



A Study of Social Health Status in the Population of the Prospective Epidemiological Shahrekord Cohort Study in Chaharmahal and Bakhtiari Province in 2019

Maryam Sadat Ghaemfard¹, Ali Ahmadi^{2*}, Asieh Mansouri³, Soleiman Kheiri²

¹Department of Epidemiology and Biostatistics, School of Health, Student Research Committee, Shahrekord University of Medical Sciences, Shahrekord, Iran

²Department of Epidemiology and Biostatistics, School of Public Health, and Modeling in Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran

³Hypertension Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Background and aims: Social health refers to the quantity and quality of interaction of an individual with society to promote the well-being of individuals in the society. This interaction promotes social capital and social security, and reduces poverty and injustice. So far, no study has been ever done on the social health situation in Chaharmahal and Bakhtiari province. This study aimed to investigate the social health status in Chaharmahal and Bakhtiari province in 2019.

Methods: In this cross-sectional and descriptive-analytical study, the data from the prospective epidemiological study of Shahrekord cohort study in Chaharmahal and Bakhtiari province in 2019 were used. In order for measuring social health, a valid Iranian social health questionnaire with a score range of 33-165 was used. ANOVA and *t* test in SPSS version 22 were employed for analyzing the data in order to compare the mean values.

Results: By way of explanation, 597 individuals out of 600 samples completed the social health questionnaire (99.5% response rate). The mean \pm standard deviation age of participants was 48.54 \pm 9.33 years and the mean \pm standard deviation score of their social health was 115.71 \pm 22.7. This score was higher in men than in women ($P=0.038$). Social health score was significantly higher in urban areas than in rural areas ($P=0.001$). Social health was highest in civil servants, and lowest in unemployed participants ($P=0.001$). Social health score was lower in obese and high body mass index (BMI) individuals than in normal BMI individuals ($P=0.047$).

Conclusion: Social health in the studied population was moderate and, therefore, deserves the attention of health policy makers and planners. Social health can be improved by holding training classes for villagers and teaching them how to interact with each other – especially with family members, furthering participation of women in social affairs and increasing their social relationships, giving advice on diets and social health to people with non-normal BMI, as well as by holding post-retirement training classes for retirees.

Keywords: Health, Social health, Shahrekord cohort study

*Corresponding Author:

Ali Ahmadi, Department of Epidemiology and Biostatistics, School of Public Health, and Modeling in Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran
Tel: +98 9133834324;
Email: aliahmadi2007@gmail.com, ahmadi@skums.ac.ir

Received: 17 Apr. 2020
Accepted: 22 Dec. 2020
ePublished: 29 June 2021



Introduction

According to the definition of the World Health Organization, health is the presence of complete physical, mental, and social well-being, and not just the absence of disease and disability. To enjoy perfect health, both physical/mental health and social health are required.¹ Russell defined social health as the social dimension of a person's health that is related to how he/she relates to others, how others react to him/her, and how he/she interacts with organizations and the norms of society.

In a healthy society, according to Russel, there are equal opportunities available for people to enjoy basic goods

and services in order to practice a perfect citizenship. A society of this kind is characterized by the existence of law, equal distribution of wealth, public access to the decision-making process, and an acceptable level of social capital.² Social health in Iran is defined as the quantity and quality of an individual's interaction with society in order to promote his/her welfare in the society. The final outcome of this interaction is the promotion of social capital and social security, and reduction of poverty and injustice.³

In an international study in 1990, the risk factors for death and the global burden of death were studied. The study showed that 60% of the risk factors associated with

death were unknown and could be related to social factors.⁴

There is an expanding research approach that links disease patterns to the structure of society. Therefore, it is assumed that some social factors affecting health can partly account for these unknown factors.⁵

A study in Iran calculated different proportions of the health determinants and concluded that the proportion of social factors was 50%, the proportion of health services was 25%, the proportion of hereditary and biological factors was 15%, and the proportion of material, environmental, and behavioral factors was 10%.⁶ According to the given study, the social factors accounted for the largest proportion among health determinants.

