit a psychologist or psychotherapist (participation decision). It is completely rational to assume that the choice of visiting a physician is not only an economic issue but also a socio-demographic decision, which is independent of the quantity consumed. The second hurdle is related to the amount of expenditure spent on treatment (this is called the consumption decision).

Following Jones (1989), DH model can be written as the following structure:

Observed consumption:

$$y_i = d.y_i^{**} \quad (1)$$

Participation equation:

$$w_i = z_i'\alpha + u_i \quad ;u_i \sim N(0,1) \quad ;\mathrm{d} = \begin{cases} 1 & \text{if } \mathrm{w} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

Consumption or expenditure equation:

$$y_i^* = x_i' + \upsilon_i \;\; ;\upsilon_i \sim N(0,\sigma^2) \;\; ;\mathrm{d} = \begin{cases} y_i^{**} & \mathrm{y_i^*ify_i^*} > 0 \\ u_i \\ v_i \end{cases} \sim N\left[\begin{pmatrix}0\\0\end{pmatrix},\begin{pmatrix}1 & \rho\sigma \\ \rho\sigma & \sigma^2\end{pmatrix}\right] \quad 0 \text{ otherwise}$$

$$\begin{matrix} u_i \\ v_i \end{matrix} \sim N\left[\begin{pmatrix}0\\0\end{pmatrix},\begin{pmatrix}1 & \rho\sigma \\ \rho\sigma & \sigma^2\end{pmatrix}\right] \tag{3}$$

where $\mathrm{w_i}$is a latent endogenous variable representing an individual's participation decision, $\mathrm{y_i^*}$ is an endogenous latent variable representing an individual's expenditure decision, yi is the observed dependent variable (treatment expenditures), zi is a set of individual characteristics explaining the participation decision, xi contains variables explaining the expenditure decision and, ui and vi are independent, homoscedastic and normally distributed error terms and $\mathrm{y_i^{**}}$ represents the real expenditures spent on the subject of interest (in our case, treatment expenditures).

We estimate parameters by maximizing the following likelihood function:

$$L\left(\boldsymbol{\alpha},\boldsymbol{\beta},\sigma_{12},\sigma_2^2 \mid y_i^*,\mathrm{w}_i,\mathbf{x}_i,\mathbf{z}_i,d_i\right) = \prod_0 \left\{\left[1-\Phi\left(\mathbf{z}_i'\boldsymbol{\alpha}\right)\right] + \Phi\left(\mathbf{z}_i'\boldsymbol{\alpha}\right)\left[1-\Phi\left(\mathbf{x}_i'\boldsymbol{\beta}\right)\right]\right\}$$
$$\times \prod_+ \Phi\left(\mathbf{z}_i'\boldsymbol{\alpha}\right)\Phi\left(\mathbf{x}_i'\boldsymbol{\beta} \mid d=1\right) f\left(y_i^* \mid d=1, y_i^* > 0\right) \tag{4}$$

Where $\prod_0[.]$ denotes zero expenditure and $\prod_+[.]$ denotes positive expenditure; Φ denotes the standard normal cumulative distribution function (CDF); $\Phi(z_i'\alpha)$ is the probability of participation, therefore $[1-\Phi(z_i'\alpha)]$ is the probability of non-participation. $\Phi(x_i'\beta)$ is the probability of consumption therefore $\Phi(z_i'\alpha)[1-\Phi(x_i'\beta)]$ is the probability of participation with no consumption (zero expenditure) and the last term (($\emptyset(x_i'\beta|d=1).f(y_i^*|d=1,y_i^*>0)$) is the probability of participation and non-zero consumption (expenditure).

5. Results

Due to the age and gender differences, we specify 12 age cohorts. The first and twelfth age cohorts contain 21-25 and 76-80 years old individuals, respectively. As it is mentioned, the correlation between error terms is an important assumption. Highly significant σ at all age cohorts (table 3) indicates the lack of correlation problem among the error terms.

Discrete random preference theory (Pudney, 1989) emphasizes on different specifications to the first and second hurdles. According to the literature, the first hurdle is supposed to contain non-economic factors and the second one contains all factors, which are affecting individual's consumption behavior (Newman et al., 2003). Results are reported in table 3.

Results from the DH model show that all coefficients in all gender and age groups are statistically significant. We use marginal effects to present our results. It should be noted that in the linear regression model, the marginal effect equals the relevant slope coefficient, so the marginal effects are not reported.

According to the definition of the "mental health status" variable in table 1, positive coefficient of the "poverty" variable indicates the inverse association between mental health and poverty status; as the same way, negative coefficients imply positive relationship between independent variables and mental health.

