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Quality of life and common psychological problems profile in a large sample of manufacturing employees in a developing country: an association analysis using latent class regression

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ABSTRACT

Background and objective: Quality of Life (QoL) indicates individual's perception of the physical, psychological and social aspects of health. To the best of our knowledge, there is no study that examined the association of QoL with composite measure of common psychological problems i.e. anxiety, depression and psychological distress in manufacturing employees. This study aimed to investigate the association of QoL with common psychological problems profile in manufacturing employees.

Material and methods: This cross-sectional study was conducted among 3063 employees of "E" Steel Company (ESCO). Psychological distress, anxiety and depression were assessed by self-administered 12-item general health questionnaire (GHQ-12) and hospital anxiety and depression scale (HADS). Euro-QoL five dimensions questionnaire (EQ-5D) was used to assess the QoL. Latent class analysis (LCA) and latent class regression (LCR) were used for analyzing data.

Results: LCA identified two classes of participants: low QoL (20%) and high QoL (80%). LCR, after adjusting for the effects of confounding variables including demographic, life style and job-related variables, showed that the higher scores of psychological problems profile was significantly associated with increased odds of being in poor QoL class; (OR: 6.03, 95% CI: 3.76,9.69).

Conclusion: In conclusion, higher scores of psychological problems profile are positively associated with poor QoL. QoL can be improved among manufacturing employees through conducting screening programs for identifying affective individuals and implementing health promoting interventions aiming to reduce psychological problems impacts and finally productivity of working force.

1. Introduction

Quality of life (QoL) is a multidimensional concept that includes individual's perception of the physical, psychological, and social aspects of health [1]. QoL is defined by the World Health Organization (WHO) "as individuals' perception of the position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns" [2]. QoL serves as an outcome variable in clinical trials and medical research and for health needs assessment and planning for the allocation of resources [3].

Many factors determine the QoL, including personal characteristics such as age and socio-economic status, objective factors such as role performance measures and biological factors and subjective factors such as subjective satisfaction and mental health [4]. Some studies showed that psychological disorders such as depression, anxiety and psychological distress are related to the QoL, so that patients with mental disorders have weak QoL [5–11]. For instance, a meta-analytic review showed significant association between anxiety disorders and poor QoL [9]. Another study showed that both anxiety and depression disorders lead to low QoL and comorbidity of anxiety and depression has stronger effect on QoL [6]. In addition, in a study conducted on general population in Canary Island, there was an inverse relationship between EQ-5D and GHQ scores [10]. Another study that was performed on patients with anxiety disorder illustrated all dimensions of QoL except the physical dimension, had inverse relationship with general psychiatric morbidity [11].

It is believed that mental disorders usually occur together. For example, anxiety and depression are related to each other, and there is overlap between their symptoms [12]. To the best of our knowledge,

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the association of psychological disorders such as anxiety, depression and stress with QoL are studied independently and separately, and their composite impact on QoL has not been evaluated not only in general population but also in high-risk population such as industrial manufacturing employees.

Human resources are the most important capital of organizations. The work force plays an important role in increasing the productivity and success of organizations and national economy [13]. Therefore, paying attention to the QoL of the workforce can increase individual's productivity.

Mental disorders impose a lot of emotional and economic burden on the individual, family and society [14]. Mental disorders can lead to poor performance, absenteeism and poor relationships at workplace, reduced productivity, disability and poor QoL [7,15].

The multidimensional concept of QoL and its individualistic nature, makes people heterogeneous in terms of QoL. Also, QoL has a latent structure that could not be directly measured. Due to this nature, it is necessary to apply an appropriate analytical technique that can provide a comprehensive evaluation of QoL in the study subjects based on all QoL's dimensions. On the other hand, for providing a unified and comprehensive assessment of psychological problems a composite measure is needed based on common psychological problems. Therefore, in current study, an advanced statistical method, i.e. latent class regression (LCR) on latent factors was used for addressing the above points [16].

Latent class analysis (LCA) is an advanced statistical method that classifies individuals into homogenous groups by clustering similar response profiles [17]. In the present study, LCA was used in order to identify subgroups of studied population based on QoL. In addition, in the framework of LCR, a latent factor was extracted as a composite measure from three common psychological problems and its association was evaluated with levels of QoL.

