Original Article
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Medical Journal of the Islamic Republic of Iran (MJIRI)
Iran University of Medical Sciences

Identifying associated factors with social capital using path analysis: A population-based survey in Tehran, Iran (Urban HEART-2)

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Received: 1 December 2015 Accepted: 18 January 2016 Published: 17 September 2016

Abstract

Background: Social capital has been defined as norms, networks, and social links that facilitate collective actions. Social capital is related to a number of main social and public health variables. Therefore, the present study aimed to determine the factors associated with social capital among the residents of Tehran, Iran.

Methods: In this large cross-sectional population-based study, 31531 residents aged 20 years and above were selected through multi-stage sampling method from 22 districts of Tehran in 2011. The social capital questionnaire, 28-item General Health Questionnaire (GHQ-28), and Short-Form Health Survey (SF-12) were used. Hypothetical causal models were designed to identify the pathways through which different variables influenced the components of social capital. Then, path analysis was conducted for identifying the determinants of social capital.

Results: The most influential variables in 'individual trust' were job status (β=0.37, p=0.02), marital status (β=0.32, p=0.01), Physical Component Summary (PCS) (β=0.37, p=0.02), and age (β=0.34, p=0.03). On the other hand, education level (β=0.34, p=0.01), age (β=0.33, p=0.02), marital status (β=0.33, p=0.01), and job status (β=0.32, p=0.01) were effective in 'cohesion and social support'. Additionally, age (β=0.18, p=0.02), PCS (β=0.36, p=0.01), house ownership (β=0.23, p=0.03), and mental health (β=0.26, p=0.01) were influential in 'social trust/collective relations'.

Conclusion: Social capital can be improved in communities by planning to improve education and occupation status, paying more attention to strengthening family bonds, and provision of local facilities and neighborhood bonds to reduce migration within the city.

Keywords: Path analysis, Social capital, Individual trust, Social trust, Social support.

Cite this article as: Asadi-Lari M, Hassanzadeh J, Torabinia M, Vaez-Mahdavi MR, Montazeri A, Ghaem H, Menati R, Niazi M, Kassani A. Identifying associated factors with social capital using path analysis: A population-based survey in Tehran, Iran (Urban HEART-2). *Med J Islam Repub Iran* 2016 (17 September). Vol. 30:414.

Introduction

Social capital has emerged as one of the popular issues in public health research in recent decades (1). Social capital, frequently defined as the norms, networks, and associations that facilitate supportive action (2), incorporates different circumstances, such as culture, social norms, institutions, and networks of interpersonal contact(2,3). Groups with higher levels of social capital

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are frequently considered as cohesive and flourishing (3).

Two main concepts of social capital, as explained by well-known sociologists (Coleman and Putnam), consist of levels of reciprocal trust among population members and civic engagement (4,5). Civic engagement refers to the level of citizens' commitment to and voluntarily participation in their societies and is reflected by their involvement in community associations (1,2).

The primary definitions of Bourdieu, Putnam, and Coleman are being applied in most public health studies on social capital that typically involve two components, namely structural component (the extent of social relationships, such as membership of networks) and cognitive component (understanding of the feature of social relationships, such as trust and social harmony) (6,7). These components characterize the norms and networks that enable an individual to act communally. Social capital can play a vital role in socioeconomic development and well-being. It is a prolific background for bringing up trust and values that facilitate communication. Transmission of information is persuaded by constant interactions among group members (6,8). Social capital may influence the general health of the population or individuals in different ways. It may increase distribution of information pertaining to health (e.g., smoking cessation), may have social controls over health-related behaviors, (1,3,8) and can reasonably facilitate collective actions among people to assure their access to amenities and community services(1,2). Moreover, social capital acts in the context of psychosocial processes, such as the provision of affective support (9). Political participation is another key determinant that helps social capital to improve health (2,7). This is done through the supports given to public services, such as education and healthcare. Although there are relationships among social capital, demographic factors, and health. However, these relationships and their causal pathways are complicated (1,10). Social capital is related to a number of individual and public health variables (10,11), such as vicious behavior, mortality rate, and health status. It has also been demonstrated that social capital can be connected to lower levels of well-being and general health, lower cancer and cardiovascular mortality, violent crime rates, suicide, and decreased depressive symptoms (12). Lindstrom showed that residing in low social capital regions may be associated with lower levels of physical activity (13). Similarly, the study performed by Ueshima revealed that low level of social capital was associated with inactivity and physical health in Japanese individuals (14). A survey conducted in Australia also indicated a direct association between age, sex, household income, education level, health status, and social capital (15). Overall, social capital can be constantly related to higher education levels, income level, house ownership, age, and gender (2,7,9). Nevertheless, even after conducting plenty of studies, there are still substantial differences regarding the particular social processes and social variables that address this relationship (to explain what some of these differences are and why they matter) (16). Since there are socio-economic status (SES) inequalities in contemporary society, this issue should be taken into account when the impact of social conditions on health and well-being is investigated (7, 10).

