Original Article

Awareness and attitude of students and professors of medical sciences universities toward social determinants of health: Design and preliminary psychometrics of a questionnaire

Farzaneh Mohammadi, Mahmoud Keyvanara[1], Rahele Samouei[1]

Abstract:

BACKGROUND AND AIM: Considering the important role of universities in advancing educational, social, cultural, economic, and political affairs and given the significant and effective role of social determinants of health (SDH) in personal and social life, this study aimed to design a preliminary questionnaire to assess the awareness and attitude of students and professors of relevant medical sciences departments toward the SDH.

METHODS: This is a descriptive survey study of the instrumentation type and is done on the students and professors of Isfahan and Kashan medical sciences universities in 2019. The content and face validity of the questionnaire were assessed. Cronbach's alpha coefficient and the correlation coefficient for each question as well as the total score of the questionnaire were reported for this attitude measurement questionnaire. The difficulty coefficient, optimum difficulty level, discrimination coefficient, and the relevant variance were calculated for every question in the awareness measurement questionnaire.

RESULTS: The internal consistency of the questionnaire for the awareness toward the SDH for 15 questions was 0.742. This consistency was acceptable for 18 questions in the attitude measurement questionnaire after omitting two questions with not appropriate distinguishing ability. The difficulty level of the questions was relatively high.

CONCLUSION: Given that no tool was observed in the search strategy to measure the SDH, therefore, the design and psychometrics of such a tool can be used to measure the awareness and attitude of the target audiences; since this tool had an acceptable validity and reliability at its initial stages, researchers are suggested to apply it for standardization in different academic societies.

Keywords:

Attitude, awareness, medical sciences universities, questionnaire, social determinants of health

Health Management and Economics Research Center, Isfahan University of Medical Sciences, [1]Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Address for correspondence:
Dr. Rahele Samouei, Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: samouei@mail. mui.ac.ir

Introduction

In recent decades, there has been an increasing interest in the social determinants of health (SDH) as a basic concept in the health sector.[1] The World Health Organization defines the SDH as the conditions in which people born, grow up, live, work, and get old.[2] These conditions are shaped by political, social, and economic powers.[3,4] SDH includes a wide range of factors such as income, education, housing, food security, job and job security, social safety net, gender, race, early childhood factors, access to health care, and being indigenous and disability[5] which can affect the health outcomes.[6] Some aspects of socioeconomic factors are directly related to

health. For instance, exposure of children to lead used in nonstandard houses results in their low cognitive performance and poor physical development.[7,8] Pollution and allergy are also more common in deprived areas and can aggravate asthma.[9] Certain groups of the population, especially those with low socioeconomic status, live and work in inappropriate environments and as a result are exposed to higher disease risk factors as well as physiological effects of chronic stress.[10] In addition, socioeconomic factors can worsen people's health condition in a relatively short period of time. For example, exposure to violence increases the likelihood of violence growth among youth[11] and alcohol availability in disadvantaged areas could affect its usage among youth and its harms.[12] Socioeconomic factors could affect people's sleep and have short-term health impacts under the influence of work environment, home, and environmental conditions.[13] Lower intake of fresh foods, lower physical activity, and consuming fast foods could lead to poorer nutrition and less physical activity.[14,15] Children who grow up in socially disadvantaged areas face challenges in their health condition and health-improving behaviors. Moreover, they often experience stressors and physiological factors including family conflicts and instability caused by inappropriate resources.[16] It seems that not only the poverty-related material deprivation but also childhood chronic stress explains the relationship between the childhood poverty time period and adults cognitive performance.[17] In addition to these relatively quick impacts on health, the effects of health-related socioeconomic factors could influence the outcomes of diseases that appear later in life. The poor socioeconomic condition of surroundings had a direct relationship with smoking even after considering and modifying for several personality traits such as educational achievement and family income.[18]

Proper planning and taking required actions can lower the resulted damages of neglecting SDH and improve health indicators. Therefore, making necessary investments with the SDH approach must be at the forefront of all affairs. Since higher education is one of the main social, economic, political, and cultural elements in any society and a center of training and educating specialized and efficient human capital, therefore, it is of special importance to contribute to the comprehensive development of the country. Having the appropriate awareness and attitude toward the SDH among university students and professors would be a way to create major changes in the attitude and awareness of the society.