2. Materials and methods

2.1. Study design and participants

The present cross-sectional study was conducted among 16,000 formal and contractual employees of "Esfahan" Steel Company (ESCO), during 2014–2015 in "Isfahan" city. Sample size was determined to be 3500 people by considering 10% prevalence of psychological problems with type one error rate of 0.05 and sampling error rate of 0.01.

Participants were selected using multi-stage cluster sampling along with stratified sampling based on managerial departments. Clusters were main seven management departments and their subsidiary sections and the strata were jobs categories of employees. The inclusion

criteria were work experience for at least 1 year and agree to participate in the study. The participants who did not answer to a large fraction of questions (more than 10% of questionnaires' pages, included 37 employees) were excluded. Due to random nature of sampling, as well as low number of female employees ($n = 800$), to reach a sufficient sample size of females in our study, 260 willing female employees to participate in study were included using convenience sampling. Data was collected by the self-administrated questionnaires. Data on 3063 (response rate: 0.87) people who provided complete questionnaires were included in the current analysis.

The process of administering and collecting the questionnaires was conducted at the company for a period of six months. All participants provided written informed consent. The study was approved by our university bioethics committee (projects numbers #87115 and #395482). More details about the ESCO project have been presented elsewhere [18].

2.2. Study instruments and assessment of variables

2.2.1. Quality of life

To assess the QoL, the standardized and generic tool Euro QoL-five dimensions was used. The EQ-5D is a self-report questionnaire developed by the Euro QoL group for describing and evaluating health status [19]. The EQ-5D questionnaire consists of two sections: the self-classifier (descriptive system) and the visual analog scale (VAS). The EQ VAS represents overall health status as a single value. This is a vertical, VAS that ranging from 0 (worst imaginable health) to 100 (best imaginable health). Respondents by choosing a point on EQ-5D VAS, rate their current health state.

The self-classifier section assesses the state of health in five dimensions: mobility, self-care care, normal activities, pain/discomfort, anxiety and depression. Each dimension has three levels: severe problem (3), some problem (2), no problem (1). The two categories of severe problem and some problem combined into a single category in LCA because low response rate in severe problem category. Higher EQ-5D scores indicate poor QoL. EQ-5D has shown a good reliability and validity [20,21]. Reliability of the questionnaire in a pilot sample of 300 participants in current study was 0.51.

2.2.2. Anxiety and depression

Hospital anxiety and depression scale (HADS) was used to evaluate mental health problems of participants. HADS is a short self-report tool that includes 14 items, 7 of which are related to anxiety, and 7 others are depression. Each item scores on a 4-point Likert scale that ranging from 0 (not present) to 3 (considerable). Each person has a score between 0

and 21 in each sub scale. High scores represent more symptoms of anxiety and depression (0–7 normal, 8–21: mild, moderate or severe disorder). In the present study, a validated version of HADS was used to evaluate anxiety and depression. It's internal consistency with Cronbach's alpha was 78% for anxiety and 86% for depression [22].

2.2.3. Psychological distress

Psychological distress was assessed by self-administered 12-item general health questionnaire (GHQ). It is a simple and brief questionnaire which asks individuals about their recent experience with psychological distress. Each item contains four scales (less than usual, no more than usual, rather more than usual or much more than usual). Total score of GHQ is between 0 and 12, based on Likert scoring styles (0–1 to 2–3). Higher scores indicate higher degree of psychological distress. Score of 4 or higher ranked as high psychological distress. A valid version of GHQ-12 in our country was in current study. The internal consistency of GHQ-12, calculated by Cronbach's alpha coefficient, was found to be 87%, indicating the reliability of the questionnaire [23].

2.2.4. Assessment of other variables

Demographic characteristics (including age (years), gender (male/female), marital status (single/married) and educational level (≤5, 6–12, >12 years of formal schooling)) and characteristics related to job including (second job (yes/no), shifting work (daily/shift)), anthropometric measures (weight (kg) and height (m)), smoking status (nonsmokers/current smoker or former smoker), sleep duration (h/d) were collected using a self-administered questionnaire. Physical activity (Met-hour/week) was assessed using the International Physical Activity Questionnaire (IPAQ). In this study, the validated short form of the questionnaire (IPAQ-SF) with Cronbach's alpha coefficient of 0.87 was used [24]. We computed total measure of physical activity by summing scores for all activities in IPAQ i.e. intense physical activity score, medium-intense physical activity score and walking and sitting activities score.

