

## Research Paper

## Regional Mental Health Inequality in a Limited Data Region in the Northeast of Iran: A Decomposition Analysis



Vajihe Armanmehr<sup>1</sup> , Zohreh Shahghasemi<sup>2</sup> , Ali Alami<sup>3</sup> , Sahar Babasafari<sup>4</sup>, Shahab Rezaeian<sup>5\*</sup>

1. Social Determinants of Health Research Center; Gonabad University of Medical Science, Gonabad, Iran.

2. Social Development & Health Promotion Research Center; Gonabad University of Medical Science, Gonabad, Iran.

3. Department of Epidemiology and Biostatistics, Social Determinants of Health Research Center; School of Public Health, Social Determinants of Health Research Center; Gonabad University of Medical Sciences, Gonabad, Iran.

4. Research Center for Environmental Determinants of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran.

5. Infectious Diseases Research Center; Kermanshah University of Medical Sciences, Kermanshah, Iran.



**Citation** Armanmehr V, Shahghasemi Z, Alami A, Babasafari S, Rezaeian S. Regional Mental Health Inequality in a Limited Data Region in the Northeast of Iran: A Decomposition Analysis. *Journal of Research & Health*. 2023; 13(1):11-18. <http://dx.doi.org/10.32598/JRH.13.1.100.7>

**doi**: <http://dx.doi.org/10.32598/JRH.13.1.100.7>

**ABSTRACT**

**Background:** Limited information still exists about the distribution of mental health (MH) in small districts. Considering the diversity in cultural specifications of entities in different societies, the current study aimed-assess the inequality of poor MH and corresponding socio-demographic components in a general population.

**Methods:** This population-based cross-sectional study was conducted in Gonabad City, North Eastern Iran. Data were collected by a general health questionnaire-28 (GHQ-28) assess MH status, considering a cut-off point of 23. The concentration index defines the inequality in the MH. Decomposition analysis was done-identify the contribution of each explanatory variable-the socioeconomic inequality in MH prevalence.

**Results:** Eight hundred subjects were recruited (response rate=98%); approximately 41.6% were aged 30 years or younger, half of whom were females. The overall prevalence of poor MH was 24.7% (95% CI: 21.8-27.9%) and the age-adjusted prevalence of poor MH was 27.5% (95% CI: 24.2-31.2%). A concentration of poor MH prevalence was observed among the poorest people (concentration index: -0.15). Socioeconomic Status (SES) (59.7%), age (24.1%), and gender (4.7%) were identified as the main contributors-socioeconomic-related inequality in poor MH prevalence.

**Conclusion:** Poor MH is significantly concentrated among the poorest people. Therefore, SES appeared-play a key role in improving the health of individuals, which can lead-improved health status in a community. Furthermore, these data suggest that the MH initiative should target the elderly and women via a recently determined family physician plan in Iran.

**Keywords:** Mental health, Mental disorder, Concentration index, Socioeconomic inequality, Cross-sectional study

**Article info:**

Received: 26 Feb 2020

Accepted: 26 Dec 2020

Publish: 01 Jan 2023

**\* Corresponding Author:**

Shahab Rezaeian, PhD.

Address: Infectious Diseases Research Center; Kermanshah University of Medical Sciences, Kermanshah, Iran.

Phone: +98 (918) 9814634

E-mail: [shahab.rezayan@gmail.com](mailto:shahab.rezayan@gmail.com)

## 1. Introduction

**M**ental disorders are not only a leading cause of morbidity and mortality but also show an upward trend worldwide [1, 2]. The prevalence of mental health (MH) disorders has a wide range within and between countries. This variation in the prevalence has been explained by socioeconomic, demographic, behavioral, and psychosocial determinants in the literature [3-6]. Inequalities in health-related outcomes are one of the major public health challenges in both developed and developing countries [7]. Hence, identifying the determinants of unequal distribution in poor health outcomes can help policymakers-reduce inequality in society.