To identify the pathways through which different variables influence the components of social capital (including individual trust, cohesion/social support, and social trust/associative relations) in society, the path analysis technique was used in this study. Ultimately, a model was developed, which best described the relations between the intended variables and social capital components.

Methods

Pooled data was derived from a large population-based survey entitled "Urban Health Equity Assessment and Response

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Tool-2" (Urban HEART-2), which was conducted in 22 districts of Tehran, the capital of Iran, in 2011. Urban HEART was developed by the World Health Organization (WHO) to generate evidence of inequities in health and its social determinants within and between cities (17).

Multi-stage sampling method was used in this study. Initially, all the 22 districts of Tehran were considered as strata (stratified sampling). Then, 200 blocks were selected randomly from each cluster (districts). Subsequently, using systematic random sampling, eight households were selected within each block to participate in the survey. Ultimately, based on an age-sex table, a person 20 year or older was included to the study from the each household. In total, 31519 households in 22 districts participated in the study. The study was conducted by more than 500 trained surveyors within a rigorous monitoring and quality assurance system encompassing field observations.

Instruments

The standardized questionnaires in the present study were including; social capital questionnaire, mental health questionnaire (General Health Questionnaire, GHQ-28) and 12-item Short Form Health Survey (SF-12). Validity and reliability of GHQ-28 (18), social capital (19) and quality of life questionnaires (20) have been confirmed in the previous studies in the Iranian population. The GHQ-28 is one of the tools for screening of mental health disorders and have four dimensions including; somatic symptoms, anxiety and sleep problems, social dysfunction and depression (18).

The SF-12 (the adjusted form of the SF-36) is divided into two summary parts of PCS (Physical Component Summary) and MCS (Mental Component Summary). Both the validity and reliability of the SF-12 in Iranian society were confirmed by Montazeri and et al. in 2009 (20).

The social capital questionnaire administered in this survey consisted of 69 questions with nine subscales, in various levels of close family, relatives, friends, neighbors, colleagues, same ethnicity and religion, and the general public. The first four items of the questionnaire were designed to measure voluntary participation, collective activity, trust, and social cohesion using a 5-point Likert scale. Another item involved the sub-items of truthfulness and avoidance of lying, trusteeship, amnesty, fairness and justice, honesty and reliability, and courage to tell the truth. Four other items were also about social support, participation in association activities (parents-teachers collaboration, religious groups, athletic groups, charities, professional groups, political parties, ethnic groups, and scientific groups), social status (in terms of cultural, social, economic, and other factors), and social networks (the relation with groups of family members, relatives, friends, neighbors, and colleagues). This questionnaire included three components including, individual trust, cohesion/social support and social trust/associative relations (19).

The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences. Furthermore, written informed consents were obtained from all the participants and they were reassured about the confidentiality of their information.

Data Analysis

Using Mplus7.1 and SPSS-19, data analysis was done through descriptive statistics, t-test, one-way ANOVA, and path analysis. Furthermore, the goodness of fit of the path analysis models was assessed by chi-square test, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Residual (RMR) indices. The significance level was set at 0.05. Weighting scheme was also used for the variables in which their distributions were not consistent with the population (the variables which were significant in the chi-square goodness-of-fit test). The population-based study of Montazeri (2009) (20) was served as a reference for the comparing the variables distribution.

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Path analysis

Path analysis is helpful in illuminating theoretical assumptions and the probable series of causal events. Thus, path analysis can be described as a simultaneous recursive model (21). Path analysis is a statistical technique that can be used in data with multiple independent (predictor) variables and can construct a fit model for each dependent variable (22). In this study, three main components of social capital; i.e., individual trust, cohesion/social support, and social trust/associative relations, were analyzed by path analysis. First, a hypothetical causal model based on the previous studies (2,6,9,11) was designed for each of these components. Then, each of the hypothetical models was analyzed using Mplus-7.1 and the variables with no statistical significance ($p>0.05$) were excluded and the final model was developed for each of the social capital components. In this model, the standardized beta coefficient (β) was obtained from the final analysis, showing relationships between the variables. In this study, dependent variables were the three components of social capital and independent variables were mental health, PCS, age, sex, marital status, job status, family size, the living area per capita, district of living, health insurance, race, house ownership, and education level.