Despite the fact that the domain of health can dramatically affect other domains, few studies have addressed social health. In a systematic review in Iran, social health was determined to be low in 15.9% of people, moderate in 56.3% of them, and high in 26.4% of them. Other factors such as gender, age, marriage, employment status, socio-economic status, income, education, communication skills, quality of life, and leisure were also reported to have impact on social health.⁷

A study by Abachizadeh et al introduced Guilan as the province having the highest social health score, and North Khorasan as the province having the lowest social health score.⁸ The study recommended conducting further social health studies in the provinces of Iran once every 3-5 years to promote social health through studying and determining the level of social health in cities, as well as identifying the factors affecting it. In developed countries and some international organizations, such as the Organization for Economic Co-operation and Development (OECD), the social health status of the population is constantly monitored using different methods.⁹⁻¹¹

So far, few population-based studies have been conducted in Iran to measure social health or similar indicators in different provinces⁸ – especially in Chaharmahal and Bakhtiari province (present study setting), with an acceptable sample size. Most studies conducted in Iran have had national scales including small sample sizes from provinces or special populations such as students, and failed to address all aspects of Iranian culture on the local and provincial scales.

Given the importance of measuring social health as a significant exposure, its relationship with risk factors and disease outcomes in cohort studies and, particularly, the lack of a detailed study on the social health status in Chaharmahal and Bakhtiari province, the present study aimed to measure social health in the province.

Materials and Methods

This descriptive-analytical, cross-sectional study was performed using the database from the prospective epidemiological study of Shahrekord Cohort Study (SCS) and non-communicable diseases in Shahrekord, Chaharmahal and Bakhtiari province in 2019. The SCS was initiated in 2015 and, presently, it is one of the stations

of Persian national cohort in southwestern Iran.

The present study aimed to investigate the general health status in adults and the chronic non-communicable diseases and their risk factors in people aged 35-70 years from Shahrekord with a sample size of 7034 participants and those from the rural areas of Ardal county with a sample size of 3041 participants in Chaharmahal and Bakhtiari province (n=10 075).

In this study, the participants were enrolled after their providing an informed consent to participate in the study, and the questionnaires and examinations were completed by the trained interviewers of the SCS in compliance with the principles of research ethics.

To estimate the sample size, the sample size calculation formula for the means in the Stata software was used given the 95% confidence interval, the social health score of 115 and the standard deviation of 22, the accuracy value of 4 points, type I error of 1%, and study power of 95%.

The minimum required sample size was 543 people; but taking into account the opinion of a biostatistician, the final sample size was decided to be 600 people in order to increase the accuracy of the analysis and reduce the sampling error. Samples were selected from the list of participants in the SCS by systematic random sampling.

To this end, first the sampling distance was calculated according to the sample size and the target population ($k=16$), and then one number was randomly selected from 1 to 16 and the next samples were selected with k distance from the selected number.

Participants were included in the study by coding. According to the population census of Chaharmahal and Bakhtiari province released by the Statistical Centre of Iran and taking into account the proportion of urban and rural population, 30% of the samples in the SCS were residents of villages and the rest were residents of cities. In the present study, therefore, 180 people were selected from rural areas and 420 ones were selected from urban areas so that the classification of the required number of rural and urban samples would be observed. Accordingly, the data from the samples could be generalized to the population of the SCS and to the urban and rural population of the province.

Data collection tools were checklists and questionnaires used in the SCS, which were completed through interviews carried out by experts as well as professional and trained interviewers under the supervision of the quality control team.

To collect urban samples' data, people were asked to attend the interviews and complete the questionnaires for people. To collect the data from Ardal county's rural samples, the questionnaires were completed and collected after interviewing the participants in the presence of the staff. The protocol for this study has already been published.¹²

The data collection tool in our study was the Iranian Social Health Survey. The scale was developed in 2013 by Abachizadeh et al and it was used in this study after

obtaining a written permission from its developers. Its validation had already been reported as being acceptable.¹³ The reliability of the scale in our study setting was also calculated by Cronbach's alpha, and its value was obtained 0.9, which indicated the acceptable reliability of the scale. Social health scores were classified into three categories as poor (33-76), moderate (77-121), and good (122-165) based on the percentile and conventional cut-off point.

To fill out the questionnaire, the participants were requested to attend in person. Then they were asked to rate their views about each questionnaire item on a five-point Likert scale (i.e. Very High, High, Moderate, Low, and Very Low). This scale measured the total score of social health with a score range of 33-165, which was calculated by summing the scores on all items, and a higher score indicated a higher level of social health. The scale addressed three domains, namely *family*, *friends and relatives*, as well as *community*, with the minimum and maximum attainable scores of 6-30, 8-40, and 19-65, respectively.

