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Original Article

Subjective Social Status as an Important Mediator in the Association Between Socioeconomic Status and Mental Health

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Abstract

Background and aims: Socioeconomic status (SES) is frequently seen as a significant indicator of mental health outcomes. This study aimed to determine the mediating role of subjective social status (SSS) in the association of SES and mental health among the employees of Tehran University of Medical Sciences (TUMS).

Methods: This cross-sectional research involved the analysis of data collected from 4461 TUMS employees using a two-step structural equation modeling (SEM) approach. The study examined the impact of SES on mental health issues, specifically symptoms of depression, anxiety, and stress. SES was assessed as a composite index, and then each indicator was evaluated separately. SSS was considered as a potential mediator using the MacArthur scale, which was converted to a five-point Likert scale. The analysis utilized a two-step SEM approach in STATA version 14.0 with maximum likelihood estimation.

Results: The majority of participants in the study were female (60.65%), and the mean (±SD) age of the participants was 42.21±8.72 years. The analysis revealed that the composite SES index had a standardized indirect effect of -0.05 on mental health through SSS. SSS accounted for 27.78% of the association between the composite SES index and mental health among TUMS employees (27.27% in males and 22.23% in females).

Conclusion: The results of the study indicated that a lower SES may impact the development of mental health issues, indicating a relationship between SES and symptoms of depression, anxiety, and stress.

Keywords: Socioeconomic status, Mental health, Subjective social status, TUMS employee's cohort study

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Introduction

Mental health is one of the most critical aspects of community health. Furthermore, improving mental health indicators leads to increased efficiency and labor productivity in all societies. The World Health Organization (WHO) defines "mental health" as a state of well-being in which an individual recognizes his or her abilities, can cope with daily life stressors, can work productively and fruitfully, and is able to contribute to his or her community.[1] According to WHO's 2017 estimates, 792 million people worldwide suffer from a mental health disorder across all age groups, with 264 million suffering from depression and 284 million suffering from anxiety disorders. Depression and anxiety are also significant causes of disability and contribute significantly to the global burden of disease.[2]

The role of socioeconomic status (SES) is critical among environmental factors influencing mental health.[3] Numerous studies have examined the relationship between SES and mental health, and the majority of them have found that the higher the SES, the better the mental health status and vice versa.[4] Subjective social status (SSS) represents a cognitive average of objective SES indices (including income, education, and occupation status).[5] SSS refers to an individual's perception of his or her social position in relation to other members of society.[6] This perceived social status is the result of a procedure known as social comparison. Furthermore, SSS is associated with objective SES indices.[7]

In 2000, the concept of SSS was first introduced in health-related research, with the suggestion that SSS can predict the psychological and physiological functioning of the body.[8] SSS can have an impact on health through psychological pathways.[9] For example, feelings of

anxiety, stress, and inequality, which are associated with perceptions of low social status, may be related to health-related physiological responses.[10]

Numerous studies have found a significant association between SSS and various aspects of physical and mental health, even after controlling the effects of objective SES indices.[11] The WHO mental health surveys, for example, show significant relationships between SSS and a variety of mental disorders after controlling for objective SES indices.[12] In a study conducted in Germany, SES was found to be associated with depressive symptoms through SSS.[13] Demakakos *et al* in the United States discovered that after controlling objective SES indices, SSS had a significant association with some physical illnesses and depressive symptoms.[14]

Despite the fact that many scholars have attempted to explain the socioeconomic gradient in mental health, there is little evidence of causal pathways by which SES affects an individual's mental health status. The purpose of this study was to determine the mediating role of SSS in the association between SES and mental health among the employees of Tehran University of Medical Sciences (TUMS).

