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## Original Article

# Decomposing of Socioeconomic Inequality in Mental Health: A Cross-Sectional Study into Female-Headed Households

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### ABSTRACT

**Background:** Connection between socioeconomic status and mental health has been reported already. Accordingly, mental health asymmetrically is distributed in society; therefore, people with disadvantaged condition suffer from inconsistent burden of mental disorders. In this study, we aimed to understand the determinants of socioeconomic inequality of mental health in the female-headed households and decomposed contributions of socioeconomic determinants in mental health.

**Methods:** In this cross-sectional study, 787 female-headed households were enrolled using systematic random sampling in 2014. Data were taken from the household assets survey and a self-administered 28 item General Health Questionnaire (GHQ-28) as a screening tool for detection of possible cases of mental disorders. Inequality was measured by concentration index (CI) and as decomposing contribution in inequality. All analyses were performed by standard statistical software Stata 11.2.

**Results:** The overall CI for mental health in the female-headed households was -0.049 (95% CI: -0.072, 0.025). The highly positive contributors for inequality in mental health in the female-headed households were age (34%) and poor household economic status (22%).

**Conclusions:** Socioeconomic inequalities exist in mental health into female-headed households and mental health problems more prevalent in women with lower socioeconomic status.

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## Introduction

Mental health is essential part of human health; undoubtedly, without mental health there is no health for all age groups<sup>1</sup>. Therefore, it has the greatest impact on qualities of people and community. Besides, better mental health is related with quality of life, physical health, efficiency, social structure, and wellbeing<sup>2</sup>. From the past, any reduction in mental health was considered as significant public health worries that lead to stimulates of preventative strategies<sup>3</sup>. Depression and bipolar disorder are considered as outcomes of psychological distress or mental health<sup>4</sup>.

Connection between socioeconomic statuses and quality of mental health and psychological distress is reported<sup>5</sup>. Mental health is asymmetrically distributed in the society; therefore, people with disadvantaged condition suffer from an inconsistent burden adverse consequences and mental disorders<sup>6</sup>. Biological, psychological, and social determinants are the components of mental health in multi factorial theory that may sometimes combine and interact together to impact the mental health<sup>7</sup>. In multi factorial theory, social determinants encompass a great part of the asymmetrical distribution of mental disorders among countries<sup>8</sup>. Job status, income and educational level are the common predictors used

to calculate socioeconomic status in relation to mental health<sup>9</sup>. Besides, marital status and migration are the important resources to estimate socioeconomic status in adolescents<sup>10</sup>.

Mental health was integrated in Primary Health Care in Iran from 1989 for accessibility of mental health care on a national scale and is currently one of the most successful models in the world<sup>11</sup>. The coverage rate in rural and urban area was 82.8% and 21.7%, respectively, which displays this integration has been much more perfect in rural areas compared to urban areas<sup>11</sup>. Additionally, current report in this context show mental disorders have been among the summit of causes of disabling disorders in Iran and trend of this process is increasing. In Iran, the prevalence of mental disorders was 22%, which was slightly worse in woman<sup>12</sup>. Previous descriptive studies that conducted for high-risk groups such as the elderly people, divorced and widowed women, unemployment and lower education people have shown higher rates of mental disorders in these groups<sup>13</sup>.

Female-headed households have many physical and mental health problems according to psychological research because they experience more stress and anxiety compared to the general population<sup>14</sup>. The rates of mental disorders in

female-headed households compared with other women in general population are higher<sup>15, 16</sup>. In Tehran, 22% of female-headed households had a good general health<sup>17</sup>. Only 20% of female-headed households had a good quality of life<sup>18</sup>.

Calculating of socioeconomic inequality in health outcomes has been common in the world, particularly in developed countries. Socioeconomic inequalities in mental health are avoidable, and their reduction can be an achievable goal for coming decades but we should provide the necessary knowledge about it. Between indexes for evaluating inequalities in health, Concentration Index (CI) is a one common measure. Inequalities can be decomposed into its determinants to calculating share of contribution to the inequality.