Results

Overall, the mean±SD age and family size were 43.6±14.33 years and 3.5±1.30 individuals, respectively. Considering the 22 districts of Tehran, the majority of the participants were living in district 18 (n=1619; 5.15%) and the fewest number of them were living in district 22 (n=1027; 3.26%). Approximately 35.12% of the participants were male. In this study, the area per capita was reported to be about 25.10±0.32 m^2. Also, about 74% of the participants were covered by health insurance.

The mean±SD scores of social capital and mental health were 3.5±1.22 (range=1-5) and 31.1±10.13 (range=0-84), respectively. In addition, almost 31% of the participants were experiencing a low social capital.

Other demographic characteristics of the study participants and the relationships between the demographic characteristics and social capital have been presented in Table 1.

According to Table 1, most of the participants (23.38%) aged between 20 and 30 years and almost 42.72% of them had high school diplomas. The mean score of social

Table 1. Demographic characteristics of Tehran residents in Urban HEART Survey

Variables	Category	Frequency (Percentage)	Mean of Social capital (±SD)	p
Age	20-30	7372(23.38)	2.85(1.51)	0.01
	30-40	7255(23.01)	3.16 (1.42)	
	40-50	6027(19.11)	3.42 (0.52)	
	50-60	5298(16.80)	3.66(1.51)	
	>60	5579(17.69)	4.10(0.65)	
Sex	Male	11064(35.11)	3.88(1.52)	0.02
	Female	20450(64.89)	3.15(1.02)	
Education level	Illiterate	2455(7.83)	2.22(1.25)	0.01
	Primary school	3032(9.67)	2.61(9.64)	
	Middle school	4051(12.92)	3.59 (1.22)	
	High school and diploma	13393(42.72)	4.01(1.21)	
	Academic	8421(26.86)	3.98(1.73)	
Marital status	Married	23486(75.65)	3.88(1.43)	0.02
	Single	5489(17.68)	3.25(1.65)	
	Widow or divorced	2070(6.66)	2.88(0.98)	
Job status	Unemployed	1747(5.60)	2.36(1.21)	0.01
	Student	1607(5.15)	4.11 (1.14)	
	Housewife	15169(48.58)	3.11(1.44)	
	Retired	4423(14.17)	3.11(1.25)	
	Employed	8278(26.51)	3.81(1.64)	
House ownership	Rental	9226(29.32)	3.29(1.17)	0.01
	Owner	20740(65.91)	4.12(1.29)	
	Other	1500(4.77)	2.89(1.23)	

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Table 2. Direct, indirect, and total effects of the independent variables on the components of social capital

Component of social capital	Variables	Direct effect (β^*)	Indirect effect (β^*)	Total effect (β^*)	p
Individual trust	Job status	0.29	0.08	0.37	0.02
	Marital status	0.26	0.06	0.32	0.01
	PCS	0.26	0.05	0.31	0.01
	Age	0.23	0.11	0.34	0.03
	Mental health	0.23	-	0.23	0.01
	Family size	-0.08	-0.02	-0.10	0.04
	House ownership	-	0.08	008	0.02
	Residency year	0.10	-	0.10	0.01
	Area per capita	-	0.02	0.02	0.01
Cohesion/ social support	Education level	0.32	0.02	0.34	0.01
	Age	0.25	0.08	0.33	0.02
	Marital status	0.26	0.07	0.33	0.01
	Jobs status	0.24	0.08	0.32	0.01
	PCS	0.23	0.04	0.27	0.03
	District	0.11	-	0.11	0.04
	Mental health	0.21	-	0.21	0.04
	House ownership	-	0.07	0.07	0.03
	Area per capita	-	0.01	0.01	0.03
Social trust/ associative relations	PCS	0.31	0.05	0.36	0.01
	Age	0.13	0.05	0.18	0.02
	House ownership	0.12	0.11	0.23	0.03
	Jobs status	0.12	0.06	0.18	0.01
	Mental health	0.26	-	0.26	0.01
	Education level	0.10	0.03	0.13	0.02
	Sex	0.09	0.05	0.14	0.02
	Marital status	0.13	0.08	0.21	0.01
	Area per capita	-	0.02	0.02	0.01

* Standardized beta coefficient

capital was significantly higher in males (p=0.02). Moreover, the mentioned variables in Table 1 were significantly related to social capital (p<0.05).