Knowledge about distinctions in features associated with poor or good health in individual socioeconomic groups is crucial-establish suitable interventions, and ameliorating the health status across the gradient [8]. In addition, physical health and chronic diseases have been demonstrated as the key determinants of MH [9]. During the past decades, the [World Health Organization \(WHO\)](#) has given some priorities for research, for a substantial reduction in health inequities [10]. Nevertheless, socioeconomic inequalities in poor MH have received less attention in some low- and middle-income countries compared-other health-related factors, such as self-reported health [11-13]. The previous provincial study has shown the prevalence of mental disorders-be 22.2% in North Khorasan [14]. In addition, another aspect of mental health, such as mental health literacy was studied in the northeastern region of Iran [15].

Protection and promotion of health between men and women is not only a fundamental privilege of human beings but also essential for health and economic development in all societies. According-the [WHO](#) report, it is crucial-ensure that health systems can respond-women and men's demands and that strong evidence is required.

The present study was conducted-identify the socioeconomic inequity in poor MH, and its determinants in a general population in the northeastern region of Iran.

## 2. Methods

This cross-sectional descriptive study was performed on 800 individuals, living in Gonabad City, Northeast Iran in 2017. Subjects were randomly selected through systematic sampling. The sample size was calculated as 800, using Cochran's formulas. A list of all families was acquired from each five healthcare centers, and sub-

jects over 18 years old were registered. Participants were randomly selected from a range of 48 households from all individuals covered by health centers. All subjects were informed about the aim and the details of the study before participation. Then, all participants were interviewed by an examiner.

### Study measures

The dependent variable was the status of MH and examined through the general health questionnaire-28 (GHQ-28), which its reliability and validity were tested previously in the Iranian study. Considering a cut-off point of 23, the subjects with equal or scores above 23 ( $23 \leq$ ) were considered as poor MH and those with lower scores ( $<23$ ) were considered as better MH. In addition, independent demographic variables, such as age, gender, education (diploma [9-12 years], primary school [less than 9 years], and higher education [more than 12 years]), marital status, household size ( $<5$  or  $\geq 5$ ), duration of residence in the neighborhood (in a year), occupation status, monthly household income (less than 2,000,000 Iranian Rials [IR], 2,000,000-4,000,000 IR, 4,000,000- 6,000,000 IR, 6,000,000-10,000,000 IR, and more than 10,000,000 IR), social capital, and self-reported socioeconomic status (SES) (low, middle, high) were measured, using a self-administered questionnaire.

A social capital questionnaire was used in high reliability and validity, consisting of nine subscales [16]. The subscales were related-participants' relationships with family, friends, relatives, colleagues, neighbors, people with a common ethnic background and religion, and the public based on a 5-point Likert scale.

### Statistical analysis

The SES was computed using the principal component analysis (PCA) for variables, including education, occupation, monthly household income, self-reported SES, and household size. The SES was categorized into five quintiles with the same sample in each population category. The quintiles range from the poorest-the richest population, as the first quintile represented the poorest population, and the fifth quintile represented the richest population.

The Wagstaff approach [17] was used-estimate the Concentration Index (CI), and its confidence interval (95% CI). The CI with a range of (-1) - (+1), indicates that a negative index reflects a higher proportion of the health outcome among poor people, while a positive index shows a higher distribution among rich individuals.

Decomposition analysis was also done to identify the contribution of each explanatory variable—the SES inequality, in the MH prevalence. A positive (negative) sign of contribution means that the relationship between the explanatory factor and MH prevalence, contributes a lower (higher) likelihood of the prevalence, among the richest (poorest) people. The outcome of the present study was categorized into two categories (better MH=0, poor MH=1), and a logistic regression model was used to perform the decomposition analysis. All statistical analyses were done at a significance level of 0.05 by Stata software version 14 (StataCorp, College Station, TX, USA).

### 3. Results

Of 782 participants, about half (49.5%) were women, and most of them (83.4%) were married. The average age of the participants was 38.5 years (ranging from 20–68 years), and 41.6% were under 30 years old. Table 1 presents more details of the sociodemographic characteristics of the study population.