Among the available studies, no previous comprehensive study has measured the awareness and attitude toward the SDH. A number of these studies have only addressed some of these factors. Aluko *et al*. assessed the knowledge, attitude, and performance of the Nigerian health-care personnel towards occupational hazards and safety procedures. This was a descriptive cross-sectional study and used the stratified sampling method to identify 290 respondents. The results showed a high level of knowledge of respondents, but there was a difference in performance.[19]

In a cross-sectional study with 1634 participants, Hu *et al*. assessed the knowledge, attitude, and relevant behaviors of eating out among university students in China using a questionnaire tool. The results revealed that when the knowledge level increases, the high satisfaction percentage with attitude and behaviors increases too. Only 10% of participants had not eaten out their lunch and dinner over the past week and month. The gender, ethnicity, mothers' training, monthly costs, living place during education, and frequency of eating breakfast out were correlated with the scores of awareness, attitude, and behaviors. Overall, the Chinese students had a poor knowledge and behavior in relation to eating out and they repeated this several times.[20]

El-Nmer *et al*. examined the effect of nutritional knowledge, attitude, and performance of parents on the nutritional behaviors of their children. The stochastic sampling method was undertaken in this study. The results of this study showed that there is no relationship between the knowledge, attitude, and performance of parents and healthy food consumption by children. Parental education and their socioeconomic status were among the most important determinants of healthy food consumption by children.[21]

Al-Haqwi *et al*. in a cross-sectional study which based on a self-administered questionnaire evaluated the knowledge, attitude, and performance of medical students in tobacco smoking in two universities in Riyadh in Saudi Arabia. The results suggested that despite having the knowledge of dangers of tobacco smoking, about 25% of the medical students smoke. They mentioned tobacco smoking as one of the solutions to overcome stress.[22]

Soleymani *et al*. evaluated the status of awareness, attitude, and declared performance of elderly people in Ahram in association with nutrition-related behaviors. Two hundred elderly people aged 60–75 years from Ahram (capital of Tangestan County, Bushehr Province, Iran) participated in this study. The instrument used was a 4-section questionnaire which contained demographic, awareness, attitude, and nutritional behavior questions. Given the low level of awareness of the elderly people about nutrition, a comprehensive and

accurate educational planning to enhance the awareness level of these people appears to be necessary.[23]

Given the important role of universities in advancing the country's educational, social, cultural, economic, and political affairs in one hand and considering the important and effective role of SDH, and moreover, due to the lack of information on the awareness and attitude of individuals and society, especially in the relevant areas, and the need to measure them on the other hand, this study aimed to develop a tool and psychometrics undertaken on it to measure the awareness and attitude of students and professors in medical sciences universities relevant to the SDH.

Methods

This descriptive-survey study was done on students and professors of medical sciences universities in Iran in 2019. The study population was all the students and professors in medical sciences universities in Isfahan and Kashan. The disciplines of choice were those related to the SDH and in different educational levels. The data collection tool was the self-determined questionnaire and contained three sections. The first section contained information on demographic variables of the participants including age, gender, marital status, discipline, and education level; the second section contained questions related to measurement of awareness level of the participants (20 questions); and the third section contained questions to measure the attitude of participants (20 questions using Likert scale) toward the SDH. At the first stage, 10 individuals from experts and professors in the disciplines related to SDH were selected to evaluate the content validity and face validity of the questionnaire. The necessary changes were made to the questionnaire based on their corrections. The validity of the attitude measurement questionnaire was evaluated too. The pilot study was conducted with 83 questionnaires distributed among the participants. The questionnaires were collected and the data were entered into SPSS 20 software for descriptive and statistical analysis. Cronbach's alpha coefficient and correlation coefficient of each question and the total score were reported for the attitude measurement questionnaire. Moreover, in the awareness questionnaire, the technical characteristics of each question were assessed to determine its accuracy and deficiencies, and for this purpose, difficulty coefficient, optimal difficulty level, discrimination coefficient, and the relevant variance for each question were calculated. One of the criteria to analyze the questionnaire questions is the difficulty coefficient. The percentage of total participants that correctly answer a question is the difficulty coefficient of that question which is indicated by the letter P:

$$P = \frac{\text{correct asnwers by high group} + \text{correct asnwers by low group}}{\text{number of individuals in high group} + \text{number of individuals in low group}} \times 100$$

The difficulty coefficient is a number between 0 and 1. If it is close to 0, it indicates a difficult question, and if it is close to 1, it indicates a simple question. The best difficulty coefficient ranges from 0.3 to 0.7 because it provides the most information about the difference between the participants. In this study, the scores of individuals were ranked from low to high to define the high group and the low group. Twenty-seven percent who received lower scores and 27% who received higher scores were selected to represent the low and the high groups.

