



# Can a Single General Self-Rated Health Question Mirror Social Determinant of Health?

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## Abstract

**Background:** Self-rated health (SRH) indicator is widely used and recommended in health research as a standard indicator for measuring health in different populations. This paper reports SRH of employees at Tehran University of Medical Sciences (TUMS), Tehran, Iran; and its related factors.

**Methods:** We used the TUMS Employee's Cohort Study (TEC) data, collected from September 2017 to August 2019. SRH of 2158 employees were assessed using a single question. Univariate and multivariate logistic regression were performed to determine factors associated with sub-optimal SRH.

**Results:** Overall, 14.9% (n = 321) of respondents rated their health as sub-optimal. Differences were observed with subgroups. Women, lower socioeconomic status (SES), experiences of more economic fluctuation conditions and lower reading scores could predict sub-optimal SRH variations in crude and adjusted regression analyses. The age, social capital, work experience and employment status could predict sub-optimal SRH variations only in crude regression analyses ( $P < 0.05$ ).

**Conclusion:** Differences in SRH report reflected differences in socioeconomic conditions. The biggest gap was observed between people of different SES (five times). Considering that SRH reflected socioeconomic characteristics of individuals, it may be considered as a quick, non-expensive, and simple way of identifying groups in need of addressing their social determinants of health.

**Keywords:** Self-rated health; Socioeconomic status; Workplace; Employees; Social determinants of health; Iran

## Introduction

Self-rated health (SRH) is a health status indicator used to evaluate overall health status of different populations; and monitor its changes over time (1, 2). In addition to clinical examinations as a gold standard and researcher-made questionnaires that measure medical history, medication

use and symptoms of disease (3), SRH is measured by a single question, "In general, how do you assess your current health?", to evaluate the general status of their health (4). The WHO, European Commission, and CDC have recognized SRH as a credible and reliable tool for assessing



and monitoring people's health and quality of life (5-7). However, it is not an alternative to clinical examination and does not determine causes of diseases.

Answer to SRH single question is affected by all areas of health (physical, mental, social and spiritual), family history, socio-economic and demographic variables, biological factors and clinical indicators. Although the answer indicates “subjective” health status, which reflects the self-reporting behavior of individual, it is affected by ‘objective’ or ‘actual’ health status (8-10).

Self-reported health predicts health conditions such as disability and mortality (11-13), physical function (14), cardiovascular disease (15), utilization of health services (16) and survival of diseases such as cancers (17). The strength of these connections varies from country to country (18) due to different health related culture. Prediction strength of SRH for health status should be examined in different contexts.

We aimed to determine SRH status and its determinants of differences among employees of TUMS.

## Methods

### *Study design and population*

This study was conducted on 2158 employees participating in the enrollment phase of TEC from January 2018 to August 2019. The staff of TUMS were referred to TEC center and examined for mental and physical health. Inclusion criteria was being employed at TUMS and its affiliated centers and signing informed consent (19).

This study was approved by the Ethics Committee at Tehran University of Medical Sciences (IR.TUMS.SPH.REC.1399.124).

### *Data Collection*

Status of SRH was measured using a single question: How would you rate your general health status? Responses included excellent (coded as 1), very good, good, fair, and poor (coded as 5) (6). To analyze the data using logistic regression

model, we combined the responses of “excellent”, “very good”, and “good” into one category of ‘optimal SRH’ (coded as 0) and the responses of “fair” and “poor” into a second category of ‘sub-optimal SRH’ (coded as 1). Independent variables included personal and social determinants of health including age, gender, marital status, educational level, household wealth quintile, childhood socioeconomic status, current socioeconomic status, fluctuating economic conditions, occupational group, employment status, job position, number of children and households, number of books read in the past year (except for textbooks, business books, prayer books and holy books), work experience, social capital and household assets.

Selection of SDH variables was based on WHO’s definition (20). Social capital was measured using social capital items derived from the World Bank questionnaire for developing countries, which has demonstrated good reliability and validity in Iran (21). Following question measured the childhood SES: ‘what was your position if the socioeconomic status was divided into five categories where you lived and when you were 18 years old?’ The participants were asked to answer the above-mentioned question by choosing: low, moderate to low, moderate, moderate to high and high (22). Current SES is an individual’s perception of his/ her own position in community hierarchy in comparison to other members of the given society (23).

Household assets combined using categorical principal components analysis (CATPCA). The first factor was selected as SES and divided into five quantiles as a common practice (24, 25). Respondents were classified into five groups, from the richest to the poorest groups.