6. Discussion

According to the literature review, results of empirical studies considering the relationship between poverty and mental health are complicated. Some studies strongly support the existence of a powerful relationship between mental health and poverty (Lund et al., 2010) and some others find no relationship between them (Das et al., 2007; 2009). This inconsistency among the previous studies could be attributed to some extent to the weaknesses of the methodologies applied to investigate this relationship. The possibility of taking zero amounts for mental health status, as our dependent variable, raises a couple of important problems, which cannot be addressed by using OLS or standard Tobit models.

Table 3a: Double Hurdle Estimation; Female 21-30 & 31-40

Variables	female 21-30		female 31-40	
	participation	consumption	participation	consumption
poverty	0.1302***		0.13101***	
	(0.14)		(0.13)	
Income	-0.1967***		-0.1082***	
	(0.08)		(0.08)	
Employed	-0.3600***	-0.309***	-0.2546***	-0.208***
	(0.43)	(0.02)	(0.46)	(0.02)
Homeowner	-0.7404***	-0.368***	-0.12185***	-0.478***
	(0.30)	(0.01)	(0.35)	(0.01)
marital	-0.2449***	-0.1451***	-0.29622***	-0.1431***
	(0.61)	(0.03)	(0.56)	(0.02)
EduLevel	-0.1490***	-0.119***	-0.2254***	-0.130***
	(0.05)	(0.00)	(0.06)	(0.00)
1.AgeCohort	-2.441***	-0.201***		
	(0.42)	(0.01)		
2.AgeCohort	-1.880***	-0.200***		
	(0.54)	(0.02)		
3.AgeCohort			-3.571***	-0.220***
			(0.45)	(0.01)
4.AgeCohort			-4.571***	-0.249***
			(0.64)	(0.02)
Year2012	-23.793***	-0.752***	-20.480***	-0.676***
	(0.64)	(0.03)	(0.68)	(0.03)
Year2013	-22.921***	-0.733***	-30.957***	-0.928***
	(0.67)	(0.03)	(0.69)	(0.03)
Constant	76.344***	3.094***		
	(1.72)	(0.04)		
Sigma	25.942***	28.793***		
	(0.25)	(0.23)		
Observations	387		879	

Source: Authors calculation

Standard errors in parentheses-*** p<0.01, ** p<0.05, * p<0.1

Table 3b: Double Hurdle Estimation; Female 41-60 & 61-80

Variables	female 41-60		female 61-80	
	participation	consumption	participation	consumption
poverty	0.1219***		0.11562***	
	(0.18)		(0.20)	
Income	-0.1937***		-0.1534***	
	(0.11)		(0.13)	
Employed	0.2036***	0.010	0.1205*	0.072***
	(0.70)	(0.02)	(0.69)	(0.02)
Homeowner	-0.5331***	-0.227***	-0.11868***	-0.411***
	(0.57)	(0.02)	(0.67)	(0.02)
marital	-0.3447***	-0.1507***	-0.39753***	-0.1739***
	(0.66)	(0.02)	(0.82)	(0.03)
EduLevel	-0.3523***	-0.163***	-0.3371***	-0.163***
	(0.09)	(0.00)	(0.11)	(0.00)
5.AgeCohort	-8.359***	-0.287***		
	(0.51)	(0.01)		
6.AgeCohort	-33.664***	-1.007***		
	(0.75)	(0.03)		
7.AgeCohort	-17.686***	-0.560***		
	(0.56)	(0.02)		
8.AgeCohort	-12.107***	-0.435***		
	(0.64)	(0.02)		
9.AgeCohort			-10.277***	-0.247***
			(0.38)	(0.01)
10.AgeCohort			-11.776***	-0.403***
			(0.73)	(0.02)
11.AgeCohort			-27.442***	-0.780***
			(0.63)	(0.02)
12.AgeCohort			-3.714***	-0.129***
			(0.42)	(0.01)
Year2012	-9.906***	-0.335***	-4.087***	-0.103***
	(0.67)	(0.02)	(0.77)	(0.02)
Year2013	-27.450***	-0.664***	-28.367***	-0.633***

Variables	female 41-60		female 61-80	
	participation	consumption	participation	consumption
	(0.90)	(0.03)	(1.13)	(0.04)
Constant	-7.526**	-0.485***	-3.808	-0.335***
	(3.79)	(0.06)	(5.16)	(0.09)
Sigma	32.008*** (0.29)	30.993*** (0.40)		
Observations	1634		461	