Materials and Methods

Study Area and Population

This study used data from the initial enrolment phase of the TUMS employees' cohort study (TEC) conducted in Tehran, Iran. This phase was carried out from January 2018 to March 2021. In the cohort study, the sample consisted of the employees of TUMS and other institutes affiliated with this university who were willing to participate in the study (n = 4461). The Research Department of TUMS formally informed all university-affiliated centers and faculties about the research. At the cohort center, data on the physical and mental health of the participants was collected.[15] In the baseline phase of this cohort study, 766 variables related to the health of the employees were examined. This present study used variables such as demographic characteristics, SES, educational status, and stress, anxiety, and depression disorders. A preprint has previously been published by Mehravar et al in 2021.[16]

Study Variables

Depression, Anxiety, and Stress Scale (DASS-42): This scale measures depression, anxiety, and stress as indicators of mental health status. It is divided into three subscales of 14 items: anxiety, depression, and stress. The items are graded on a four-point Likert scale: never (score 0), rarely (score 1), occasionally (score 2), and always (score 3). The depression subscale assesses dysphoric mood, a lack of confidence, hopelessness, a sense of worthlessness in life, a lack of interest in involvement, a lack of enjoyment, and a lack of energy and strength. The anxiety subscale assesses physiological overarousal, fears, and situational anxiety. Finally, the stress subscale assesses the difficulty in achieving peace, as well as nervous tension, irritability, and restlessness. The validity and reliability of the tool have been confirmed in the Iranian population,[17] and the scale has frequently been used in studies carried out in Iran.[18] A higher score on this scale indicates that the individual suffers from anxiety disorders, depression, and stress to a greater extent.

Objective SES

SES is made up of components such as education, wealth index, and social class. Education is divided into eight categories (illiterate, primary, intermediate, diploma, upper diploma, Bachelor of Science, Master of Science, and Doctor of Philosophy).

The wealth index is calculated using data about durable assets (dishwasher, microwave, personal computer/laptop, washing machine, LCD/LED TV, DVD players, home theater systems, access to the internet at home, automobile, total price of cars owned by family, number of rooms per person, and floor area per person). The categorical principal components analysis (CATPCA) is used to calculate the household wealth index.[19] It should be noted that higher wealth index scores indicate a higher level of economic well-being.

CATPCA is also used to assess participants' social class by collecting data on how frequently they go to music concerts, cinemas, theaters, or restaurants, how many national and international family trips they take, how much money they spend on the internet, and how many extracurricular books they read. Higher social class scores indicate a higher level of social status.

Subjective Social Status

The SSS mediating variable reflects an individual's perception of their (or their family's) SES in comparison to other members of society.[20] In this study, the SSS of the participants was assessed using the MacArthur scale, which was converted to a five-point Likert scale.[8,21] The participants were asked: Which of the five socioeconomic classes does your family belong to in today's Iranian society? (upper class: score 1, upper middle class: score 2, middle class: score 3, lower middle class: score 4, and lower class: score 5). Individuals with higher SSS scores had a worse SSS.

Statistical Analyses

The CATPCA method determined that the first component that explained the most significant proportion of the variance in the composite variable was the best substitute for wealth and social class indices. In the principal components analysis technique, a large number of highly correlated variables are converted into a smaller set of uncorrelated variables.[22] The variables "mental health, wealth index, and social class" and "education and SSS" were analyzed using "interval" and "ordinal" scales, respectively.

To assess the correlations between the research variables, the Pearson correlation coefficient test was used.

The mediation analysis was then carried out using a two-step structural equation modeling (SEM) (a measurement model and a structural model) approach proposed by Anderson and Gerbing.[23] Using this method, the direct and indirect effects of SES indices on mental health were investigated while accounting for the mediating role of SSS. In SEM, all parameters were estimated using the Maximum Likelihood Estimation method. Indicators of root mean square error of approximation (RMSEA) < 0.05, standardized root mean square residual (SRMR) < 0.08, CFI > 0.9, and Tucker–Lewis index (TLI) > 0.9 were used to test the goodness of fit of the model.[24] All SES indices were first incorporated into the mediation model as the composite SES index (a combination of wealth index, social class, and education). Then, they were inserted into the model separately using STATA version 14.0 (STATA Corporation, College Station, Texas).