In this study, we aimed to examine possible associations between socioeconomic inequality and mental health in the female-headed households and hope to provide the decomposed contributions of socioeconomic determinants in mental health.

## Methods

In this cross-sectional study, 787 female-headed households were enrolled in 2014, using systematic random sampling among 4273 female-headed households under cover Welfare Organization of Ilam Province, Ilam, Iran. Sampling was undertaken using simple random sampling. We classified at first the population of female-headed households into 10 branches for different cities. Then a simple random sample was chosen from each city separately. These simple random samples were combined to form the overall sample; by default 30% ratio for a good health<sup>18</sup>, with precision 4%. The coefficient of effect was 1.5 considered to increase the accuracy of sampling. Eventually the sample size was estimated as 787 people.

Inclusion criteria were the head of the household at the time of completing the questionnaire and consent to participate in the study. In the end of survey, all of missing subjects were 79, so 708 of subjects completed questionnaires (response rate 89.9%).

Data were taken from the household assets survey and a self-administered 28-item General Health Questionnaire (GHQ-28) as a screening tool for detection of possible cases of mental disorders. For all participants according to household assets independent variables such as housing status, marital status, educational level, residence (rural and urban area), job status, and economic status were gathered. Therefore, for creates of socioeconomic status index we reduced the number of variables using principal component analysis (PCA). We conducted PCA in four steps, first we selected asset variables (age, job status, educational level, marital status, home status, residence (rural, urban), economic status (low, middle and well)), in second part we performed the PCA in the software, afterwards we interpreted the results and, eventually we classified the outputs into socioeconomic status.

A standard of GHQ -28 was used to detect mental disorders. Validity and reliability of GHQ -28 has been confirmed in Iran<sup>7</sup>. Likert scoring method was used to determine the best cut-off point. We considered those who scored 24 or above as suspected cases of mental disorder.

Consequently, a binary dependent variable was created. For four subcategories of GHQ- 28 includes somatic symptoms, anxiety and insomnia, social dysfunction and severe depression 7 cut-off point and above was considered to detect of mental disorders. Person to person interview was used to all participants using a standard questionnaire. Questionnaires were completed by experts during the 6 months.

## Analysis

We used the PCA procedure in order to identify variables with greater impact overall variance. Using this procedure, new variables that represent socioeconomic status are identified<sup>19</sup>. Inequality is calculated by measuring the concentration index (CI). It is equal to two times the concentration curve and the line of equality. If there is no inequality in the distribution, CI is zero. When the curve is above of equality line CI is negative and variable is concentrated in those with low socioeconomic status and positive CI reminds more concentration of variable in those with high-grade socioeconomic status. By the mathematical formula, CI can be computed as twice the covariance of the health variable and a person's rank in terms of economic status, divided by the mean of the health variable  $C = \frac{2}{\mu} \text{cov}(Y_i R_i)$  Where  $y_i$  and  $R_i$  are respectively the health status of the  $i$ th individual and the fractional rank of the  $i$ th individual (in terms of the index of household economic status);  $\mu$  is the mean of the health and  $\text{cov}$  denotes the covariance<sup>20</sup>. We used decomposition approach for the decomposing socioeconomic determinants analysis, quintiles 1 and 2 and quintiles 3, 4, and 5 were grouped together. This created a binary low socioeconomic status variable included socioeconomic in the bottom 40% of this approach allows one to determine rate of participation variables to inequality. Binary variable illiterate and primary school were grouped to decompose analysis. Age group of <45 years and unemployed women were other binary variables in decomposition analysis. For this approach, we denote total score of socioeconomic status by  $y$  and the set of covariates by  $X = x_1, x_2, \dots, x_k$  linear model using an approach,  $y = \alpha + \sum \beta_k X_k + \epsilon$  were,  $\alpha$  and  $\epsilon$  denote<sup>21</sup> constant and error term, respectively. We can obtain the contribution of each determinant to inequality by multiplying the elasticity of each determinant by its concentration index  $(\beta_k X_k / \mu) C_k$  where  $\mu$  is the mean of  $y$  and  $C_k$  for determinants ( $C_k$ ). This is the absolute contribution of each determinant to the measured inequality. In final step, we calculated percentage contribution of each determinant simply through dividing its absolute contribution by the concentration index of the health variable  $(\beta_k X_k / \mu) C_k / C$ .