### *Data Analysis*

Descriptive analyses were conducted to calculate the distribution of socio-demographic variables and SRH. We performed univariate and multivariate logistic regressions to determine factors associated with sub-optimal SRH. First, each independent variable was entered separately into univariate logistic regression analysis. Then, the vari-

ables showing significant levels lower than 0.2 were entered into multiple logistic regression model (26). Crude and adjusted odds ratios (ORs) with corresponding 95% confidence interval (95% CI) were reported. We assessed collinearity between variables through measurement of variance inflation factor (VIF). Values of VIF ranged from 1.206 to 1.285, indicating non-existence of multicollinearity in the model (27). Statistical significance was defined as *P*-value less than 0.05.

## Results

Of 2158 participants, 850 (39.4 %) were men. Mean age of the respondents was 42.4 years (SD 8.51; range: 21-67). Overall, nearly 15% of the respondents rated their health as sub-optimal; however, it differed among different subgroups (Table 1).

**Table 1:** Suboptimal health by socio-demographic characteristics of the participants

<i>Variable</i>	<i>Overall (2158) N (%)</i>	<i>Suboptimal SRH N (%)</i>	<i>P-value</i>
Gender			<0.001
Male	850 (39.4)	83 (9.8)	
Female	1308 (60.6)	238 (18.2)	
Total	2158 (100)	321 (14.9)	
Age			<0.001
21≤age≤30	139 (6.4)	16 (11.5)	
30<age≤40	783 (36.3)	81 (10.3)	
40<age≤50	791 (36.7)	146 (18.5)	
Over 50	445 (20.6)	78 (17.5)	
Marital Status			0.61
Never married	356 (16.5)	47 (13.2)	
Married	1722 (79.8)	259 (15)	
Divorced	49 (2.3)	9 (18.4)	
Widowed	31 (1.4)	6 (19.4)	
Education Level			0.43
Primary & middle school	152 (7)	23 (15.1)	
Diploma	321 (14.9)	54 (16.8)	
Bachelor degree	967 (44.8)	150 (15.5)	
Master degree/ GP	567 (26.3)	71 (12.5)	
MD specialist/ Ph.D	151 (7)	23 (15.2)	
Household wealth quintile			0.87
Richest	433 (20.1)	62 (14.3)	
Rich	430 (19.9)	67 (15.6)	
Intermediate	433 (20.1)	66 (15.2)	
Poor	430 (19.9)	58 (13.5)	
Poorest	432 (20.0)	68 (15.7)	
Childhood socioeconomic status			0.09
high	97 (4.5)	10 (10.3)	
Moderate to high	382 (17.7)	53 (13.9)	
Moderate	1103 (51.1)	153 (13.9)	
Moderate to low	320 (14.8)	58 (18.1)	
low	256 (11.9)	47 (18.4)	
Current socioeconomic status			

High	125 (5.8)	9 (7.2)	<0.001
Moderate to high	597 (27.7)	80 (13.4)	
Moderate	1147 (53.2)	167 (14.6)	
Moderate to low	218 (10.1)	43 (19.7)	
Low	71 (3.3)	22 (31)	
Fluctuating economic conditions			
Very much	54 (2.5)	10 (18.5)	0.02
Much	255 (11/8)	52 (20.4)	
Neither little nor much	504 (23.4)	82 (16.3)	
Little	379 (17.6)	54 (14.2)	
Very little	965 (44.7)	123 (12.7)	
Occupational group			
Administration	1266 (58.7)	188 (14.8)	0.03
Clinical and medical services	405 (18.8)	77(19)	
Public services	172 (8.0)	25 (14.5)	
Technical services	64 (3.0)	3 (4.7)	
Staff of diagnostic and chemical laboratories	87 (4.0)	11 (12.6)	
Security	89 (4.1)	10 (11.2)	
Others	75 (3.5)	7 (9.3)	
Employment status			
Permanent position	1189 (55.1)	195 (16.4)	0.02
Temporary position (by contract)	969 (44.9)	126 (13)	
Job position			
Senior manager	48 (2.2)	9 (18.8)	0.15
Junior manager	125 (5.8)	26 (20.8)	
Staff	1338 (62.0)	200 (14.9)	
Others	647 (30.0)	86 (13.3)	
Number of children (N= 1802)			
No children	302 (16.8)	38 (12.6)	0.34
One child	592 (32.9)	88 (14.9)	
Two children	731 (40.6)	123 (16.8)	
Three children and more	177 (9.8)	25 (14.1)	
Number of households			
One person	72 (3.3)	8 (11.1)	0.67
Two persons	386 (17.9)	56 (14.5)	
Three persons	741 (34.3)	105 (14.2)	
Four persons	757 (35.1)	123 (16.2)	
Five persons and more	202 (9.4)	29 (14.4)	
Book reading in the past year			
No reading	925 (42.9)	157 (17)	0.04
One to two books	519 (24.1)	74 (14.3)	
More than 2 books	714 (33.1)	90 (12.6)	

Chi-squared analyses showed that the rate of sub-optimal SRH within some subgroups was significantly different. Within subgroups, significant variations existed in regards to gender, age group, current SES, experiencing fluctuating economic conditions, occupational group, employment status and book reading in the past year. Most variations were related to gender, age, and current SES (Table 1).