The mediating role of SSS was evaluated by calculating standardized path coefficients for indirect and total effects using the variance accounted for (VAF) formula.[25]

*Mediation percentage (VAF) = (indirect effect/total effect)*100*

VAF values > 80 % indicate full mediation; 20% < VAF values < 80 % indicate partial mediation, and VAF values < 20% show no mediation.[26]

Results

As shown in Table 1, among all 4461 participants, 2706 individuals (60.65%) were female, and 1755 individuals (39.35%) were male. The mean (± SD) age of the male and female participants was 43.23 ± 9.0 years (range: 20-73) and 41.61 ± 8.40 years (range: 19-75), respectively. Most of the participants (78.91%) were married.

As shown in Table 2, SES indices were moderately correlated with each other and SSS. Among the SES indices, the highest correlation was observed between the wealth index and SSS ($r = 0.48$, $P < 0.001$). Mental health subscales (including depression, anxiety, and stress) were strongly correlated with each other; however, depression had the highest correlation with SSS ($r = 0.39$, $P < 0.001$). These correlations were all moderate. In addition, the wealth index had the highest correlation with mental disorders (especially stress) among other SES indices ($r = 0.51$, $P < 0.001$).

The hypothetical model was analyzed with the variables of composite SES-index, mental health, and the mediating variable of SSS using SEM. Acceptable values were obtained for all goodness-of-fit tests, which are used to assess how well the saturation model fits the hypothetical model (RMSEA = 0.05, comparative fit index [CFI] = 0.98, TLI = 0.97, SRMR = 0.02, and oefficient of determination [CD] = 0.76).

As shown in Figure 1, in the measurement model, social class ($r = 0.73$) had the most significant effect on the latent variable of SES. Wealth index (0.71) and education (0.65) were ranked second and third. In other words, the social class index was positively correlated with SES. In addition, the variable of stress ($r = 0.89$) had the most significant effect on the latent variable of mental health, and depression (0.87) and anxiety (0.85) were ranked second and third, respectively. Stress was found to have a positive relationship with mental health. Higher SES scores indicated a better SES.

Table 1. Characteristics of the Study Population in TUMS Employee's Cohort Study

Variables	Total (N = 4461)	Male (n = 1755)	Female (n = 2706)
	Mean (SD)	Mean (SD)	Mean (SD)
Age (range: 19-74 years)	42.29 (8.71)	43.24 (9.07)	41.67 (8.42)
Education (range: 1-8)	5.54 (1.44)	5.19 (1.56)	5.77 (1.30)
Wealth index (range: -5.08 to 2.84)	-1.01 (1.02)	-0.15 (1.06)	0.06 (0.98)
Social class (range: -2.12 to 5.09)	-0.06 (1.08)	-0.27 (1.05)	0.06 (1.07)
SSS (range: 1-5)	2.84 (0.81)	2.97 (0.84)	2.75 (0.78)
Depression (range: 0 to 42)	8.03 (8.06)	7.10 (7.37)	8.63 (8.41)
Anxiety (range: 0 to 38)	6.03 (5.56)	5.48 (5.06)	6.38 (5.81)
Stress (range: 0 to 39)	12.63 (8.28)	11.58 (7.83)	13.31 (8.48)

Abbreviations: SD, standard deviation; SSS, subjective social status.
Note: High scores of wealth index and social index indicate better SES. High scores of anxiety, depression, and stress indicate worse mental health status. High scores in SSS indicate worse subjective social status.

In contrast, higher SSS and mental health scores indicated worse status. In CATPCA, the first dimension with a specific value equal to 2.64 explained the most significant variance of the variables (59.61%). Then, the second dimension, with a particular value of 1.79, explained 40.43% of the total variance of the variables.