Source: Authors calculation

Standard errors in parentheses-*** p<0.01, ** p<0.05, * p<0.1

Table 3c: Double Hurdle Estimation; Male 21-30 & 31-40

Variables	male 21-30		male 31-40	
	participation	consumption	participation	consumption
poverty	0.1258***		0.12295***	
	(0.17)		(0.18)	
Income	-0.1225***		-0.3105***	
	(0.11)		(0.12)	
Employed	-0.597	-0.076***	-0.5538***	-0.234***
	(0.68)	(0.02)	(0.80)	(0.02)
Homeowner	-0.5683***	-0.243***	-0.4257***	-0.203***
	(0.58)	(0.02)	(0.63)	(0.02)
marital	-0.3279***	-0.1459***	-0.30254***	-0.1372***
	(0.65)	(0.02)	(0.73)	(0.02)
EduLevel	-0.3247***	-0.155***	-0.3407***	-0.156***
	(0.10)	(0.00)	(0.10)	(0.00)
1. AgeCohort	-8.618***	-0.300***		
	(0.52)	(0.01)		
2. AgeCohort	-30.149***	-0.859***		
	(0.66)	(0.02)		
3.AgeCohort			-12.107***	-0.435***
			(0.64)	(0.02)
4. AgeCohort			-8.328***	-0.280***
			(0.51)	(0.01)
Year2012	-8.935***	-0.289***	-7.962***	-0.267***

Variables	male 21-30		male 31-40	
	participation	consumption	participation	consumption
	(0.69)	(0.02)	(0.72)	(0.02)
Year2013	-29.969***	-0.763***	-30.388***	-0.743***
	(0.90)	(0.03)	(0.99)	(0.03)
Constant	13.067***	0.162***	5.783	0.559***
	(3.56)	(0.06)	(4.37)	(0.07)
Sigma	32.281*** (0.29)	31.710*** (0.32)		
Observations	9141		21517	

Source: Authors calculation

Standard errors in parentheses-*** p<0.01, ** p<0.05, * p<0.1

Table 3d: Double Hurdle Estimation; Male 41-60 & 61-80

Variables	male 41-60		male 61-80	
	participation	consumption	participation	consumption
poverty	0.1268***		0.13158***	
	(0.16)		(0.13)	
Income	-0.2717***		-0.1397***	
	(0.10)		(0.08)	
Employed	-0.9650***	-0.468***	-3.958***	-0.247***
	(0.49)	(0.02)	(0.46)	(0.02)
Homeowner	-0.9139***	-0.360***	-0.12050***	-0.476***
	(0.38)	(0.01)	(0.35)	(0.01)
marital	-0.1774***	-0.960***	-029820***	-0.1425***
	(0.70)	(0.02)	(0.57)	(0.03)
EduLevel	-0.2767***	-0.143***	-0.2320***	-0.132***
	(0.07)	(0.00)	(0.06)	(0.00)
5. AgeCohort	-2.893***	0.177***		
	(0.42)	(0.01)		
6. AgeCohort	-4.614***	-0.042***		
	(0.39)	(0.01)		
7.AgeCohort	-3.714***	-0.129***		
	(0.42)	(0.01)		
8. AgeCohort	-15.583***	-0.549***		

Variables	male 41-60		male 61-80	
	participation	consumption	participation	consumption
	(0.63)	(0.03)		
9. AgeCohort			-21.819***	-0.681***
			(0.63)	(0.02)
10.AgeCohort			-24.799***	-0.678***
			(0.75)	(0.03)
11. AgeCohort			-10.277***	-0.247***
			(0.38)	(0.01)
12. AgeCohort			-20.480***	-0.676***
			(0.68)	(0.03)
Year2012	-8.759***	-0.292***	-7.023***	-0.188***
	(0.47)	(0.01)	(0.46)	(0.01)
Year2013	-24.201***	-0.739***	-19.998***	-0.654***
	(0.76)	(0.03)	(0.67)	(0.03)
Constant	-8.433***	-0.521***	-97.771***	-2.997***
	(2.32)	(0.04)	(4.27)	(0.17)
Sigma	27.944***	28.818***		
	(0.28)	(0.23)		
Observations	27068	5365		

Source: Authors calculation

Standard errors in parentheses-*** p<0.01, ** p<0.05, * p<0.1

The problem is that zero expenditure on mental disorder treatments can also be due to lack of awareness about the mental status or simply because of mental illness denial by the ill person. To deal with this problem, we applied a Double Hurdle (DH) model. According to Table 3 our results show that poverty and mental health are inversely associated and this negative relationship is highly significant at all age cohorts and both genders, but there are considerable differences at specified gender and age cohorts.