The overall prevalence of poor MH was 24.7% (95% CI: 21.8–27.9%). After adjusting age as a potential confounder, the age-adjusted prevalence of poor MH was 27.5% (95% CI: 24.2–31.2%). The higher prevalence was among the people with the lowest SES quintile

(39.6%), and those with less than 36.3% social capital. The prevalence of poor MH showed an increasing trend by age.

The relative concentration index for whole samples was -0.153 [95% CI: (-0.244) - (-0.061)], suggesting the poor MH was more concentrated among the poorest individuals ( $P < 0.001$ ). The concentration curve for poor MH lies above the diagonal line of equity, showing pro-rich inequalities in the population (Figure 1).

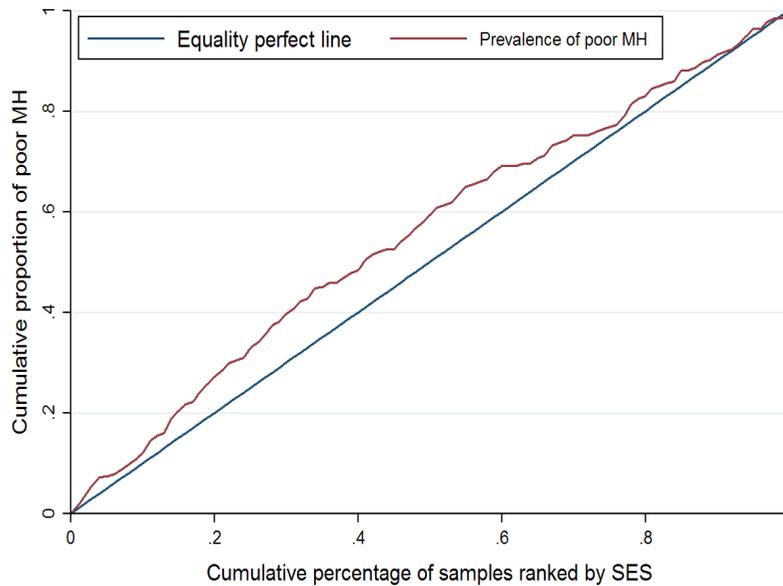
Table 2 presents the decomposition of socioeconomic inequality for poor MH. SES (comprising monthly income, job, and education) with a contribution of 59.7%, made the largest part and most significant contribution—the observed pro-rich inequality in poor MH. Demographic factors, such as age (24.1%) and gender (4.7%), were other crucial contributors—inequalities. Marital status, residency duration in the neighborhood, and social capital contributed significantly—the observed pro-rich inequality in poor MH. The results suggested that 89.5% of socioeconomic inequality in poor MH was explained by the explanatory variables, included in the model.

**Table 1.** Descriptive characteristics of variables used in the study

Variables	No. (%)	Prevalence of Poor MH		
		Crude (95% CI)	Age-adjusted (95% CI)	
Gender	Male	396(50.5)	20.9(17.2-25.3)	22.8(18.7-27.5)
	Female	388(49.5)	28.6(24.3-33.3)	30.1(25.8-34.7)
Age groups (y)	20-30	326(41.6)	19.3(15.4-24)	19.7(15.6-24.6)
	31-40	221(28.2)	23.5(18.4-29.6)	22.5(17.4-28.6)
	41-50	157(20)	30.6(23.8-38.3)	27.7(21.1-35.4)
	51≤	80(10.2)	38.7(28.5-50)	36.3(28.1-45.4)
Marital status	Single	130(16.6)	19.2(13.2-27.1)	20.1(14.8-26.7)
	Married	654(83.4)	25.8(22.6-29.3)	28.7(25.5-32.2)
Residency in the neighborhood (y)	≤5	239(30.5)	21.7(16.9-27.5)	19.1(15.5-23.5)
	6-15	215(27.4)	23.2(18.1-29.4)	21.4(17.1-26.4)
	16-30	251(32)	25.9(20.8-31.7)	29.9(25.1-35.4)
	≥31	79(10.1)	34.1(24.4-45.5)	33.9(27.4-41.1)
Social capital	Low	271(34.6)	30.6(25.4-36.4)	36.3(31.7-41.1)
	Middle	259(33)	23.5(18.7-29.1)	22.6(18.6-27.1)
	High	24(3.2)	19.6(15.2-25.1)	23.2(19.3-27.7)
Socioeconomic status	Poorest	157(20)	33.7(26.7-41.5)	39.6(33.9-45.5)
	Poor	168(21.4)	27.4(21.1-34.7)	26.8(22.1-32.2)
	Middle	151(19.3)	23.2(17.1-30.7)	25.2(19.7-31.4)
	Rich	152(19.4)	18.4(12.9-25.5)	23.7(18.8-29.4)
	Richest	156(19.9)	20.5(14.8-27.6)	18. (14.3-24.4)