2.3. Statistical analysis

In the present study, LCR with latent predictor, as the main statistical method was used for analyzing data [16]. It is consisted of two steps: firstly, LCA was used to classify participants based on patterns of subjects' responses to the 5 domains of the EQ-5D. To determine the optimal number of latent classes, LCA with 1-class was fitted and the number of classes were increased to 5 sequentially. Bayesian information criterion (BIC) and Lo–Mendell–Rubin likelihood ratio test were used to assess the best-fitting model [25,26].

The lowest BIC as well as interpretability of classes were considered simultaneously during model fitting. After selecting the appropriate number of classes (two classes), in the next step, the LCR model was fitted. For this purpose, at first, a composite measure from three psychological problems as a latent variable was constructed using confirmatory factor analysis which it was named "psychological problem profile" represents comprehensive evaluation of mental health' profile of study participants and was used as latent predictor for QoL. We adjusted the effects of many potential confounders, including demographic, life style and job-related variables in the fitted models. In regression analysis, list-wise deletion was used for addressing cases with missing covariates (<0.1%).

Continuous and categorical variables were expressed as mean (SD) and number (percentage), respectively. Continuous and categorical variables were compared in the studied groups using two independent samples t-test for normally distributed variables and Mann–Whitney U test for non-normal quantitative variables and chi-square test, respectively.

3. Results

In this study, overall, 3500 people participate and finally 3063 completed the questionnaires and were included in the current analysis. Variables of physical activity, sleep duration, BMI and Psychological distress had ≤0.1% missing data and the remaining variables had no missing data (Figure 1). Of the study participants 91.5% were males and 8.5% were females with mean (SD) age of 36.73 (7.30) years. About 90% were married, 54.9% were shift workers and 29.4% had university educational attainment. Psychological distress, anxiety and depression were found in 4.6%, 6.6% and 4.5% of the participants, respectively.

Table 1 demonstrates the identified classes of subjects based on five domains of QoL resulted from LCA. Interpretation of classes is based on the probabilities of "no problem")or "some/severe problems" (in five dimensions. The probability of "no problem" for all five dimensions for those in class 2 is very high. Accordingly, class 2 includes people who have high QoL and the majority of subjects were classified in this class (80%). Class 1 consists of individuals who had higher probability of "some/severe problems" and lower probability of "no problem" in five dimensions. This class is identified as low QoL and consists of 20% of the sample.

Differences between classes in terms of demographic, life style, job related variables and psychological problems are reported in Table 2. People in high QoL class were more likely to be younger, men, and had lower BMI, depression score, anxiety score, stress score and lower sleep duration compared with those in low QoL.
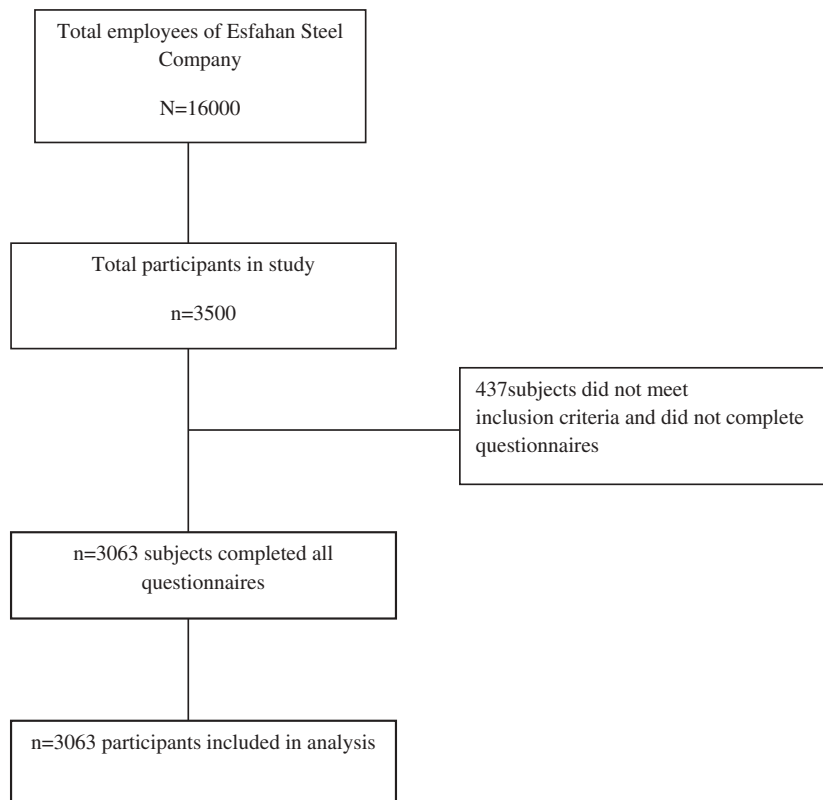
Figure 1. Flow diagram presenting the selected study samples.