In this study and in addition to social health, data on demographic variables including age, gender, place of residence, education level, employment, marital status, and body mass index (BMI) were also collected and the social health was examined according to these variables.

SPSS version 22 was used to conduct data analysis. Descriptive data such as minimum, maximum, median, mean and standard deviation were used to describe the main characteristics of the participants. T-test, ANOVA, and multivariate analysis of covariance were used to compare the mean values of the social health in two or more groups. The data were analyzed with 95% confidence interval and $P < 0.05$ was considered significance level.

Results

By way of explanation, 597 people out of 600 samples completed the social health questionnaire (99.5% response rate). The mean \pm standard deviation for the age of participants was 48.54 ± 9.33 years. As for the gender of the participants, 256 (42.9%) people were male and the rest were female. As for the literacy and marital status of the participants, 165 (27.6%) people were illiterate and 549 (90%) ones were married (Table 1).

Table 1 shows the descriptive data of demographic characteristics of the participants, and the comparison of mean \pm standard deviation scores of social health in terms of demographic characteristics in univariate and multiple analyses. As shown in this table, there was no statistically significant difference in social health scores in terms of the age. There was a significant relationship between gender and social health in univariate analysis ($P = 0.038$); however, the relationship was not significant ($P = 0.821$) after the inclusion of other variables.

There was a significant relationship between residence place and social health in both univariate ($P = 0.001$) and multivariate ($P = 0.003$) analyses, so that the social health of people living in the cities was higher than that of those

living in rural areas.

Education level and social health in univariate analysis had a significant relationship ($P = 0.058$), so that the highest level of social health was observed in people with postgraduate education; however, the relationship was not significant ($P = 0.275$) after the inclusion of other variables.

No significant relationship was found between marital status and social health. Employment status and social health had a significant relationship ($P = 0.001$), so that the employed people had higher social health than those who were housewives, retirees and unemployed. As for the employed people, civil servants earned higher social health scores than those employed in private sector; in multivariate analysis, the relationship was partly significant ($P = 0.057$).

There was a significant relationship between BMI and social health in both univariate ($P = 0.007$) and multivariate ($P = 0.027$) analyses, so that the social health score was highest in the people with normal BMI, and it was lowest in the most obese ones ($P = 0.047$).

The mean \pm standard deviation score of social health in this study was determined to be 115.71 ± 22.77 . By dividing the social health score according to the first to fourth quartile, the ranges of social health score in our study in the first, second, third, and fourth quartiles were 100, 117, 131, and 165, respectively. The mean \pm standard deviation scores of social health in domains of family, friends and community, as well as the total score of social health are shown in Table 2.

Discussion

This study aimed to investigate the social health status of the population of the SCS in Chaharmahal and Bakhtiari province. According to the study results, the total score of social health in this population was moderate (115.71).

Social health was significantly different with regard to residence place (urban vs. rural), gender, and BMI. Our study was the first survey to investigate the social health in Chaharmahal and Bakhtiari province based on the population of the SCS with a sufficient sample size. Given the classification of social health, the score obtained in this study was moderate, which was consistent with the systematic review of social health status in Iran.⁷

In a national study conducted in Iran in 1995, the social health was measured in all cities using the scale applied in our study. The number of the participants selected from each province in the given study compared to the present study in one province was very small; however, their findings were consistent with ours. In given study, the social health in Chaharmahal and Bakhtiari province was reported to be 105.5, which was lower than that in our study.

The comparably higher social health score in the present study might be attributed to an improving trend in social health, or to the differences in the age range of the participants in the two studies: in the National Social Health Study, people over 18 years of age were enrolled;