In the SEM structural model, SES had a significant relationship with SSS (β for standardized directed effect = -0.50); therefore, a one-unit increase in the SES score reduced the participants' SSS by 0.50. In addition, SSS was directly related to mental health (β for standardized directed effect = 0.10). In other words, exacerbation of the SES of the university employee worsened their SSS, which in turn deteriorated their mental health status.

The direct, indirect, and total effects were determined to assess the potential mediating role of SSS in the relationship between SES indices and mental health (Table 3). Based on the results, the composite SES index and SES indices indirectly affected mental health through SSS. The standardized indirect effect of the composite SES index on mental health through SSS was -0.05. Therefore, the contribution of SSS to the association between the composite SES index and the mental health of TUMS employees is 27.78%. SES indices also had significant indirect effects on mental health through SSS. The contribution of SSS to the association between the index of wealth, education, social class, and mental health was 41.67%, 36.36%, and 28.57%, respectively.

Figure 2 shows the indirect effect of SES on mental health through SSS for both women (β for standardized

Table 2. Correlations Between Indicators of SES, SSS, and Mental Health Outcome (Correlation Coefficients) (n = 4461)

	Education	Wealth index	Social class	Depression	Anxiety	Stress
Wealth index	0.57*					
Social class	0.58*	0.61*				
Depression	-0.31*	-0.42*	-0.21*			
Anxiety	-0.22*	-0.43*	-0.18*	0.81*		
Stress	-0.36*	-0.51*	-0.37*	0.77*	0.75*	
SSS	-0.40*	-0.48*	-0.47*	0.39*	0.35*	0.32*

*$P < 0.001$.

Table 3. Mediation Analysis of the Association between SES and Mental Health Through SSS in TEC Study (n = 4461)

Paths (Mediated by SSS)	Direct Effect (SE)	Indirect Effect Through the SSS (SE)	Total Effect (SE)	Percentage of VAF by SSS
SES→ Mental health	-0.14 (0.02)	-0.05 (0.01)	-0.18 (0.01)	27.78
Education→ Mental health	-0.07 (0.01)	-0.04 (0.01)	-0.11 (0.01)	36.36
Wealth index→ Mental health	-0.07 (0.03)	-0.05 (0.01)	-0.12 (0.03)	41.67
Social class→ Mental health	-0.09 (0.01)	-0.04 (0.01)	-0.14 (0.01)	28.57

Abbreviations: VAF, variance accounted for; SSS, subjective social status; SE, standard error; SES, socioeconomic status.

- Direct effect = the pathway from the SES to the mental health while controlling for the SSS.
- Indirect or mediated effect = the pathway from the SES to the mental health through the SSS.
- Total effect = direct effect + indirect effect.
- VAF = (indirect effect/ total effect) × 100.
- VAF < 0.2: no mediation; 0.2 ≤ VAF ≤ 0.8: partial mediation; VAF > 0.8: full mediation.
- All *P*-values are less than 0.001.

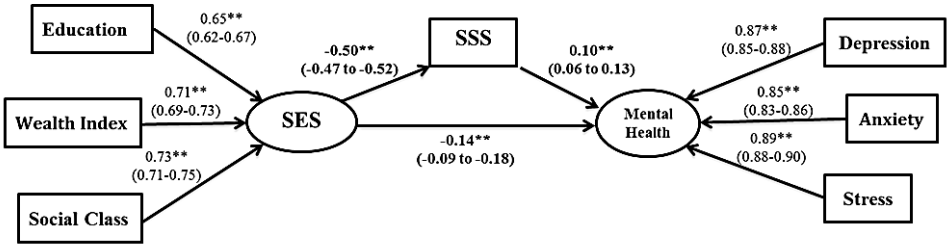

Figure 1. Measurement and Structural Models in Structural Equation Modeling of the Association between Socioeconomic Status (SES) and Mental Health through SSS in TUMS Employee's Cohort Study (n = 4461). Standardized directed coefficients are out of parentheses, and 95% CI is in parentheses. ** $P < 0.001$