## Results

44.9% of the study sample entailed female-headed households upper 45 years; in the hole of the participants only 10.0% were employed; the majority of them allotted to illiterate subgroup (57.2%); Middle household economic status (49.2%) and (56.4%) lived in rural areas (Table 1). Results of PCA showed age, household economic status and educational level had a bigger impact variance; overall 69.6% of whole variance belonged to these variables. Asset index variable was denoted by 9 variables and new variable divided to quintiles (Poorest, Second, Middle, Fourth and Richest)

according to output of PCA factor score that was between - 2.97 and 2.00.

**Table 1:** Mental disorders Prevalence in terms of determinant variables among Female-Headed Households

Determinants	Sample size (%)	Suspected cases	
		Number	Percent
Employment status			
Employed	71 (10.0)	47	66.2
Unemployed	637 (90.0)	499	78.3
Residential area			
Rural	399 (56.4)	316	79.2
Urban	309 (43.6)	230	74.4
Economic status			
Low)	345 (48.7)	258	74.8
Middle	348 (49.2)	276	79.3
High	15 (2.1)	12	80.0
Educational level			
Illiterate	405 (57.2)	321	79.3
Primary school	170 (24.0)	131	77.1
Secondary/High school	67 (9.5)	51	76.1
Diploma	50 (7.1)	33	66.0
Academic	16 (2.3)	10	62.5
Age (yr)			
15-24	22 (3.1)	14	63.6
25-44	280 (39.5)	199	71.1
45-64	208 (29.4)	165	79.3
≥65	198 (28.0)	168	84.8

CI curve is shown in Figure 1; inequality curve displays female-headed households with lower socioeconomic status having more risk for mental disorders. The overall CI for mental health was -0.049 (95% CI: -0.072, 0.025). CI for GHQ-28 subcategories including somatic symptoms, anxiety and insomnia, social dysfunction and severe depression is shown in Table 2. Interoperations of CI assert anxiety, insomnia, and severe depression are more associated to poorest socioeconomic status (Table 2).

**Table 2:** Concentration index for GHQ-28 subscales and total scale in women Female-Headed Households

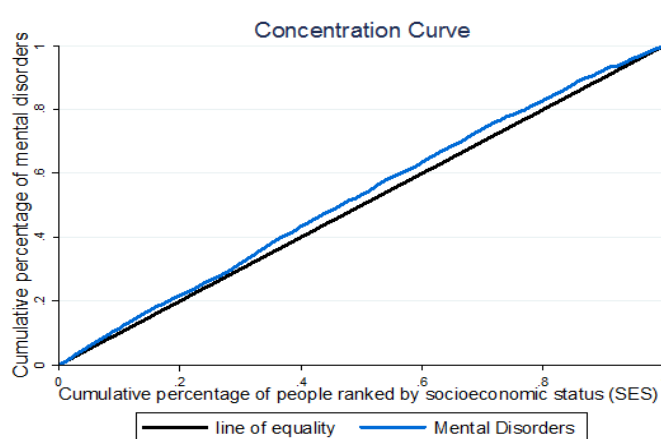
GHQ-28 subscales and total scale	Concentration index	SD	95% CI	
A Somatic symptoms	0.058	0.012	0.033	0.083
B Anxiety and Insomnia	-0.048	0.019	-0.086	-0.010
C Social dysfunction	-0.001	0.006	-0.014	0.011
D Severe depression	-0.045	0.034	-0.114	-0.022
GHQ-28 total scale	-0.049	0.011	-0.072	-0.025

