The effects of prevalence of inequalities in mental disorders between groups using Blinder– Oaxaca decomposition

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Abstract:

BACKGROUND: The prevalence of inequalities in sociodemographic factors in some mental disorders (MDs) has been shown in previous reports. The aim of this study was to assess the main contributors that affected prevalence of inequalities in MDs between groups.

MATERIALS AND METHODS: This was a cross-sectional study that was conducted on adults in 10 cities from Ilam province. We selected participants using cluster sampling; clusters were cities (n_1 = 10), geographical area (n_2 = 153), and households (n_3 = 382). Screening tools and clinical interview were applied through standardized and validated questionnaires, namely, GHQ-28 and DSM-IV-TR, respectively. Participants were divided into socioeconomic groups via principal composition analysis (PCA). Blinder–Oaxaca approach was applied to distinguish the gap in inequalities between groups.

RESULTS: The prevalence of MDs in the advantage group was 22.6% and, in disadvantages was 35.6%. The concentration index (CI) of the MD prevalence rate was –0.013 (95% CI: –0.022, –0.004) which indicated that MDs were more common in the disadvantaged groups. The odds of MDs in advantaged people was 81% more compared to the disadvantaged group (OR: 1.81; 95% CI: 1.28, 2.57), also in females compared to males (1.60; 95% CI: 1.21, 2.24). Analysis of gap inequality between groups showed that the gap in prevalence rates of MDs between groups was 12%.

CONCLUSION: This study revealed a socioeconomic inequality in MD rates in the adult population. Therefore, results of this study provide contributors in MDs inequality in order to control and reduce the prevalence of MDs in the community.

Keywords:

Decomposition, inequality, mental disorders, oaxaca-blinder decomposition, social determinants of health

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Background

It is predicted that by 2030, mental disorders (MDs) will rank as the second most common disability (DALYs) worldwide.[1] As estimated, annually 17.6% of the general population is involved in MDs.[1] Previous methodological studies also noted anxiety and depressive disorders as common types of MDs.[2] In 2015, 4.4% of the world population suffered from depressive disorder and 3.6% from anxiety disorders.[3]

Prevalence rate of MDs in Iran were estimated to be 17.1% in Rahimi-Movaghar *et al*.'s study and 23.6% in the Mohammadi *et al*.'s study, among other local and national epidemiological studies.[4–6] A review of the literature shows that prevalence is lower in some countries, such as Nigeria (13.2%), and China (12%).[7,8] A new estimation for rates MDs in the general population is a key element to conduct health programs and effective surveillance.

Past studies showed that psychiatric disorders and depression were significantly

linked to suicidal ideation.[9] In one study, patients that had a history of MD were 70% more prone to suicidal ideation in the next year;[10] among them at least 2%–25% suffered from major depression.[11] MDs increased the risk of suicide in people who had history of suicide,[12] and it was also linked to internet addiction and dependency.[13,14]

Some sociodemographic inequalities in MD prevalence has been shown previously, namely, alcohol substance use disorder in males and anxiety and depression in females.[15] As shown in previous studies, advantaged status was linked to higher MD prevalence: The risk of suicidal attempts was higher when in poor financial situation.[16] Contrary to these results, there are some inconsistencies in the results of previous studies regarding the relationship between socioeconomic status and MD rates. In this study, we tried to identify inequalities in groups regarding MDs; therefore, eliminating the causes of inequalities can reduce the prevalence of MDs. This study was conducted to boost our knowledge about inequalities in the prevalence of MDs between groups using Blinder–Oaxaca decomposition to determine group differences in the effects of an independent variable.

Material and Methods

Study design and setting
This was a cross-sectional study conducted on adults in 10 cities from Ilam province, western Iran.

Study participants and sampling
We included 763 participants in all cities via cluster sampling; clusters in this study were cities (n_1 = 10), geographical area (n_2 = 153), and households (n_3 = 382). In all stages of sampling, a simple random sampling method was used to enroll participants. The population of Ilam province was 623,235 in the latest national survey, 80% of which resided in 10 cities. In the initial step, we stratified the sample based on 10 cities according to the population of each city; according to this, the number of clusters (households) in each city was determined (Eyvan: 34; Ilam: 191; Chardavol: 11; Sirvan: 11; Malekshahi: 15; Mehran: 18; Badreh: 7; Abdanan: 30; Dehloran: 42; Darrehshahr: 20), so that each cluster was represented by 2 subjects. The inclusion criterion was age over 15 years and resident of Ilam province at the time of the study and the exclusion criterion was incomplete or unclear questionnaires.