Table 3 shows the crude and adjusted odds ratios and 95% confidence interval for the association between psychological problems profile scores and

Table 1. Latent classes of quality life identified by latent class analysis.

Items of EQ-5D questionnaire	Class-specific response pattern of participants to EQ-5D items	
Levels of quality of life Class size	Low 621(0.20)	High 2442(0.80)
Mobility		
I have no problems in walking about	0.69	0.99
I have some problems in walking about/I am confined to bed	0.31	0.01
Self-care		
I have no problems with self-care	0.99	1.00
I have some problems washing or dressing myself/I am unable to wash or dress myself	0.01	0.00
Usual activities (e.g. work, study, housework, family or leisure activities)		
I have no problems with performing my usual activities	0.94	1.00
I have some problems with performing my usual activities/I am unable to perform my usual activities	0.06	0.00
Pain/discomfort		
I have no pain or discomfort	0.13	0.94
I have moderate pain or discomfort/I have extreme pain or discomfort	0.87	0.06
Anxiety/depression		
I am not anxious or depressed	0.48	0.89
I am moderately anxious or depressed/I am extremely anxious or depressed	0.52	0.11

Data are presented as percentage.

levels of QoL. The high QoL class was considered as reference category. Higher scores of psychological problems profile are positively associated with poor QoL in crude model (OR: 6.12, 95% CI: 3.88, 9.65). After adjusting for the effects demographic variables including age, sex, marital status and education level, the higher scores of psychological problems profile was significantly associated with increased Odds of being in poor QoL class (OR:6.12, 95% CI: 3.84, 9.74). This association was remained significant after further adjustment for life style (OR: 6.04, 95% CI: 3.77, 9.70) and job-related confounding variables (OR: 6.03, 95% CI: 3.76, 9.69).

4. Discussion

QoL serves as an outcome variable in clinical trials and medical research and has a latent and multidimensional construct and also individualistic nature. In this cross-sectional study two distinct classes were identified form employees of "E" Steel Company (ESCO) based on their QoL. Most of participants (80%) assigned to high QoL class and remaining to low QoL. The results of our study showed that people with higher scores of psychological problems profile had significantly higher risk for being in poor levels of QoL.

Although, we did not find any previous study on the association of psychological problems with QoL in manufacturing employees based on LCA; however, there are many studies in this regard among general,

Table 2. Demographic characteristics, life style, job-related variables and psychology variables of participants across two classes of QoL.