The rates of sub-optimal SRH were significantly higher among older age groups, clinical and

administration occupational groups, among those with permanent position, people with lower SES status and people who had high economic fluctuations ( $p < 0.05$ ).

Women and older employees were more likely to describe their health as sub-optimal, even up to 5 times (Table 2). To reduce the potential bias resulting from differences in the groups being compared, adjustments were conducted.

**Table 2:** Logistic regression of suboptimal health according to socio-demographic characteristics

<i>Characteristics</i>	<i>Crude OR</i>			<i>Adjusted OR</i>		
	OR	95% CI	P	OR	95% CI	P
Gender						
Men (Ref)	1			1		
Women	2.05	1.57-2.68	<0.001	2.75	2.05-3.70	<0.001
Marital status						
Married (Ref)	1			-	-	-
Never married	0.85	0.61-1.20	0.37	-	-	-
Divorced	1.27	0.60-2.65	0.52	-	-	-
Widowed	1.35	0.55-3.33	0.50	-	-	-
Educational level						
Primary & middle school (Ref)	1			-	-	-
Diploma	1.13	0.66-1.93	0.64	-	-	-
Bachelor degree	1.03	0.63-1.65	0.90	-	-	-
Master degree/ GP	0.80	0.48-1.33	0.39	-	-	-
MD specialist/ Ph.D.	1.01	0.53-1.88	0.98	-	-	-
Household wealth quintile						
Poorest (Ref)	1			-	-	-
Poor	0.89	0.61-1.29	0.55	-	-	-
Intermediate	0.98	0.68-1.42	0.94	-	-	-
Rich	0.96	0.66-1.39	0.84	-	-	-
Richest	0.83	0.57-1.21	0.35	-	-	-
Childhood socioeconomic status						
High (Ref)	1			1		
Moderate to high	1.40	0.68-2.86	0.35	1.33	0.63-2.82	0.45
Moderate	1.40	0.71-2.75	0.32	1.22	0.59-2.51	0.57
Moderate to low	1.92	0.94-3.93	0.07	1.87	0.88-3.99	0.10
Low	1.95	0.94-4.04	0.07	1.54	0.70-3.38	0.27
Current socioeconomic status						
High (Ref)	1			1		
Moderate to high	1.99	0.97-4.08	0.058	1.80	0.85-3.79	0.11
Moderate	2.19	1.09-4.41	0.02	2.01	0.96-4.16	0.06
Moderate to low	3.16	1.48-6.74	0.01	2.67	1.20-5.93	0.01
Low	5.78	2.48-13.46	<0.001	5.01	1.98-12.62	0.001

Fluctuating economic conditions						
Very little (Ref)	1			1		
Little	1.13	0.80-1.60	0.46	1.09	0.76-1.56	0.61
Neither little nor much	1.32	0.98-1.79	0.06	1.21	0.88-1.66	0.23
Much	1.75	1.22-2.51	0.01	1.65	1.13-2.39	0.01
Very much	1.55	0.76-3.17	0.22	1.37	0.65-2.87	0.40
Occupational group						
Administration (Ref)	1			1		
Clinical and medical services	1.34	1.01-1.80	0.04	1.15	0.84-1.57	0.38
Public services	0.97	0.62-1.53	0.91	0.93	0.54-1.60	0.80
Technical services	0.28	0.08-0.90	0.03	0.41	0.12-1.38	0.15
Staff of diagnostic and chemical laboratories	0.83	0.43-1.59	0.57	0.83	0.43-1.63	0.59
Security	0.72	0.36-1.42	0.35	0.98	0.47-2.04	0.96
Others	0.59	0.26-1.30	0.19	0.69	0.30-1.60	0.39
Employment status						
Temporary position (by contract)	1			1		
Permanent position	1.31	1.03-1.67	0.02	1.06	0.79-1.41	0.69
Job position						
Senior manager (Ref)	1			-	-	-
Junior manager	0.76	0.48-2.64	1.13	-	-	-
Staff	0.47	0.36-1.59	0.76	-	-	-
Others	0.29	0.31-1.42	0.66	-	-	-
Age	1.02	1.01-1.04	<0.001	1.01	0.98-1.04	0.43
work experience	1.02	1.01-1.04	0.001	0.25	0.98-1.05	1.01
Social capital	0.98	0.97-0.99	0.02	0.20	0.98-1.004	0.99
Number of children	1.05	0.91-0.98	0.40	-	-	-
Number of households	0.44	0.93-1.17	1.04	-	-	-
Book reading in the past year	0.94	0.91-0.98	0.01	0.94	0.91-0.98	0.01

## Discussion

SRH indicator is widely used in public health research and is recommended as a standard indicator in public health studies (6, 28). One study has even suggested that to estimate health inequality, it is necessary to measure SRH in a similar way in different populations (29).