Table 1. Demographic Characteristics and Social Health Scores of Participants

Variable	No. (%)	Mean \pm SD Score of Social Health	P value	P value *	
Age (y)	30-50	358 (60)	115.03 \pm 21.9	0.375	0.797
	51-70	239 (40)	116.7 \pm 23.9		
Gender	Male	256 (42.9)	117.9 \pm 22.7	0.038	0.821
	Female	341 (57.1)	114.03 \pm 22.6		
Residence place	City	417 (69.8)	117.9 \pm 21.3	0.001	0.003
	Village	180 (30.2)	110.5 \pm 25		
Education level	Illiterate	165 (27.6)	114.4 \pm 23.8	0.058	0.275
	Under high school diploma	166 (27.8)	113.3 \pm 24.7		
	From high school diploma to bachelor's degree	243 (40.7)	117.02 \pm 20.7		
	Master's degree and PhD	3.5 (21)	126.1 \pm 16.04		
	Missing data	0.3 (2)	-		
Marital status	Single	18 (3)	114.5 \pm 27.1	0.362	0.265
	Married	549 (92)	116.04 \pm 22.7		
	Widow/widower	26 (4.4)	112.1 \pm 21.4		
	Divorced	4 (0.7)	98 \pm 14.02		
Employment status	Private sector-employed	192 (32.2)	115.9 \pm 22.9	0.001	0.057
	Civil servant	101 (16.9)	123.5 \pm 18.4		
	Housewife	258 (43.2)	112.2 \pm 23.1		
	Retired	28 (4.7)	117.9 \pm 23.5		
	Unemployed	10 (1.7)	109.8 \pm 31.1		
	Missing data	8 (1.3)	-		
BMI	Thin (<18.59)	9 (1.5)	115.7 \pm 18.6	0.047	0.027
	Normal (18.6-24.9)	156 (26.1)	122.8 \pm 16.2		
	Overweight (25-29.9)	254 (42.5)	117.44 \pm 22.6		
	Obesity 1 (30-34.9)	120 (20.1)	113.7 \pm 23.6		
	Obesity 2, 3 (>35)	43 (7.2)	106.8 \pm 22.8		
	Miss data	15 (2.5)	-		

Abbreviations: SD, standard deviation; BMI, Body mass index.

* Covariance analysis

Table 2. Estimates of Total Score of Social Health and the Scores of its Three Domains

	Minimum	Maximum	Mean \pm SD
Family	6	30	25.91 \pm 5.306
Friends and relatives	11	40	31.17 \pm 6.928
Community	19	95	58.63 \pm 14.880
Social health (total score)	43	165	115.71 \pm 22.776

Abbreviation: SD, standard deviation.

while in our study, people aged 35-70 years were included. In the given study, people aged 17-30 years had the lowest level of social health, and the exclusion of this age group in our study could be the reason behind the higher score of the social health in that study.

In the present study, the social health scores on three domains of family, friends and relatives, as well as the community were obtained as 86.36, 77.92 and 90.2, respectively. The lowest social health score was obtained for

the domain of friends and relatives. The low level of social health in this domain may be associated with less intimacy of people with those around them, which requires cultural interventions to increase the sense of trust, confidence and intimacy in the community of friends and relatives of this population. If this domain of social health increases and people consider their friends and relatives as their supporters and help each other when physical and mental problems emerge, not only their social health but also their physical and mental health improve and, subsequently, a more healthy society is achieved.

The domain of community was lowest in the National Social Health Study in Iran, whereas this domain was highest in the study in Shahrekord. This difference can be attributed to the small community of Shahrekord compared to the larger cities and better social communication of people in the community, or to the difference in the age range of participants in the two studies since people aged 30 years or higher have more social connections in the community due to attending the workplaces than younger

people who depend more on family, friends, and relatives.

Regarding the age, the mean scores of social health in the age groups 30-50 years and 51-70 years were not significantly different. This finding was not consistent with the results from the National Social Health Study in Iran because the age of participants in that study was 18 years or higher.

In a study by Zali Arallou and Alaie on social health among teachers where the age group of the participants was similar to that of our participants, no significant relationship was detected between age and social health.¹⁴ Overall, a significant relationship between age and social health has been found in studies in which people aged 18 or higher were included; however, this relationship has not been not significant in studies examining people aged 30 or higher.

Regarding the gender, social health scores were significantly higher in men than in women, which was not consistent with the results from the National Social Health Study of Iran. The difference can be attributable to the traditional culture and small size of Shahrekord, as well as to the absence of women or lack of their interactions in the community, which reduces their social relationships. In a study review in 1996, eight studies out of 22 social health studies confirmed the association between social health and gender. In given studies, gender was reported to have had a small effect on social health.⁷

As for the residence place (city vs. village), a significant relationship was discovered between place of residence and social health, which could be explained by the fact that the diversity and abundance of communication leads to an increase in the level of social health among people living in urban areas. This variable has not been included in the reviewed studies. In the National Social Health Study in Iran, the downtowns and suburbs were examined, but no significant association was found between residence place and social health.