variables	Low	High	P*
Sex			
Male	547(88.1)	2256(92.4)	0.001
Female	74(11.9)	186(7.6)	
Marital status			
Married	568(91.5)	2190(89.7)	0.185
Single	53(8.5)	252(10.3)	
Education level			
0–5 years	41(6.6)	214(8.8)	0.193
6–12	389(62.6)	1519(62.2)	
>12	191(30.8)	709(29)	
Smoking status			
Non smokers	416(67)	1755(71.9)	0.017
Current or former smoker	205(33)	687(28.1)	
Shift work			
Daily(daily shift)	316(50.9)	1064(43.6)	0.001
Shift(rotating shift work)	305(49.1)	1378(56.4)	
Second job			
Yes	54(8.7)	231(9.5)	0.559
Age (years)	38.48 ± 7.22	36.26 ± 7.26	<0.001
BMI (kg/m^2)	26.09 ± 4.11	25.46 ± 3.70	<0.001
Physical activity (METs hour/ week)	9.20 ± 14.51	9.97 ± 15.55	0.26
Sleep duration(hour)	6.91 ± 1.22	7.16 ± 1.15	<0.001
Depression			<0.001
Score	3.57 ± 3.19	1.81 ± 2.25	
Yes	72(11.6)	66(2.7)	
Anxiety			<0.001
Score	4.24 ± 3.70	1.70 ± 2.45	
Yes	105(16.9)	96(3.9)	
Psychological distress			<0.001
Score	1.28 ± 1.87	0.45 ± 1.11	
Yes	71(11.5)	69(2.8)	

The column header row: *Levels of QoL (QoL class)* spanning Low and High.

	Levels of QoL (QoL class)		

*P-values resulted from two independent samples *t*-test (or Mann–Whitney *U* test) and χ[2] test for continues and categorical variables, respectively

Table 3. Crude and multivariable adjusted odds ratio (OR) and 95% confidence interval (95% CI for OR) of the association of psychological problems profile scores and QoL.

	Coefficient	z-value (P-value)	Odds ratio (OR)	95% CI for OR
Crude model	1.81	7.79 (< 0.001)	6.12	(3.88,9.65)
Model 1*	1.81	7.62 (< 0.001)	6.12	(3.84,9.74)
Model 2**	1.80	7.47 (< 0.001)	6.04	(3.77,9.70)
Model 3***	1.80	7.44 (< 0.001)	6.03	(3.76,9.69)

*Model 1 was adjusted for age, sex, marital status and education level.
**Model 2 was adjusted for age, sex, marital status, education level, smoking status, BMI, physical activity and sleep duration.
***Model 3 was adjusted for age, sex, marital status, education level, smoking status, BMI, physical activity, sleep duration, shifting work and second job.

and some specific population [10,27–32]. Previous studies using simple statistical methods have focused on investigating the association of each psychological problem with QoL scores, separately. In the present study, we applied LCA for classifying the individuals in terms of QoL and constructed a composite measure from three psychological problems (depression, anxiety and psychological distress) and evaluated their association.

The present study in line with other previous studies showed that psychological distress, anxiety and depression disorders are significantly associated with QoL. Olatunji et al. in a meta-analytic review demonstrated that anxiety disorders significantly associated with weak QoL [9]. They reported that the mental and social domains of QoL compared to physical health, family relationships, functioning at work and functioning at home dimensions have the strongest association with anxiety disorders.

Pirkola et al.'s study on a general population showed that both anxiety and depression disorders lead to weak QoL and comorbid anxiety and depressive disorders leads to further reduction of QoL compared to every one of the two disorders [6]. Comer et al. in a study on general population showed that some of anxiety disorders are strongly in relation to decreased levels of role functioning, social functioning and mental health dimensions of QoL [27]. Anxiety disorders have a higher impact on impairment in mental health aspect of QoL than physical aspect [11]. Cramer et al. in a population-based study demonstrated that some aspects of QoL, including contact with friends, self-realization and subjective well-being, are more affected by some of anxiety disorders [28]. Since anxiety disorders can lead to problems such as role limitations, marital and financial problems, education and relationship impairments, disability, impairment mental health, weak physical functioning, it can be concluded that anxiety disorders through the negative impact on many functional areas may lead to change of QoL [9,27].

L. Hansson reported that impaired QoL and functioning are associated with depression and anxiety disorders [5]. A depressed person may experience some symptoms such as sadness, hopelessness, feeling of tiredness, inability to concentrate and make decisions, sleep disorders, impaired appetite, loss of interest in normal daily activities. Symptoms of depression such as sleep disorders impair social or occupational functioning. It is possible that the impact of depression on QoL related to the social or occupational functioning impairment and biological or psychological aspects of depression [33].