MH: Mental health





**Figure 1.** The concentration curve of poor mental health in the study population, the Northeastern region of Iran



**Table 2.** Decomposition of socioeconomic inequality for poor mental health (MH) in Gonabad

Variables	Partial Effect	Elasticity	Concentration	Contribution	Contribution %	
Gender	Male	-	-	-	-	
	Female	0.0804	0.1608	-0.0337	-0.0072	4.7
Age groups (y)	20-30	-	-	-	-	
	31-40	0.0334	0.0380	-0.0421	-0.0021	1.4
	41-50	0.0881	0.0712	-0.1415	-0.0134	8.8
	51≤	0.1443	0.0595	-0.2693	-0.0213	13.9
Marital status	Single	-	-	-	-	
	Married	0.0039	0.0131	-0.0586	-0.0010	0.7
Residency in the neighborhood (y)	≤5	-	-	-	-	
	6-15	0.0150	0.0166	0.0063	0.0001	-0.1
	16-30	0.0457	0.0591	0.0287	0.0023	-1.5
	≥31	0.0906	0.0370	-0.1532	-0.0075	4.9
Social capital	Low	-	-	-	-	
	Middle	-0.0832	-0.1110	0.0284	-0.0042	2.7
	High	-0.1364	-0.1786	-0.0374	0.0089	-5.8
Socioeconomic status	Poorest	-	-	-	-	
	Poor	-0.0471	-0.0407	-0.3857	0.0209	-13.7
	Middle	-0.0707	-0.0552	0.0217	-0.0016	1.0
	Rich	-0.1157	-0.0907	0.4087	-0.0492	32.3
	Richest	-0.0714	-0.0574	0.8020	-0.0612	40.1
	Sum	-	-	-	-0.1366	89.5
Residual	-	-	-	-0.0160	10.5	
Total	-	-	-	-0.1526	100	



## 4. Discussion

This study provides evidence of the SES inequalities in poor MH, and decomposition analysis identifies the contribution of some sociodemographic factors-SES inequalities in poor MH. Our findings show that the prevalence of poor MH is not only unequally distributed among different SES groups but also varies by gender and age groups.

As shown in the literature, some processes involving several factors contribute-the inequality of poor MH. The findings of the present study show that poor MH is unequally distributed between genders. A similar study conducted in the capital of Iran showed a relatively small positive contribution-the inequality for gender [18], and this contribution was reported as 6% in another article [19]. A gender difference of poor MH (28% in females and 16.4% in males) has been reported in a study conducted in North Khorasan [14]. Several studies have shown a significant relationship between gender and some subscales of MH, including anxiety, depression, and somatic disorders. According-the WHO, the number of people suffering from mental illness is reported high as 21.9 among men, and 25.9 among women [20]. Results of the previous studies show gender disparities in health-related outcomes [21], for example, women report more stressful life events than men [22]. In addition, women showed higher levels of anxiety and depression, compared-men. Furthermore, women showed lower health status, higher rates of somatic symptoms, and higher frequency of visits-the doctor [23]. Matud found that gender was equally related-each element in the stress process in the input, through resolving whether a situation will be perceived as stressful as in the output, influencing coping responses and the health implications of stress reactions [24]. Furthermore, women report threatening events as more stressful and are more likely-be exposed-stress related-“role function”, compared-men [25].