To calculate the optimal difficulty level of questions, the formula below was used. P in calculating the optimal difficulty level is the percentage of those who positively answered a question. The optimal difficulty level was between 0.5 and 1 and the most optimal level was 62.5.

Optimal difficulty level=$(1+P)/2$

Discrimination coefficient identifies the power of question in distinguishing between strong and weak groups of participants. The formula below was used to calculate the discrimination coefficient:

$$D = \frac{\text{number of correct answers in high group} + \text{number of correct answers in low group}}{\text{total number of individuals in one group}\,(\text{high or low})} \times 100$$

The discrimination coefficient is between +1 and −1. The negative coefficient indicates that the respondents with lower awareness answered the question to a greater extent compared to respondents with more awareness, which implies that the question does not have an appropriate ability to discriminate and is misleading or ambiguous. A coefficient close to 0 does not have the discrimination ability too.

Another variable which was calculated for each question was the variance. The variance of a question was calculated using the formula below:

Variance = $P(P\text{-}1)$

where P shows the percentage of those who positively answered a question. The variance is between 0 and 0.25, and the higher its value, the better. In fact, each question

with higher variance and higher correlation with other questions helps the total variance of the test.

Results

In this study, the information of 83 individuals from students and professors in disciplines relevant to SDH were collected, of whom 71 people (85.5%) were female and 12 people (14.5%) were male, 73 people (88%) were single and 10 people (12%) were married, and 66 people (79.6%) were undergraduates, and their average age was 25.64 ± 2.68 years.

The results of preliminary psychometrics of the attitude measurement questionnaire of students and professors about the social determinants of health

To measure the internal consistency of the attitude measurement questionnaire of students and professors toward the SDH, Cronbach's alpha was calculated and it indicated that by eliminating some of the questions, the value of alpha considerably increases. Given that 5 questions adversely affected the internal consistency of the questionnaire, it was decided to delete questions 2, 12, 17, 18, and 19 from the attitude measurement questionnaire. In Table 1, the reliability of the attitude measurement questionnaire toward the SDH with 15 questions was calculated.

According to the results in Table 1, Cronbach's alpha of all questionnaire questions was more than 0.7 and Cronbach's alpha for all questions was 0.742. The value of alpha of 0.7 and higher is desirable and approved.

According to the results in Table 2, all the questions except question 8 had a positive and significant correlation with the total score of the attitude measurement questionnaire. As there were not many questions in the questionnaire, this question was not eliminated at this stage and was left to be evaluated by psychometrics again in the main run.

The results of preliminary psychometrics of the awareness measurement questionnaire of students and professors about the social determinants of health

Some of the indices of psychometrics tests of knowledge and awareness including difficulty coefficient and discrimination coefficient of questions are reported in Table 3.

According to the results in Table 3, the difficulty coefficient of question 10 in the awareness measurement questionnaire was 0.146 and as it is close to 0, therefore, it is considered to be a very difficult question. The difficulty coefficient for other questions is around average or slightly higher than average. The analysis of

Table 1: Reliability assessment of attitude measurement questionnaire of the social determinants of health

Question	Alph if the question eliminated
1	0.722
2	0.736
3	0.737
4	0.714
5	0.710
6	0.728
7	0.759
8	0.724
9	0.724
10	0.750
11	0.733
12	0.730
13	0.728
14	0.710
15	0.709
Total	0.742

Table 2: Assessment of correlation coefficient of each questions with the total score of attitude measurement questionnaire of social determinants of health