Serrano-Aguilar et al. indicated that psychological distress impairs QoL in general population [10]. Hassanzadeh et al. on Iranian population showed that, there is a significant negative correlation between QoL and mental health [29]. Mathiesen et al. indicated that psychological distress has an important role in determination of QoL [34]. J. Alonso et al. found that mental disorders have a more impact in reducing "mental" dimension of QoL than physical dimension [7]. The mechanism underlying the relationship between QoL and mental disorders is expressed as follows: psychological problems can lead to disability and loss of QoL because of limitations in cognitive and motivational reserves, emotion regulation, social perception and a tendency to magnify bodily symptoms [7,10].

The present study has several strengths and limitations. A notable strength of this study is the application of an advanced statistical model for comprehensive evaluating both QoL and psychological problems and their association. Other strengths of this study are large sample size and adjustment for many potential confounders in the association analyses. Despite these strengths, the present study has several limitations. Due to the cross-sectional nature of the study, it was impossible to inference causal relationship between psychological problems and QoL. The self-report questionnaires were used for collecting information in the present study. Use of self-report data may lead to misclassify of study participants. We did not have any data on those participants who refused to participate in our study or on those participants with large missing values; therefore, the generalizability of results should be interpreted cautiously. It should also be mentioned that all data in the present study was obtained by self-administered questionnaires, which might be affected by recall bias and lead to misclassification of participants. The subjective decisions in LCA, such as the number of classes to be extracted, and interpretation of the results. On the other hand, since the study conducted on industrial manufacturing workers, our findings are not generalizable to the Iranian general population even due to the differences in background and working atmosphere the results must be generalized to other manufacturing employees with cautious.

5. Conclusion

In conclusion, current study indicated that the higher scores of psychological problems profile is positively associated with poor QoL industrial manufacturing employees. QoL can be improved among manufacturing employees through conducting screening programs for identifying affective individuals and implementing health promoting interventions aiming to reduce psychological problems' impacts and finally productivity of work force.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

[1] Testa MA, Simonson DC. Assessment of quality-of-life outcomes. N Engl J Med. 1996;334(13):835–840.
[2] Who Group. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. Soc Sci Med. 1995;41(10):1403–1409.
[3] Katschnig H, Krautgartner M. Quality of life: A new dimension in mental health care. In: Sartorius N, Gaebel W, López-Ibor JJ, & Maj M, editors. Psychiatry in society. West Sussex, UK: Wiley; 2002. p. 171–192.
[4] Bridges K, Huxley P, Mohamad H, et al. Quality of life and mental health services. London: Routledge; 2005.
[5] Hansson L. Quality of life in depression and anxiety. Int Rev Psychiatry. 2002;14(3):185–189.
[6] Pirkola S, Saarni S, Suvisaari J, et al. General health and quality-of-life measures in active, recent, and comorbid mental disorders: a population-based health 2000 study. Compr Psychiatry. 2009;50 (2):108–114.
[7] Alonso J, Angermeyer MC, Bernert S, et al. Disability and quality of life impact of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. Acta Psychiatr Scand. 2004; (suppl.): 38–46.

[8] Gaynes BN, Burns BJ, Tweed DL, et al. Depression and health-related quality of life. J Nerv Ment Dis. 2002;190(12):799–806.

[9] Olatunji BO, Cisler JM, Tolin DF. Quality of life in the anxiety disorders : A meta-analytic review. Clin Psychol Rev. 2007;27:572–581.

[10] Serrano-Aguilar P, Ramallo-Fariña Y, Trujillo-Martín MDM, et al. The relationship among mental health status (GHQ-12), health related quality of life (EQ-5D) and health-state utilities in a general population. Epidemiol Psychiatr Sci. 2009;18(3):229–239.

[11] Luo N, Fones CS, Thumboo J, et al. Factors influencing health-related quality of life of Asians with anxiety disorders in Singapore. Qual Life Res. 2004;13(2):557–565.

[12] Belzer K. Comorbidity of anxiety and depressive disorders: issues in conceptualization, assessment, and treatment. J Psychiatr Pract. 2004;10(5):296–306.