Data collection tool and technique
The General Health Questionnaire–28 (GHQ-28) for elementary screening and Structured Clinical Interview for DSM-IV-TR for clinical interviews were used. In the first stage, persons who had earned a score of ≥23 were contacted and the Persian version of the DSM-IV-TR was applied in the second stage by a psychologist. In this stage, the prevalence of psychiatric disorders, epilepsy, and intellectual disability was assessed in participants referred from the first stage.

Quality control (QC) in both stages, before and after completion of questionnaires, was applied. A separate sociodemographic questionnaire was completed for all subjects to stratify according to their socioeconomic status (SES), that is, advantaged and disadvantaged groups, by using predictor variables, such as having of personal home, separate kitchen, refrigerators and bathroom, a number of rooms, heating appliances, oven, microwave, dishwasher, vacuum cleaners, personal car, washing machine, landline telephone, internet access, computers, microwave oven, mobile phone, color TV vs LCD TV, and furniture. All subjects were stratified into SES groups via principal composition analysis (PCA), used according to a study by Vyas and Kumaranayake in 2006[17]. Advantaged and disadvantaged groups were determined to compare inequality in prevalence of MDs by SES variables.

Ethical consideration
This study was undertaken with the approval of the ethical committee of Ilam University of Medical Sciences, Islamic Republic of Iran (IR.medilam.rec. 1394.128).

Statistical analysis
The prevalence of MDs with a confidence interval of 95% (95% CI) in advantaged and disadvantaged groups was calculated. Logistic regression analysis and odds ratio (OR) were used to the risk of MD. Inequality index in this study was the concentration index (CI), and contributors to inequality was discovered using the Blinder–Oaxaca decomposition technique between advantaged and disadvantaged groups.[16]

Inequalities in MDs according to SES were shown in the inequality index (concentration curve (CC)). The negative CI showed that health variable was more concentrated in advantaged persons. The equal contribution of health indicators in the population is defined as equality line and CI equal to zero. Blinder–Oaxaca decomposition is a practical method used to determine inequalities by explained and unexplained factors. Explained factors are responsible for inequality. Unexplained factors show inequalities that cannot be explained by determinants in the model.[17] A decomposition analysis was applied in Stata software using the Oaxaca command[18] The analysis of inequalities was performed by Stata software version 11.1.

Results

All 763 participants were divided into two groups—the advantaged group with 558 participants (73.1%) and

the disadvantaged group with 205 participants (26.9%)) according to their socioeconomic status. Prevalence of MDs in the advantaged group was 22.6% also in disadvantages = d was 35.6%. Based on the types of MDs, anxiety, compulsive disorders and major depressive disorder (MDD) were prevalent in both groups. The rates of MDD, anxiety and compulsive disorders in the advantaged versus disadvantaged were 17.7% versus 27.3%; 17.2% versus 32.2%; and 11.1% versus 15.1%, respectively [Table 1].

According to our results, an increasing trend of MDs was observed in the disadvantaged group. The CI of the prevalence of MDs was − 0.013 (95% CI: −0.022, −0.004) which indicates that MDs were more common in the disadvantaged group [Figure 1].

Results of the univariate analysis showed that the OR of MDs in the advantaged group was 81% more compared to disadvantaged group (OR: 1.81; 95% CI: 1.28, 2.57). MDs were more common in females (1.60; 95% CI: 1.21, 2.24). The risk of MDs in middle-aged (26–45 years) group was higher than

younger ages (15–25) (OR: 2.70; 95% CI: 1.71, 3.75). A married person was more prone to developing MDs than one who was single (OR: 1.12; 95% CI: 1.01, 1.85). Academic degree was inversely and significantly related to having MDs, and unemployment increased the risk of developing MDs by about two folds (OR: 2.13; 95% CI: 1.49, 3.04).

The results of the Blinder–Oaxaca technique revealed that the prevalence rate of MDs in the disadvantaged group was 36% as opposed to 23% in the advantaged group; the gap in prevalence rates of MDs between the groups was 12%. That could be by equality in covariates between groups including gender, educational level, marital and job status [Table 2].