**Table 3:** Decomposition analysis of socio-economic determinants of mental health in women Female-Headed Households

Determinants	Coefficient	t	P value	Contribution	
				Absolute	Relative
Age group (>45 yr)	.9170	4.92	0.001	0.349	0.34
Job (Employed)	.4240	5.72	0.001	0.032	0.03
Residence (Rural areas)	-.0977	-2.55	0.011	0.003	0.02
Marital status (Married)	.3516	8.20	0.001	0.001	0.08
Educational level ( Illiterate, high school)	-.5965	-8.55	0.001	0.022	0.14
Household economic status (Poorest, second poor)	.8312	10.74	0.001	0.035	0.22
Home statues (Rental)	-.2381	-5.81	0.001	0.008	0.05
Residual	-	-	-	0.021	0.12

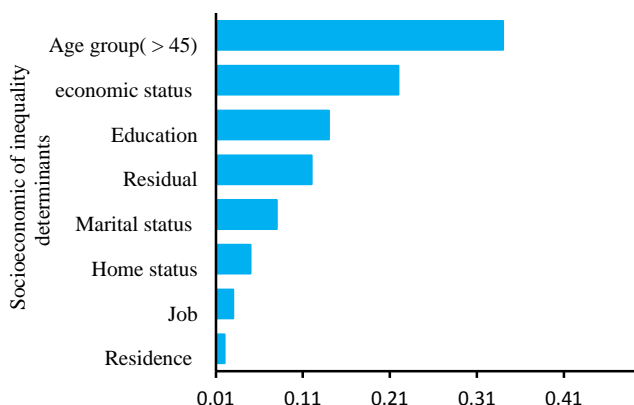
### Discussion

Research in socioeconomic inequalities is very restricted in developing countries due to lack of such analyses. On the other hand, find up roots of socioeconomic inequality in our societies can be vital for policy purposes and information in order to possible interventions<sup>22</sup>. In spite of importance of inequality research in the world, studies in Iran have limited



**Figure 1:** Concentration curve of mental health in women Female-Headed Households

Decomposition approach was used for the decomposing socioeconomic determinants. To this calculation, we created dummy variable for all variables with several categories and following that entered the model. Table 3 shows the percent of contribution to socioeconomic inequality in mental health in female-headed households. The highly positive contributors in inequality in mental health were age group of <45 years (34%) and poor household economic status (22%). Only 12% were not explained by data entered into the model called residual component (Figure 2). The qualified contributions of six socio-economic determinants by taking the total explained component as 100%.



**Figure 2:** Contributions of socio - economic determinants in inequality of mental health

to a few outcomes such as child mortality rate and risk factors of diabetes and non-communicable disease<sup>22-24</sup>. In the current study, we explored the impact of socioeconomic inequality on mental health in female-headed households. The proportion of female-headed households in Iran has been rising in recent years; with recent reports (2013) estimating

that 12% of all household heads in Iran are women. However, current information about the health of this vulnerable group, particularly with respect to mental health, is limited<sup>25</sup>.

There are two methods used to measure economic status. The direct method measures income, expenditures, and/or consumption and is an expensive method for which data are difficult to correct, possibly leading to bias. In comparison, the proxy method involves the use of data related to household assets and other personal characteristics to calculate alternative variables for estimation of living standards and overall household welfare<sup>19</sup>. In this study, the proxy method was used based on information on household assets and by using PCA to create a new index.

CI for mental health in our study shows that mental health is unequally distributed among female-headed households. This finding is supported by other studies undertaken in other parts of Iran, such as Zahedan and Tehran, showing that mental disorders are inconsistently distributed among women of lower socioeconomic status<sup>17,25</sup>.