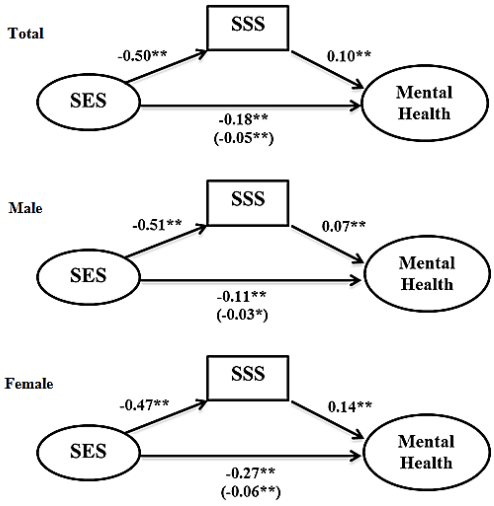

Figure 2. Mediation Analysis Model of the Association between Socioeconomic Status (SES) and Mental Health Through SSS in TUMS Employee's Cohort Study by Gender (n = 4461; men = 1755; women = 2706). Standardized coefficients for total effects are presented, and standardized coefficients for indirect effects are presented in parentheses. SSS and mental health were reverse-scored so that higher values reflected worse status. ** $P < 0.001$, * $P < 0.05$

indirect effect = -0.06) and men (β for standardized indirect effect = -0.03). In other words, a one-unit increase in the SES score of female employees reduced their mental health score by 0.06 through SSS. Finally, the contribution of SSS to the association between the composite SES index and the mental health of TUMS employees was 27.27% in males and 22.23% in females.

Discussion

The data from the enrolment phase of a cohort study conducted on TUMS employees was used to determine the role of SSS as a mediator in the relationship between SES and mental health. According to the results of the present study, SSS partially mediated the effects of SES on the mental health of women and men TUMS employees. In other words, SSS contributes to 27.78% of the explanation of SES in mental health.

Only a few studies have used SEM to investigate the effects of the above-mentioned variables on mental health simultaneously. Hoebel *et al* used sequential logistic regression models in 2017 to examine the role of SSS as a

mediator in the relationship between SES and depressive symptoms in a sample of approximately 5000 German adults. The results of the mediation analysis showed an indirect relationship between SES and depressive symptoms through SSS, with SSS accounting for 34.78% of the effect of SES on depressive symptoms (46.15% in men and 27.27% in women).[13] In line with the present results, Hoebel et al also observed that SSS mediated a higher percentage of the relationship in men than women. Demakakos et al examined the relationship between SES and health using data from the English Longitudinal Study of Aging in the United States. Their study population comprised 3368 men and 4065 women aged 52 years or older. They discovered that in both men and women, SSS mediated the relationships between objective SES indices and depression and some chronic physical illnesses. SSS also mediated the relationships between education, occupational class, and depression; however, it did not mediate the relationship between wealth and health outcomes. Since multivariate regression analysis was used to mediate, indirect effects and the contribution of the SSS variable were not reported.[14]

In our study, SSS mediated more than 40% of the effect of the wealth index on mental health. In a study on Iranian participants, Beigi *et al* found that SSS had the highest correlation with wealth index among all objective SES indices.[21] In a population-based study conducted in rural Uganda, people who perceived themselves to be less wealthy were more likely to develop depression than those who perceived themselves to be more affluent (the effects of other objective SES indices were controlled for).[27] Therefore, in similar studies, scholars can use the single-item measure of SSS rather than the relatively sophisticated tool of ASSET.

In the present study, SSS mediated 36.36% and 28.57% of the effects of education and social class on mental health, respectively. Most studies have highlighted the leading role of economic status in the incidence of mental health disorders[28,29]; however, Hoebel *et al* observed that education had the strongest relationship with depressive symptoms among all objective SES indices.[13] In the present study, the most prominent mediating role of SSS was observed in the relationship between wealth index and mental health (41.67%), with education ranking second. In the case of occupational class, the results of studies are highly contradictory,[30] which is most likely due to differences in occupational classification in different countries.