SRH has been reported in many countries. SRH of Italians and Canadians has been reported about 11% (30-31). It was 17% in South Africa (32), and 5.9% in Saudi Arabia (33). In Iran, sub-optimal or poor SRH has been reported between 5.7 to 14.7% (34-37). In this study, about 15% of the participants assessed their health status as sub-optimal, which was more than most of the mentioned studies. Caution is needed in comparing SRH in different countries, as differences in SRH do not necessarily imply differences in their

actual health; and is more a cultural difference in self-report behaviors. The results of studies indicated that different racial groups with similar objective health condition choose different answers (38).

In a qualitative study investigated SRH from perspectives of Iranians, Iranians considered their physical health more when assessing their health (39). However, comparison within similar race and cultural groups, can reflect actual health differences.

Findings of this study showed that the most important predictors of SRH included gender, SES, fluctuating economic conditions, book reading, age, work experience and social capital. Therefore, similar to actual health status, SRH, or subjective health is dependent and influenced by social health determinants. The relationship between socio-economic status and SRH, identified



in this study and the other studies (28, 31, 37) may be partly justified by lifestyle and psychosocial factors, so that people with higher SES have a healthier lifestyle; and experience less stress and depression (35, 40). Since many studies confirmed that inequalities in SRH reflect inequalities in 'objective' or 'actual' health status, using this indicator can be an effective and fast way to determine the health inequity of individuals and identify at-risk groups.

Various studies have demonstrated that women rated their health status worse than men (35, 37, 41, 42). Higher rate of sub-optimal SRH in women may be attributed to the following reasons: women are more likely to report health problems, different adverse effects of employment on them, differences in gender roles, and different health experiences (43-45).

Our study, similar to other studies, showed that older participants were more likely to assess their health as sub-optimal (34, 35, 46-48). After adjusting for other characteristics, there was no significant association between age and SRH. Older people may compare themselves to others of the same age. People also tend to overestimate their health status compared to others, and this increases with age (49, 50).

Contrary to existing literature, which reports odds of SRH were worse among non-permanent workers than that among permanent workers (51, 52), in this study, permanent positions had significantly higher odds of sub-optimal SRH than temporary positions. This association can be largely explained by the older age of people in permanent positions, and job characteristics explained above.

In this study, the clinical/medical services group were more likely than administrative/occupational group describe their health as sub-optimal. Burnout is highly prevalent among healthcare providers across countries in the Middle East (53). Work overload and difficulties balancing professional and private life were both reported to be significant predictors of high emotional exhaustion in a study conducted in Iran (54). Perhaps job stress and heavy workload have

contributed to reporting sub-optimal health level among this group.

Social capital has been evaluated as a positive factor on SRH (37, 55, 56). Social capital can improve health through greater diversity in and access to information and material resources, social support, job opportunities, access to health services, cognitive skills and life meaning (57, 58). In our study, social capital had an inverse relationship with sub-optimal health. Further studies need to be conducted to assess this relationship.

By increasing the numbers of books read, probability of individuals assessing their health as sub-optimal decreased by 6%. In a longitudinal study, book reading contributed to a survival advantage; book readers also experienced a 20% reduction in risk of mortality over 12 years of follow up compared to non-book readers (59). Reading books can help protect brain, reduce stress, improve sleep, prevent dementia, increase ability to make decisions and solve problems (60).

This study has the limitation of all cross-sectional study designs that because the exposure and outcome are simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome.

## **Conclusion**

There are considerable inequities in the level of SRH. The biggest gap observed between people of different SES (five times). Similar to objective health as measured by healthcare professionals and clinical assessment, SRH can reflect inequity in SES. In other words, answering a question about SRH can both reflect level of actual health status and reflect SES of individuals. Using this indicator can be an effective and fast way to determine health status, identify at-risk groups and determine SES of individuals, especially in research projects facing limited time and budget. Results of this study can provide new knowledge about employees' health and well-being and social determinant of SRH, which can contribute to designing evidence-based workplace health promotion interventions.

## Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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## Conflict of interest

The authors declare that they have no conflicts of interest.

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