Question	Correlation coefficient	Significance level
1	0.273	0.005
2	0.278	0.009
3	0.435	<0.0001
4	0.549	<0.0001
5	0.547	<0.0001
6	0.44	<0.0001
7	0.251	0.18
8	0.459	<0.0001
9	0.446	<0.0001
10	0.288	0.006
11	0.265	0.013
12	0.421	<0.0001
13	0.357	0.001
14	0.575	<0.0001
15	0.57	<0.0001

the discrimination coefficient of the questions revealed that question 10 had a negative discrimination coefficient of −0.05. The discrimination coefficient for question 20 was 0. The questions 10 and 20 were excluded from the questionnaire due to the lack of discriminatory power. On the other hand, despite a positive discrimination coefficient of questions 1 and 11, as they were not powerful enough to discriminate the two groups, they required a revise. It can be seen from the other parts of the results that the variances of all questions of the questionnaire were acceptable and approved. The optimal difficulty level of the questions was also acceptable which can be found in the appendix. The lowest optimal level was related to question 10 with a value of 0.573 which was removed from the questionnaire along with question 20.

Table 3: Difficulty coefficient and discrimination coefficient of questions of awareness measurement questionnaire about the social determinants of health

Question	Difficulty coefficient	Optimal difficulty level	Variance	Discrimination coefficient
1	0.235	0.617	0.179	0.033
2	0.711	0.855	0.205	0.25
3	0.354	0.677	0.228	0.383
4	0.317	0.658	0.216	0.283
5	0.439	0.719	0.246	0.41
6	0.78	0.89	0.171	0.4
7	0.207	0.603	0.164	0.35
8	0.305	0.652	0.211	0.266
9	0.28	0.64	0.201	0.5
10	0.146	0.573	0.124	-0.05
11	0.25	0.625	0.187	0.05
12	0.293	0.646	0.207	0.216
13	0.301	0.65	0.21	0.366
14	0.439	0.719	0.246	0.33
15	0.476	0.738	0.249	0.433
16	0.5	0.75	0.25	0.41
17	0.277	0.638	0.2	0.25
18	0.349	0.674	0.227	0.6
19	0.513	0.756	0.249	0.733
20	0.277	0.638	0.2	0

Discussion

This study designed and reported initial psychometrics of awareness and attitude measurement questionnaire of SDH of students and professors of Iran's medical sciences universities. The results of the validity test of the awareness questionnaire indicated some minor and editorial changes that were mostly related to editing questions, changing some words which were difficult or ambiguous for the participants in the study. Some professors also believed that some negative words or adverbs such as "completely" or "always" needed to be changed.

In examining the internal consistency of the questionnaire, if some questions cause this consistency to decline, these questions do not fit in that set. After excluding 5 inappropriate questions, the second stage reliability test reported an appropriate level of internal consistency which indicated the reliability and usability of the questionnaire. Moreover, the positive and significant correlation of each question with the total score of the questionnaire reflected this appropriate capability; however, the only question that was not correlated with the total score was not eliminated at this stage considering the lack of questions in the questionnaire and left to be evaluated in the main rerun.

Assessment of the psychometric properties of the awareness measurement questionnaire showed that the difficulty coefficient of the questionnaire was generally higher than the average which was adjusted after eliminating some questions; however, as the discussions related to the SDH are more of interpretive nature and less frequently deal with true and false answers, there were difficulties in designing the questionnaire. As the right answers in social content questions are generally clear answers among other choices, therefore, it requires more study and analysis to design the wrong choices so that the designed questions have the overall power to distinguish between aware and less aware individuals; however, the reality of the study population is that they generally had little information and awareness about the SDH, and the motivation to design the questionnaire was to measure the awareness and knowledge of academics.

The reader should bear in mind that as this was a pilot study, the number of participants was suitable for the initial preparation of the questionnaire rather than standardization. Another limitation of the study was that the respondents were from different disciplines, levels, and universities and were very highly diverse and dispersed. SDH has many diverse domains, and naturally, the questions would have less consistency to cover different domains.

Conclusion

The results of the psychometrics of the awareness measurement questionnaire for students and professors of medical sciences students of SDH indicated acceptable psychometric properties and validity. This tool can be used in scientific and academic environments to measure the awareness and attitude of professors, students, and

researchers to do required targeting and planning based on the measurement results.

Conflicts of interest

There are no conflicts of interest.