Our analysis, by comparing the marginal effects of various factors on Iranians' mental health status, shows that poverty affect female's and male's mental status is almost similar and gender specification doesn't change the magnitude of the effect. This is mostly because of the sample we used at this study. According to table 2, almost 92

percent of our sample consist of men and the correlation between gender and mental health status is high (98 percent), thus gender specification does not affect our results. However, if we take the 1 percent difference between the marginal effects of poverty on mental health status, we could conclude that the marginal effect of poverty on females' mental status is higher early in life, but this association is inverse for male. The reason why men mostly suffer poverty at mid-life and the end of life period is related to their social position in Iran. Breadwinners in Iran are mostly men and the load of household's livelihood is on men, so the severity of poverty status affection on the health status of an Iranian male is higher early in life.

The second factor is the reference individual's net income during the last 12 months. Turning to economic variables, income has a positive effect on Iranians mental health status. This finding, for example, is in line with Lund et al. (2013). Coefficients vary across both genders and age cohorts but there is no special order through genders and age cohorts. The affection of income on the health status of Iranian male is higher early in life, decreases until 40 and increases again during 41-60 and decreases during the end of life period. It is important to have proper income early in life for an Iranian male because, they mostly are breadwinners and household's livelihood is their burden to carry. The importance of the effect of income on male's mental status during 41-60 is because of the retirement luggage. It is obvious from table 3 that the effect of income on a representative Iranian female's mental health is greater at mid-life. The reason is that they, alongside with men, are seeking for a peaceful life after retirement.

One of the most important factors affecting mental health is employment status. This factor could influence mental status in different ways. Employment could have both positive and negative effects on mental health and well-being (Lazarus and Folkman, 1984; Edwards and Cooper, 1988; Payne, 1999; Briner, 2000; Adisesh, 2003; Nelson and Simmons, 2003). There is a consensus that work is vital in promoting mental health and recovery from mental disorders and the job loss is detrimental (Thomas et al., 2002; Seymour and Grove, 2005). Harnois and Gabriel (2000) declare that workplace environment could have a significant effect on individual's mental status, so unpleasant environments inversely affect mental health.

Salovey et al. (2000) state that negative emotions influence social relationships and then mental health negatively. Cox et al. (2000) and Briner (2000) define work related stress as a negative psychological state. Warr (1987) and Hammarström (1994) indicate that middle working age could have negative effect on mental health if working hours were greater than 12. Tuomi et al. (1997); Shephard (1999); Ilmarinen (2001); Benjamin and Wilson (2005) show that physical and mental capability declines with age but Hansson et al. (1997); Wegman (1999); Shephard (1999); Kilbom (1999); Ilmarinen (2001) indicate that work should accommodate the needs of aging people. Finally Rick and Briner (2000) declare at least in certain thresholds work could have negative impact on mental health.

Reported results in table 3 support positive and negative influence of employment status on mental health. The estimated marginal effect of employment status on the reference female's health status is positive and significant at all age groups but 21-40 years old females (in line with Thomas et al., 2002; Seymour and Grove, 2005). As the reference female grows older, the influence of employment status on her mental health decreases. The reason is that in Iran, breadwinners are mostly men and females almost do not have such economic burden (unless they were household's head), so Iranian men have to work even after retirement to cover the current expenditures, therefore the impact of employment is higher for men at mid-life. Employment impact on middle age and aged women is negative (in line with Benjamin and Wilson 2005) which it is the result of the household's financial load, which is mostly on men. This part of results is in line with Hansson et al. (1997); Wegman (1999); Shephard (1999); Kilbom (1999); Ilmarinen (2001).

Home ownership is a proxy for the household's wealth. Results show that home ownership status is more important to males and females early in life rather than the end of life. Early in life, men don't have enough wealth to own their dwelling house while, formation of their own family and household's livelihood is their burden to carry, therefore home ownership which is standing for wealth, is important to males than females early in life. Home ownership status becomes more important during the period before retirement. It can be referred to the end of life calmness which both males and females desire.

According to Afifi et al. (2006), Bromet et al. (2011), and Wade and Pevalin (2004), married individuals compared to non-married (divorced, separated, never married and widowed) ones have better mental status. This is also confirmed through our estimations. These results are in line with Shephard (1999) and Kilbom (1999). In our study, the last factor affecting mental status is education level. Results show that educated women (men) have less mental disorders and marginal effect of education is higher (lower) for older men (younger women) compared to their younger (older) counterparts.

7. Conclusion

This study has investigated whether the increased level of poverty in Iran (due to the recent economic changes caused by sanctions and energy price reform) influence Iranians mental health status or not. To fulfill this purpose, we used IHBS micro-dataset and applied double-hurdle approach. Our results show that poverty has negative impacts on Iranian's mental health and this finding remains robust through different age cohorts and gender groups. In addition, the results confirm the positive impacts of education, income and marriage on Iranians mental health. These findings largely agree among the different age and gender groups.

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