The concentration index also revealed that poor MH was more prevalent, among the poor population, which is consistent with other studies in Iran [18, 26], Europe [19], and the UK [27]. The WHO stated that the results of the studies in the past twenty years indicate an interaction between poverty-related factors and poor MH, showing that the frequency of common mental disorders is twice higher in poor people than in rich people. In addition-the higher prevalence of chronic diseases, such as MH among the poorest people, the mortality rate is also twice higher among low-income groups [28]. Some other health-related factors, including obesity, smoking,

and hypertension, are negatively related-wealth [29]. Consistent with the literature [18], furthermore, our results showed that wealth inequalities contribute more-the inequalities in poor MH. Low-income families are usually more exposed-various hazardous risk factors, and concurrence of social stresses and environmental hazards that may lead-poor health outcomes, and various inequalities [30, 31]. In contrast, high-income groups have more resources-protect against diseases and related consequences [32]. Nayak et al. proposed that lower income groups reported further sources of chronic health-related burden, such as difficulties in close relationships, financial strain, and job or ability-work [8]. Maher and colleagues stated a reciprocal relationship between wealth and health status, showing that good economic status improves health status, and improved health status leads-better economic status. They also found that cultural and political variables can significantly improve the economic and health status of the population [33].

In the present study, health status was shown-deteriorate with increasing age, which was consistent with previous studies [34]. It was found that the age group is another critical factor, in explaining MH inequalities. This evidence was also reported in former studies [18, 19]. In this regard, we can point-some reasons, such as a higher proportion of other chronic diseases and psychological disorders, and the increase in retirement problems at older ages. Although the main reason is unknown, the associated factors of unequal distribution of poor MH may differ from one place-another, because of different sociodemographic characteristics.

The age-adjusted prevalence of poor MH was 23.2%, in individuals with high social capital, compared-36.3% in those with low social capital. This factor increased the concentration of poor MH among the better-off people and contributed significantly-the observed pro-poor inequality in poor MH in the population. Previous studies, examining the association between workplace social capital and MH [35, 36], showed that higher workplace social capital is associated with a reduced risk of poor MH. Social capital and SES are two critical factors, which can, directly and indirectly, affect mental health status [37]. Another crucial determining factor, contributing-the inequality of poor MH is the duration of residency in the neighborhood, which correlates with social solidarity. Ganji et al. [38] found this significant relationship and illustrated that the duration of residency is related-improved social solidarity.

This study had several limitations, which should be considered. Despite the numerous regression-based decomposition methods, we used the Wagstaff method. Hence, the comparison of our results with others should be warily done. Since this was a cross-sectional study, the interpretation of the causal relationships should be carefully done. Data collection was based on self-reporting, which may lead to information bias.

## 5. Conclusion

The findings of the present study showed SES-related inequalities in poor MH, which were mostly explained by SES factors. The overall improvement in public health status accompanied by the observed inequality has highlighted the need to explore underlying reasons and interventions to reduce inequality. These data also suggest that mental health programs should target the elderly and women via the recently determined family physician plan in Iran.

## Ethical Considerations

### Compliance with ethical guidelines

This research was approved by the Ethics Committee of [Gonabad University of Medical Sciences](#) (Code: 1401/1 1401/1974).

### Funding

This study was financially supported by the [Gonabad University of Medical Science](#).

### Authors' contributions

Conceptualization and supervision, data collection: Vajihe Armanmehr and Zohreh Shahghasemi; Methodology: Shahab Rezaeian and Ali Alami; Writing-original draft: Vajihe Armanmehr; Writing-review and editing: All authors; Data analysis: Shahab Rezaeian and Sahar Babasafari.

### Conflict of interest

The authors declared no conflict of interest.

### Acknowledgments

The authors thank Steven E. Wallis (director, foundation for the Advancement of Social Theory for his useful comments. In addition, we sincerely appreciate the social development and health promotion research center of [Gonabad University of Medical Sciences](#) for approving this study.

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