The important components (latent variables) of social capital included individual trust, cohesion/social support, and social trust/associative relations whose mean±SD scores were 3.9±1.02, 3.4±1.17, and 2.9±1.02, respectively.

The direct, indirect, and total effects of the independent variables on the components of social capital have been presented in Table 2.

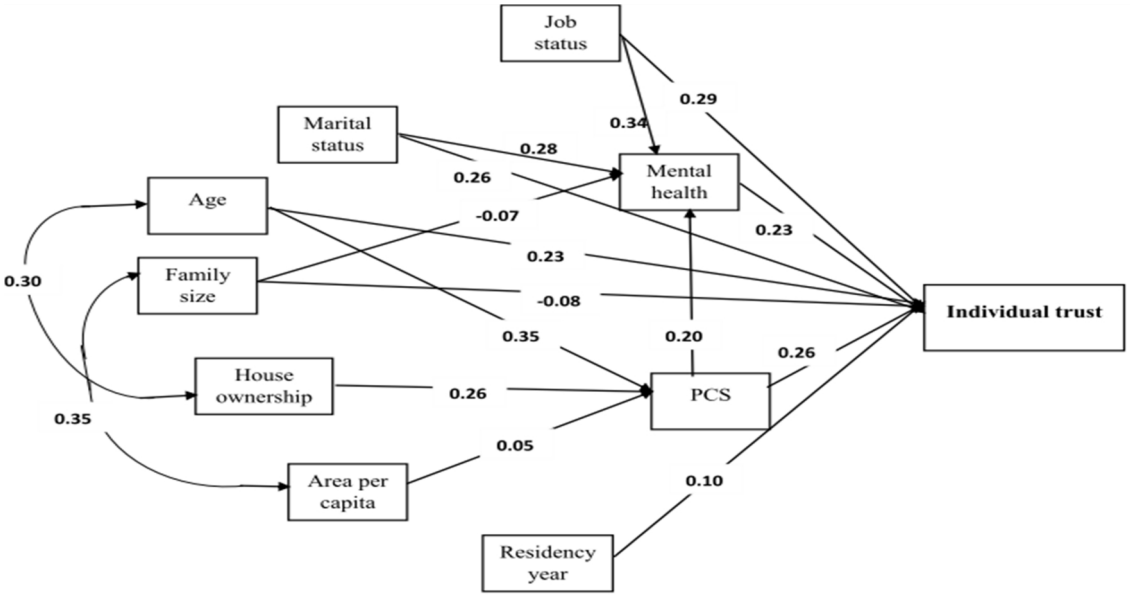


Fig. 1. Path analysis diagram of individual trust in the residents of Tehran

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Also, the correlation coefficient was estimated as 0.30 for the exogenous variables, age, and house ownership and 0.35 for family size and area per capita.

The path analysis model of individual trust and its associated variables has been presented in Figure 1.

According to Figure 1, jab status, marital status, age, PCS, and mental health were directly associated with individual trust. The goodness of fit indices for this model were as follows: chi-square=148, df=10, P-value=0.1, RMSEA=0.03, SRMR=0.04, CF=0.97, and RMR=0.03.

The final model related to the components of cohesion/social support has been shown in Figure 2.

According to Figure 2, jab status, marital status, age, and education level were significantly associated with cohesion / social support, while other variables were not strongly associated with this component. The goodness of fit indices in this model were as follows: chi-square=144, df=9, p=0.2, RMSEA=0.04, SRMR=0.03, CF=0.95, and RMR=0.04.

The association between the exploratory variables and social trust/associative relations based on the path analysis model has been shown in Figure 3.