The detail of individual contributions. According to this about 11% of total MDs prevalence inequalities (12%) could be explained by variability of the characteristics between the two groups. The highest contribution in this gap was the education levels of the participants (−0.06, 95% CI: −0.10, −0.01) [Table 3].

Discussion

The aim of this study was to estimate the inequality index and the covariates that caused inequalities in the prevalence of MDs. The Blinder–Oaxaca decomposition was applied to investigate the main contributors to MD inequality. Prevalence of MDs was 34.6% in the disadvantaged group, which was significantly higher than that in the advantaged group (22.6%). The rates of MDs in this study was higher than previous reports published in the literature; for example, the worldwide-pooled prevalence in a meta-analysis was 13.4%,[18] and in a similar study by Chetty,[19] it was 15%. A higher rate of MDs has been reported in Bosnia and Herzegovina (48%), Kosovo (62.2%), and Croatia (39.8%).[20] In this study, among all types of MDs, anxiety and MDD had the highest prevalence. The
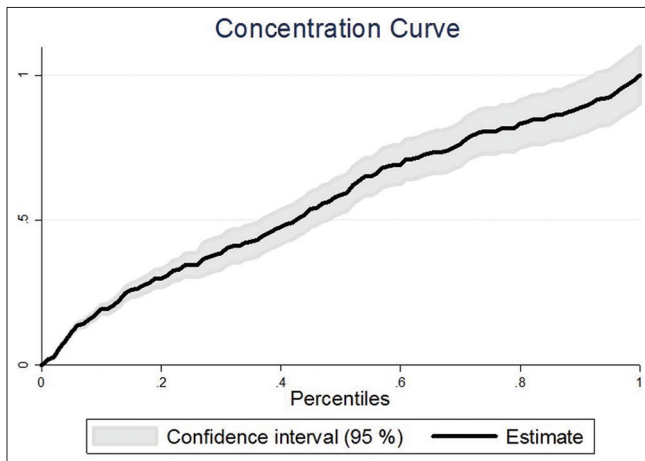

Figure 1: Distribution of mental health disorders between socioeconomic status

Table 1: The prevalence rate and 95% confidence interval of mental disorders in advantaged and disadvantaged groups

Mental Disorders	Advantaged Group	Disadvantaged Group	Overall Prevalence
Major depressive	17.7 (15.1-19.7)	27.3 (25.4-29.3)	20.3 (17.8-22.3)
Manic	3.6 (2.2-5.1)	4.4 (3.1-6.2)	3.8 (2.2-5.1)
Anxiety	17.2 (14.3-20.6)	32.2 (29.3-35.1)	21.2 (18.6-23.1)
Panic	4.1 (3.7-5.9)	13.2 (11.7-16.0)	6.6 (5.1-7.9)
Compulsive	11.1 (9.4-13.3)	15.1 (12.7-17.5)	12.2 (10.3-14.3)
Phobia	6.6 (4.4-8.1)	11.7 (10.0-12.9)	8.0 (6.8-9.3)
Psychotic	2.3 (1.7-3.2)	10.2 (8.9-11.8)	4.5 (3.4-5.7)
Epilepsy	0.7 (0.5-0.9)	2.4 (1.7-3.1)	1.2 (0.7-1.8)
The symptoms of organic brain	2 (1.1-3.4)	6.3 (4.5-7.8)	3.1 (1.8-4.2)
Mental retardation	1.1 (08.1-1.9)	2.4 (1.7-3.9)	1.4 (0.7-2.1)
Somatization	3.6 (2.8-5.3)	4.9 (2.9-6.8)	3.9 (2.8-5.6)
Total	22.6 (20.3-23.7)	35.6 (32.7-37.6)	25.8 (23.9-27.1)

Table 2: The decomposition of mental disorder between the advantaged and disadvantaged groups

SES	β	SE	Z	P	95% Confidence Interval	
					Lower	Upper
Differential						
Advantaged*	0.23	0.01	13.2	<0.001	0.20	0.27
Disadvantaged*	0.36	0.03	10.4	<0.001	0.29	0.42
Difference	−0.12	0.03	−3.1	0.001	−0.19	−0.04
Decomposition						
Endowments	−0.15	0.03	−4.4	<0.001	−0.21	−0.08
Coefficients	−0.00	0.02	−0.2	0.788	−0.05	0.04
Interaction	0.03	0.01	2.7	0.007	0.00	0.05