Social health scores were not significantly different in terms of education level; in other words, education was not significantly associated with social health, which was consistent with the results from the National Social Health Study in Iran and the study by Sabouri,¹⁵ but it was not consistent with the results from the study by Ghafari et al.¹⁶

Social health scores were not also significantly different in terms of marital status in the present study. This finding was not in line with the results from National Social Health Study in Iran. This inconsistency could be due to the inclusion criteria and the age difference of the participants in the two studies. Since only people aged over 30 years were included in our study, majority of the participants were married and only 3% were single.^{16,17}

Employment status and social health were significantly related so that the highest scores of social health were obtained by civil servants, followed by those employed in the private sector, retirees, and housewives. Unemployed people had the lowest levels of social health. Unemployment and the resulting stress and lack of income

can lead to inequality in health outcomes, stress, and unhealthy behaviors.

The difference in social health between civil servants and private sector-employed people is interesting and shows that civil servants enjoy higher social health because of experiencing higher job security. The results of studies also show that job dissatisfaction, as with unemployment, can affect physical and mental health.¹⁸

Numerous studies have shown that regardless of the economic and financial conditions, unemployment also causes psychological problems in people. Various studies have indicated that people who receive the same salary and pension when leaving work suffer from certain mental and physical disorders.¹⁹ This result is consistent with our study result as it was observed that retirees had lower social health than employed individuals.

This result suggests that special programs and conditions should be developed for retirees so that they do not lose their social, physical, and mental health in post-retirement period; and since that Iran population is aging, special attention should be paid to retirees by policymakers of the country.

Social health was lowest in people with grade 2 or higher obesity, indicating that these people had cared little about their physical and social health than others, and had limited contact with people around them. Their obesity was likely the reason for poor communication and reluctant acceptance of those around them or feeling of being rejected by others, which, in turn, led to a decline in their social health. Obese people are at high risk because they have disorders in both their physical and social health.

In addition to the diets that are given for the physical health of people, advice can also be given to them on how to communicate with others in order to improve their social health in the hope that their improved social health may help to improve their physical and mental health.

A study has shown that social relationships may play a highly influential role in the production of endocrine hormones.²⁰ The finding can be further investigated by conducting more prospective cohort studies. In our multivariate analysis, there was a significant difference between social health score, and residence and BMI; and the relationship between social health and employment status was somewhat significant. Moreover, the significant relationship between gender and social health was unnoticeable in our multivariate analysis. Because social health was lower in rural areas than in urban areas, it is possible to hold training classes and offer the villagers counseling on how people relate to each other and how to express feelings and emotional interactions – especially in family gatherings, so that social health could be improved among rural people.

It is also possible to improve social health among women in this region through culturalization and encouraging them to participate in social activities, as well as increasing their social relationships. Because social health in people with high BMI was low, it is recommended that advice

be given to this group in health centers and along with diets in order to improve their social relationships and, subsequently, their social health.

In this study, it was found that retirees had lower social health than currently employed individuals; it is possible to prevent the decline of social relationships after retirement by holding training courses to improve retirees' social health. This group should also be in contact with people who are in a similar situation in order to alleviate their retirement-related concerns. One of the limitations of this study was the lack of calculation of social health in terms of economic status, which is recommended to be addressed in future studies.

Conclusion

Social health level in the studied population was moderate and, therefore, deserves a due attention from health policymakers and planners. By determining the social health status in this population, it became possible to investigate various health outcomes in people with different social health scores in the SCS. Social health scores were significantly higher in urban areas than in rural areas, in men than in women, and in civil servants than in unemployed people. Social health was highest in people with normal BMI, but it was lowest in those with obese BMI.

Ethical Approval

This article was derived from the epidemiology master thesis of the first author and the study protocol was approved by the Ethics Committee for Biological Research (code: IR.SKUMS.REC.1398.12).

Conflict of Interest Disclosures

The authors declare that there is no conflict of interests.