[13] Kittipichai W, Arsa R, Jirapongsuwan A, et al. Quality of life among Thai workers in textile dyeing factories. Glob J Health Sci. 2015;7(3):274.

[14] World Health Organization. Investing in mental health. Geneva: World Health Organization; 2003. Available from: http://www.who.int/iris/handle/10665/42823

[15] Harnois G, Gabriel P. Mental health and work: impact, issues and good practices. Geneva: World Health Organization and International Labour Organisation; 2000.

[16] Guo J, Wall M, Amemiya Y. Latent class regression on latent factors. Biostatistics. 2005;7(1):145–163.

[17] Lanza ST, Flaherty BP, Collins LM. Latent class and latent transition analysis. In: Schinka JA, Velicer WF, editors. Handbook of psychology: vol 2. Research methods in psychology. Hoboken (NJ): Wiley; 2003. p. 663–685.

[18] Yazdi M, Roohafza H, Feizi A, et al. The influence of dietary patterns and stressful life events on psychological problems in a large sample of Iranian industrial employees: structural equations modeling approach. J Affect Disord. 2018;236:140–148.

[19] EroQol Group. EuroQol-a new facility for the measurement of health-related quality of life. Health Policy (New York). 1990;16(3):199–208.

[20] Agt H, Essink-Bot M-L, Krabbe P, et al. Test-retest reliability of health state valuations collected with the EuroQol questionnaire. EQ-5D concepts methods a dev hist. J Chromatogr B Analyt Technol Biomed Life Sci. 2005;827:109–123.

[21] Kontodimopoulos N, Pappa E, Niakas D, et al. Validity of the EuroQoL (EQ-5D) instrument in a Greek general population. Value Heal. 2008;11(7):1162–1169.

[22] Montazeri A, Vahdaninia M, Ebrahimi M, et al. The Hospital Anxiety and Depression Scale (HADS): translation and validation study of the Iranian version. Health Qual Life Outcomes. 2003;5:1–5.

[23] Montazeri A, Harirchi AM, Shariati M, et al. The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version. Health Qual Life Outcomes. 2003;1(1):66.

[24] Moghaddam MHB, Aghdam FB, Jafarabadi MA, et al. The Iranian version of International Physical Activity Questionnaire (IPAQ) in Iran: content and construct validity, factor structure, internal consistency and stability. World Appl Sci. 2012;18(8):1073–1080.

[25] Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. Struct Equ Model. 2007;14(4):535–569.

[26] Lo Y, Mendell NR, Rubin DB. Testing the number of components in a normal mixture. Biometrika. 2001;88(3):767–778.

[27] Comer JS, Blanco C, Hasin DS, et al. Health-related quality of life across the anxiety disorders. J Clin Psychiatry. 2011;72(1):43.

[28] Cramer V, Torgersen S, Kringlen E. Quality of life and anxiety disorders: a population study. J Nerv Ment Dis. 2005;193(3):196–202.

[29] Hassanzadeh J, Asadi-Lari M, Baghbanian A, et al. Association between social capital, health-related quality of life, and mental health: a structural-equation modeling approach. Croat Med J. 2016;57(1):58–65.

[30] Dickens C, Cherrington A, McGowan L. Depression and health-related quality of life in people with coronary heart disease: a systematic review. Eur J Cardiovasc Nurs. 2012;11(3):265–275.

[31] Blakemore A, Dickens C, Guthrie E, et al. Depression and anxiety predict health-related quality of life in chronic obstructive pulmonary disease : systematic review and meta-analysis. Int J Chron Obstruct Pulmon Dis. 2014;501–512.

[32] Lee Y, Kim MS, Cho S, et al. Association of depression and anxiety with reduced quality of life in patients with predialysis chronic kidney disease. Int J Clin Pract. 2013;67(4):363–368.

[33] Ebben MR, Spielman AJ. Sleep and quality of life in anxiety disorders. In: Verster JC, Pandi-Perumal SR, Streiner DL, editors. Sleep and quality of life in clinical medicine. Springer; 2008. p. 239–249.

[34] Mathiesen EF, Nome S, Eisemann M, et al. Drinking patterns, psychological distress and quality of life in a Norwegian general population-based sample. Qual Life Res. 2012;21(9):1527–1536.