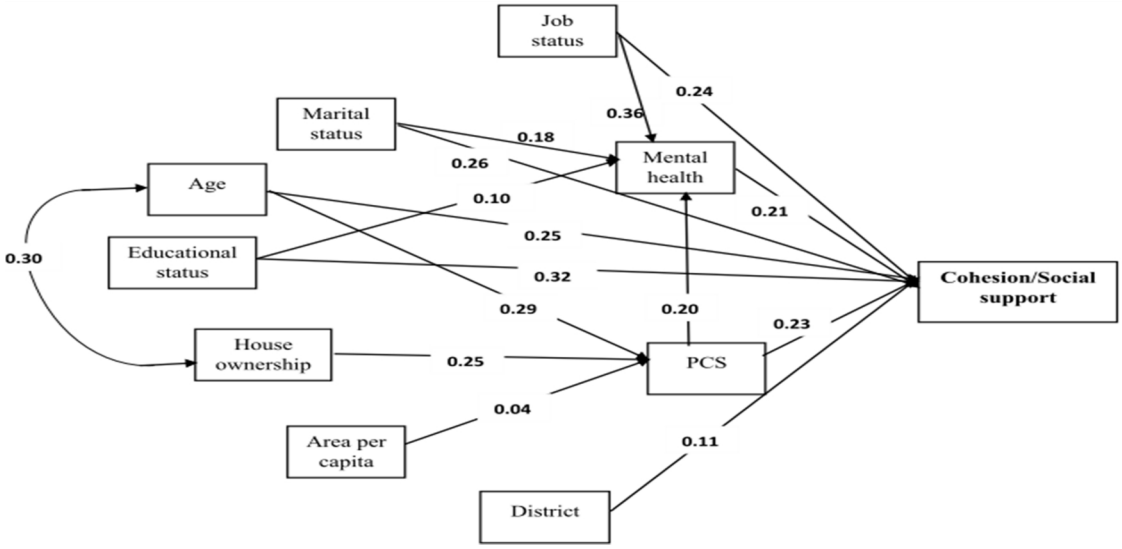


Fig. 2. Path analysis diagram of cohesion/social support in the residents of Tehran

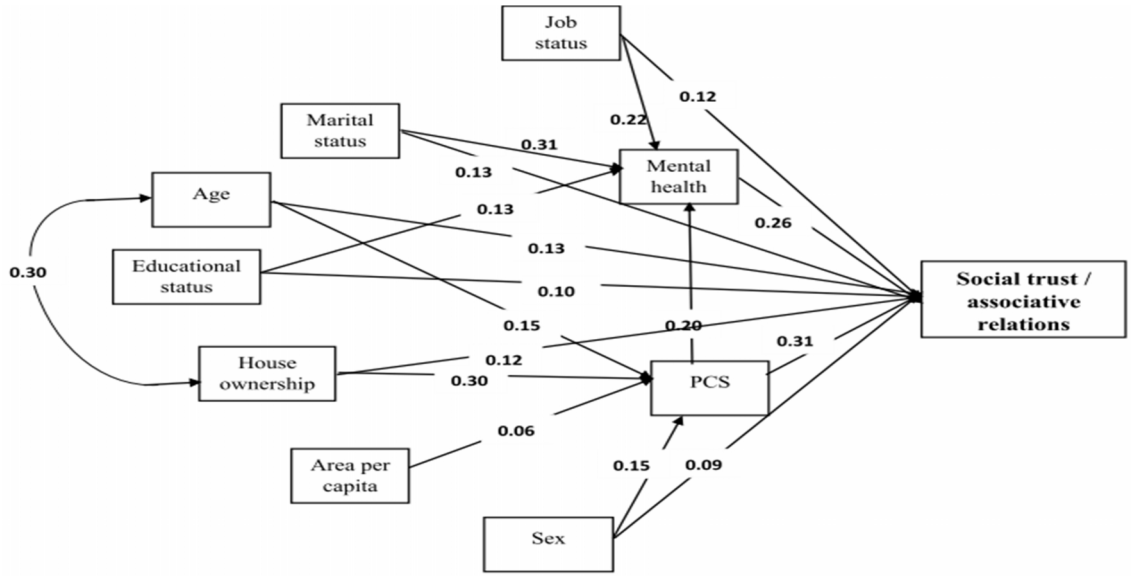


Fig. 3. Path analysis diagram of social trust/associative relations in the residents of Tehran

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The goodness of fit indices for Figure 3 were as follows: chi-square=134, df=9, p=0.2, RMSEA=0.04, SRMR=0.02, CF=0.94, and RMR=0.04.

Discussion

The present study aimed at determining the components of social capital and assessment of indirect and direct associations between the components of social capital and some independent variables using path analysis in the residents of Tehran. According to the study results, job status, marital status, PCS, mental health, age, and family size were associated with individual trust (as the first component of social capital). Additionally, the direct effects of all these factors on individual trust were more than their indirect effects (through mental health and PCS). Different factors can affect social capital in various ways. Employment status is one of the most important factors influencing social participation and social capital, as it can be a way to empower individuals and health-related behaviors (2,23). Compared to unemployed individuals, employed ones usually have more association activities. Also, previous researches showed that the people who had jobs with more sociable demanding characteristics had higher levels of social capital (23,24). Job status also can have an impact on social capital through work conditions (25).