*Prevalence of mental disorders, SE: Standard error, SES: Socioeconomic status

Table 3: The participation rate of contributors in inequality between the advantaged and disadvantaged groups

SES	β	SE	Z	P	95% Confidence Interval	
					Lower	Upper
Differential						
Advantage*	0.23	0.01	13.2	<001	0.20	0.27
Disadvantage*	0.36	0.03	10.5	<.001	0.29	0.42
Difference	−0.12	0.03	−3.2	0.001	−0.19	−0.04
Explained						
Female gender	−0.00	0.00	−0.8	0.375	−0.00	0.00
Illiteracy	−0.06	0.02	−2.8	0.005	−0.10	−0.01
Married	−0.00	0.00	−0.6	0.504	−0.00	0.00
Unemployment	−0.05	0.01	−4.2	<0.001	−0.08	−0.03
Total	−0.12	0.02	−4.5	<0.001	−0.17	−0.07
Unexplained						
Female	−0.02	0.02	−1.3	0.184	−0.07	0.01
Illiteracy	0.13	0.06	2.0	0.039	0.00	0.26
Married	−0.05	0.04	−1.1	0.250	−0.15	0.04
Unemployment	−0.11	0.04	−2.4	0.015	−0.20	−0.02
_cons	0.06	0.14	0.4	0.638	−0.21	0.34
Total	0.00	0.02	0.0	0.950	−0.04	0.04

*Prevalence of mental disorders, SE: Standard error, SES: Socioeconomic status

prevalence rates of MDD in non-fatal disabilities is one of four; also, it ranks third in injuries by disability-adjusted life year (DALY) in both sexes.[21]

Logistic regression analysis was conducted to detect the best model to predict the prevalence of MDs. The Disadvantaged group and unemployed persons were two significant predictors for the increase of prevalence of MDs. These results are consistent with previous reports.[18,19] We also found that the 26–45 age group and females were more prone to MDs. Age was the main predictor in panic disorder, manic episode, drug abuse/dependence and, antisocial personality disorders which are linked to higher prevalence in younger ages. Literature showed a higher prevalence rate of MDs including anxiety and somatization disorders in females compared to males.

We plotted the inequality curve and also decomposed it to determine the factors causing significant differences between the two groups. Results showed that the advantaged participants in our population were more vulnerable to have MDs than the disadvantaged participants. This result is in line with that of a study by Deen et al. who reported a significant relationship between inequality and mental illness.[18] Kessler et al. showed that deprivation significantly increased the risk of MDs; also, persons with lower income were two times more likely to have MDs.[19] Similar results documented by Peen et al. revealed that urbanity enhanced the risk of mood disorders and anxiety by 20% and 21%, respectively.[21] Schizophrenia was estimated to occur more than twice in urban residents.[22] Kirkbride et al.[23] in their study in UK, showed that living in densely populated areas, and income inequality added 18% to 25% to the risk of mental disorders.

The Blinder–Oaxaca technique discovered that 11% of inequality gap could be avoided in disadvantaged groups, if there was no inequality. Educational level, gender, job and marital status were the main covariates to explain the inequality between groups. Among the main contributors of inequalities was illiterate persons. Stringhini et al.[18] in the British Whitehall II longitudinal cohort study found that lower social status was associated with unhealthy behaviors as well as obesity, smoking and, inactivity. Another study suggested that lack of healthy behaviors possibly had an effect on lower life expectancy among those in the lowest income quartile.[19] Meara et al.[21] found that lower morbidity of MDs was associated with higher levels of education.

Limitation and recommendation
Some limitations to this study should be noted as follows: First, the large size of the study population (Ilam province) and the large distance between cities prolonged data collection; the second limitation was related to the summary form of diagnostic tools, which did not include all mental disorders. The researchers suggest that a nationwide study be conducted to assess the inequalities in MDs. Intervention studies can also be designed based on the results of the present study to reduce inequality in MDs.

Conclusion

Results showed that almost one-fourth of the population had MDs, which is comparable to results in other regions of the world. We have found positive sociodemographic inequalities in MDs rates. Therefore, results of this study provide contributors to MD inequalities so that we may control and reduce the prevalence of MDs in the community.

Conflicts of interest
There are no conflicts of interest.

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