The results from the adopted decomposition approach showed that all of the explored explanatory variables have a positive contribution to socioeconomic inequality in mental health, signifying that the contribution to the marginal effect by each mentioned determinant increases socioeconomic-related inequalities in mental health. One explanation for these positive contributions could be that female-headed households are mostly at risk with respect to their mental health. The important predictive variables contributed to the presence of socioeconomic inequality in female-headed households were age > 45 yr and economic status. Indeed, these two variables together are responsible for 56% of the impact of economic inequality on mental health. Other predictive variables related to socioeconomic inequality with positive contributions are education, marital status, home status, and unemployment. Residence also makes a minor positive contribution to inequality. Unemployment and unstable work situations are more prevalent in the lower economic quintiles and are associated with a higher risk of mental disorders. Thus, decomposition can help us to understand its determinants by being combined with monitoring of inequality.

Educational level also emerged as a third contributor to inequality in mental health in female-headed households in the present study. During the past 20 years, adult literacy rates in Iran have improved through different efforts and strategies (for example, the initiation of literacy campaigns), but a gap between men (6.5%) and women (11.1%) that already existed remains persistent. Therefore, greater investment is needed to reduce inequities in education, particularly in women<sup>26</sup>.

Previous studies measuring economic inequality and its relationship to mental health are few. In a study that evaluated inequality determinants over time in the United Kingdom (with evaluations in 1992 and 1998), Wildman claimed no decrease in inequality during the study period, and noted that age was a major positive contributor in inequality of mental health<sup>27</sup>. Costa-Font and Gil conducted one study in Spain to investigate the potential contribution of different factors to differences in mental health and found that level of income had the highest correlation with different outcomes with respect to inequality<sup>28</sup>.

Morasae and colleagues undertook a study in people aged 15 years and older to assess socioeconomic-related inequalities of mental health in Tehran, reporting that socioeconomic inequalities are present with important contributors including economic status (44.7%), educational level (13.4%) and age (13.1%)<sup>22</sup>. Other studies also exist that employed similar methods without using a decomposition approach. Mangalore and colleagues in the UK publicly revealed that inequalities in mental health were related to low socioeconomic status<sup>8</sup>. In South Korea, the authors showed a significant increasing trend over a period of 10 years (1998-2007) for inequality in severe depression and suicide-related behavior<sup>29</sup>. Overall, the findings in the present study are in agreement with the results of previous international mental health studies in which socioeconomic determinants were distributed unequally according to varying levels of socioeconomic status in spite of the difficulties related to direct comparison, resulting in a different approach to analyzing the findings.

Policy makers can use the decomposition method detailed herein for planning and policy purposes. From the vantage of demographic characteristics, across the different ages female-headed households provide the highest positive contribution to inequality in our statistical studies; on the other hand, mental disorders are more prevalent in those < 45 years of age. Therefore, policy makers generally seeking to decrease the positive contribution of age in socioeconomic inequality's role in mental health should try to implement programs that enhance social welfare for those > 45 years of age. Policies to increase the economic power of households helmed by those who are middle aged and older can be a possible method to decrease inequality.

The limitations of this study can be attributed to the general features of a cross-sectional study. First, significant causation must be interpreted with caution. Second, completion of the self-administered questionnaire (GHQ-28) was difficult in our study because almost all of the participants were illiterate; in response, more interviews were conducted with the help of experts.

Some strategies can be suggested since our results, along with previous findings that revealed the role of socioeconomic inequality in unequal distribution of health outcomes in the Iranian people,<sup>30,31</sup> provide an understanding of deprived groups in terms of socioeconomic characteristics. These groups should be provided assistance where practicable. Secondly, development programs should be created for those households with lower socioeconomic status. Third, government policies can be set up to distribute equitably wealth.

## Conclusions

Mental health status is different among female-headed households according to socioeconomic status, with the results confirming the gap between the mental health of advantaged and disadvantaged female-headed households. Age and economic status have the greatest positive contribution in mental health for female-headed households. As a result, active collaboration of intersectional and health systems with other social and economic authorities is critical to decrease socioeconomic-related inequalities in mental health in female-headed households.



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## Conflict of interest statement

The authors declare that they have no conflicts of interest.

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