References

1. Lucyk K, McLaren L. Taking stock of the social determinants of health: A scoping review. PLoS One 2017;12:e0177306.
2. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Social Determinants of Health Discussion Paper 2 (Policy and Practice). ISBN 978 92 4 150085 2 and 73 pages. Available from: https://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf. [Last accessed on 2020 Jan 31].
3. Islam MM. Social determinants of health and related inequalities: Confusion and implications. Front Public Health 2019;7:11.
4. CSDH. Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization; 2008.
5. Hunter K, Thomson B. A scoping review of social determinants of health curricula in post-graduate medical education. Can Med Educ J 2019;10:e61-71.
6. Andermann A, CLEAR Collaboration. Taking action on the social determinants of health in clinical practice: A framework for health professionals. CMAJ 2016;188:E474-83.
7. Afeiche M, Peterson KE, Sánchez BN, Schnaas L, Cantonwine D, Ettinger AS, *et al*. Windows of lead exposure sensitivity, attained height, and body mass index at 48 months. J Pediatr 2012;160:1044-9.
8. Lidsky TI, Schneider JS. Lead neurotoxicity in children: Basic mechanisms and clinical correlates. Brain 2003;126:5-19.
9. Lanphear BP, Kahn RS, Berger O, Auinger P, Bortnick SM, Nahhas RW. Contribution of residential exposures to asthma in us children and adolescents. Pediatrics 2001;107:E98.
10. An K, Salyer J, Brown RE, Kao HF, Starkweather A, Shim I. Salivary biomarkers of chronic psychosocial stress and CVD risks: A systematic review. Biol Res Nurs 2016;18:241-63.
11. Bingenheimer JB, Brennan RT, Earls FJ. Firearm violence exposure and serious violent behavior. Science 2005;308:1323-6.
12. Pollack CE, Cubbin C, Ahn D, Winkleby M. Neighbourhood deprivation and alcohol consumption: Does the availability of alcohol play a role? Int J Epidemiol 2005;34:772-80.
13. Marco CA, Wolfson AR, Sparling M, Azuaje A. Family socioeconomic status and sleep patterns of young adolescents. Behav Sleep Med 2011;10:70-80.
14. Gordon-Larsen P, Nelson MC, Page P, Popkin BM. Inequality in the built environment underlies key health disparities in physical activity and obesity. Pediatrics 2006;117:417-24.
15. Cummins S, Macintyre S. Food environments and obesity-neighbourhood or nation? Int J Epidemiol 2006;35:100-4.
16. Matthews KA, Gallo LC, Taylor SE. Are psychosocial factors mediators of socioeconomic status and health connections? A progress report and blueprint for the future. Ann N Y Acad Sci 2010;1186:146-73.
17. Evans GW, Schamberg MA. Childhood poverty, chronic stress, and adult working memory. Proc Natl Acad Sci U S A 2009;106:6545-9.1.
18. Chuang YC, Cubbin C, Ahn D, Winkleby MA. Effects of neighbourhood socioeconomic status and convenience store concentration on individual level smoking. J Epidemiol Community Health 2005;59:568-73.
19. Aluko OO, Adebayo AE, Adebisi TF, Ewegbemi MK, Abidoye AT, Popoola BF. Knowledge, attitudes and perceptions of occupational hazards and safety practices in Nigerian healthcare workers. BMC Res Notes 2016;9:71.
20. Hu P, Huang W, Bai R, Zhang F, Sharma M, Shi Z, *et al*. Knowledge, attitude, and behaviors related to eating out among university students in China. Int J Environ Res Public Health 2016;13. pii: E696.
21. El-Nmer F, Salama AA, Elhawary D. Nutritional knowledge, attitude, and practice of parents and its impact on growth of their children. Menoufia Med J 2014;27:612-6.
22. Al-Haqwi AI, Tamim H, Asery A. Knowledge, attitude and practice of tobacco smoking by medical students in Riyadh, Saudi Arabia. Ann Thorac Med 2010;5:145-8.
23. Soleymani L, Najafpour Boushehri S, Tahmasbi R. Knowledge, attitude and practice declaration of elderly in Ahram city toward nutrition behavior in 2013. Iran South Med J 2015;18:370-82.