In our study, higher SES scores were found to reduce the prevalence of mental disorders (including depression, anxiety, and stress) in both men and women. In a comprehensive study of approximately one million people living in 55 regions of Sweden, factors such as low social support, social humiliation, low employment status, and economic problems were found to be independently associated with mental health symptoms; however, education had no significant effect on the participants' mental health status.[31] Wang et al reported that a low SES contributed to the development of major depressive disorder in the general Canadian population; however, this association depended on factors of gender and employment status. For example, working men from low-income families, as well as unemployed men and women with poor economic status, were more likely than others to suffer from major depression.[32]

Our results indicated that social class was positively correlated with the SES more than the education and wealth index. Therefore, it can be suggested that the social class index be used in future studies as one of the critical indicators determining the SES. The strength of the study was the large sample size of the study. Furthermore, the SEM model was used in this study, which has many advantages over regression and classical models. It estimates the relationships between several manifest and latent variables while correcting for measurement errors. Besides, standardized coefficients allowed the researchers to compare various types of variables with one another.

Study Limitations

Given the lack of a standard occupational classification system in Iran and the fact that there are people ranging from very rich to very poor in a single occupation class in available systems, the role of SSS in mediating the relationship between occupation and mental health was not evaluated. Due to the large number of participants, self-reported tools were used to assess the mental health of the TUMS employees, which was another limitation of the present study.

Given the cross-sectional nature of the study, the researchers were unable to determine causal associations and causal directions between variables, and they failed to examine causal mediation in the mediation analysis process. In this study, the results confirmed only the consistency of the hypothetical mediation model with the data used. To overcome this limitation, prospective data must be used to determine the causality of the hypotheses. Other phases of the TUMS employees' cohort study will be completed in the future; therefore, using the prospective data, the researchers can reassess the analyzed relationships and compare the obtained results with the current findings, allowing them to draw more valid conclusions. Given that the study population consisted of all TUMS employees, the results should be carefully generalized to the general population. However, the fact that the selected employees came from various age groups and occupational backgrounds (*e.g.*, administrative, service, educational, and medical groups) contributed to the diversity of their SES.

Conclusion

SSS, which refers to a person's perception of their social position in relation to other members of society, accounts for a considerable contribution (27.78%) of the effect of the composite SES index on common mental health disorders

(*e.g.*, depression, anxiety, and stress). The mediating role of SSS in this relationship is likely related to forming capabilities and individuals' social and economic status. Therefore, in future studies, the effect of SES on various aspects of health should be investigated through other causal pathways, and the contribution of other influential factors should be determined.

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Authors' Contribution

Conceptualization: Fatemeh Mehravar, Saharnaz Nedjat.
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Supervision: Saharnaz Nedjat.
Validation: Fatemeh Mehravar, Mohammad Ali Vakili.
Visualization: Fatemeh Mehravar, Mohammad Ali Vakili.
Writing-original draft: Fatemeh Mehravar.
Writing-review & editing: Fatemeh Mehravar, Saharnaz Nedjat, Abbas Rahimi Foroushani, Mohammad Ali Vakili.

Conflict of Interests

The authors declare that there is no conflict of interest.

Ethical Approval

Ethical approval for this study was obtained from the Ethics and Research Committee of Tehran University of Medical Sciences (TUMS.VCR.REC.1398.829). Before registration, all participants read and signed the informed written consent form. A copy of the signed consent form was given to the participant. The guidelines on research involving the use of human subjects (beneficence, non-maleficence, veracity, confidentiality, and voluntarism) were strictly adhered to according to the Helsinki Declaration. Participants did not incur any cost by participating in this study, and there was no financial inducement.

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