Acknowledgments

Shahid Beheshti University of Medical Sciences Social Factors Affecting Health Center is acknowledged for support of the study, providing Iranian social health questionnaire and answering the researchers' questions. The authors also gratefully thank Health Modeling Research Center and Shahrekord University of Medical Sciences Vice Chancellor for Research and Technology for approval of the study protocol and providing financial (grant no. 3153) as well as other support.

References

1. WHO. World Health Organization Health definition 2001
2. Razavi DS, Demari DB, Tabrizchi DN, Eghlima DM, Azin DA, Baher DH, et al. Report of studies and support of the social sciences group of the Iranian Academy of Medical Sciences. 1st ed. Tehran: Publications of Medicine and Society; 2015. p. 102. [Persian].
3. Group SHR. The Iranian Academy of Medical Sciences First Social Health Conference of Iran 2008
4. Lopez AD, Murray CC. The global burden of disease, 1990-2020. *Nat Med*. 1998;4(11):1241-3. doi: 10.1038/3218.
5. Marmot M, Wilkinson RG. Social Determinants of Health. 1st ed. United States: Oxford University; 1990.
6. Marandi SA. Social factors of health, Persian textbook of public health. 2nd ed. Tehran: Ministry of Health and Medical Education, Deputy of Research and Technology; 2006. [Persian].
7. Modiri F, Safiri K, Mansourian F. A study on social health and its effective factors. *Quarterly Journal of Social Development (Previously Human Development)*. 2018;12(2):7-28. doi: 10.22055/qjsd.2018.13506. [Persian].
8. Abachizadeh K, Omidnia S, Hajebi A, Shekarriz-Foumani R, Mohseni M, Zamankhani F. Measuring self-perceived social health of Iranians; finding from Iran social health survey. *Nov Biomed*. 2017;5(3):91-7. doi: 10.22037/nbm.v5i3.15516.
9. Organisation for Economic Co-operation and Development (OECD). OECD Guidelines on Measuring Subjective Well-Being. Paris: OECD Publishing; 2013.
10. European Social Survey (ESS). ESS round 6 source questionnaire. London: Centre for Comparative Social Surveys, City University; 2012.
11. Allin P. Measuring societal wellbeing. *Economic & Labour Market Review*. 2007;1(10):46-52. doi: 10.1057/palgrave.elmr.1410157.
12. Khaledifar A, Hashemzadeh M, Solati K, Poustchi H, Bollati V, Ahmadi A, et al. The protocol of a population-based prospective cohort study in southwest of Iran to analyze common non-communicable diseases: Shahrekord cohort study. *BMC Public Health*. 2018;18(1):660. doi: 10.1186/s12889-018-5364-2.
13. Abachizadeh K, Tayefi B, Nasehi AA, Memaryan N, Rassouli M, Omidnia S, et al. Development of a scale for measuring social health of Iranians living in three big cities. *Med J Islam Repub Iran*. 2014;28:2.
14. Zali Arallou M, Alaie M. The study of the rate of social health among primary school teachers in Ardabil and social factors associated to it. *Journal of Sociology Studies*. 2014;6(22):123-40. [Persian].
15. Sabouri. Evaluation of social health in education staff of Tehran region Eleventh. 1391.
16. Ghafari G, Molaei J, Moemeni H. Investigating the factors influence on social health among the citizens of province Ilam. *Quarterly Journal of Social Development (Previously Human Development)*. 2018;13(1):37-66. doi: 10.22055/qjsd.2018.14011.
17. Keyes CL, Shapiro AD. Social well-being in the United States: a descriptive epidemiology. In: *How Healthy Are We?* University Chicago Press; 2004. p. 350-72.
18. Winefield AH, Tiggemann M, Winefield HR. The psychological impact of unemployment and unsatisfactory employment in young men and women: longitudinal and cross-sectional data. *Br J Psychol*. 1991;82(Pt 4):473-86. doi: 10.1111/j.2044-8295.1991.tb02414.x.
19. Rudas N, Tondo L, Musio A, Masia M. [Unemployment and depression. Results of a psychometric evaluation]. *Minerva Psichiatr*. 1991;32(4):205-9.
20. Seeman TE, McEwen BS. Impact of social environment characteristics on neuroendocrine regulation. *Psychosom Med*. 1996;58(5):459-71. doi: 10.1097/00006842-199609000-00008.