The present study results also indicated that marital status had a positive effect on social capital components. Evidence has also demonstrated that marital status had a direct relationship with social control, help, and informal networks, and this relation was stronger among married people (6,26). Also, the previous studies revealed a negative association between the number of children in the family, and social capital and informal networks (27,28), which agrees with the findings of our study. This is probably due to several social and economic factors which are related to the number of family members (28).

The results of the current study showed that cohesion and social support was affected by education level, age, marital status, job status, and mental health. In addition, the direct effects accounted for main changes in cohesion/social support rather than the indirect effects (through mental health and PSC). In the previous studies, younger ages and higher education levels were associated with social capital (6,28). The findings of the present study were also consistent with those obtained by Furstenberg, showing a relationship between the socioeconomic components, such as college and high school education and social economic status, and social capital.[28] Education level does not absolutely explain the outcome of social capital components, but it can be as a moderator variable in increasing social capital (29,30).

Our study results also revealed a strong association between social capital and age, such a way that social capital was higher in older age groups compared to younger ones. Other researchers have also disclosed that the association between social capital and informal networks was stronger in older age groups (3,6,12), which is in agreement with our study findings. Martin reported that in families with more elderly members, the amount of social capital was about two and half times more than that in families with fewer elderly members. This probably stemmed from their financial savings (31). In another study conducted by Shultz in the USA, a positive relationship was shown between social trust and older age. According to that study, the level of social trust was higher among above-50-year-old individuals compared to those below 50 years of age. Social trust was also higher among the individuals with high education and income levels. In addition, social capital was higher in the employed individuals and families with children in comparison to unemployed individuals and families without children (32). These results were almost compatible with those of our study and indicated that differences between the results might be due to variation in culture, social context, and lifestyle.

In our survey, social trust/associative re-

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lations was effected by PCS, age, house ownership, job status, marital status, and mental health. According to Figure 3 and Table 3, direct effects of the variables on social capital were higher in comparison to their indirect effects. Furthermore, mental and physical health had a direct relationship with social capital. Social capital changes the effect of risk factors and can be an effective way to promote resilience to harmful agents to mental health (33). It is believed that the elements of social capital would be more related to mental and physical health rather than other factors, such as demographic ones. This is probably due to the fact that mental and physical health were related (directly or indirectly) to house ownership, higher income levels, job status, and other factors (9,33). The study conducted by Takakura in Japan in 2015 confirmed that social capital could be the main way for the youth to attain good health(1). Also, a study in Bolivia (2015) demonstrated that people in the healthy village project site had higher active participation and social capital (3), which is consistent with the results of the present study.

The limitation of our study was its cross-sectional design through which both exploratory variables and social capital were measured simultaneously. Therefore, temporality was not regarded in the determination of the associations. In some cases, there were only housewives available at homes when the surveyors referred to them for distribution of questionnaires, reflecting the unequal distribution of samples. We used weighting scheme as a solution for this limitation for the variables that were significant in the chi-square Goodness-of-Fit test.

The strong points of this study were its population-based design and application of path analysis methods for determining the associations between the variables.

Overall, this population-based study can provide an excellent basis to compare social capital between different groups in future studies with limited sample sizes. However, due to the cross-sectional design of the present study, transposition of the relationships between the variables was not specified. Hence, cohort studies are recommended to be performed for future investigations. These sentences should be in a discussion not a conclusion.

Conclusion

In the current study, the employed individuals showed higher trust and social capital. Therefore, job creation, in addition to its other beneficial effects, increases awareness and official participation in public affairs and increases the social capital. Moreover, the factors related to socioeconomic status had a direct relationship with social capital. Thus, any plan to reduce economic and social gaps can decrease the gap between the rich and the poor, eventually increasing the social capital in the population. Perhaps the most important finding of the path analysis of social capital in Tehran was the direct effects of job status, marital status, family size, education level, and mental and physical health on the social capital. This is necessary to be carefully taken in into account by policymakers and urban development authorities.

Acknowledgements

This article was approved by the Research Vice-Chancellor of Shiraz University of Medical Sciences (Proposal No. 94-7470). In addition, the authors wish to thank the executives and experts of the municipality of Tehran for conducting this study.

Conflict of Interests

The authors declare that they have no conflict of interests.

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