Investigating the relationship between satisfaction of basic psychological needs, general health, and some background variables in the Iranian older adults: a cross-sectional study

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**Abstract**

**Background:** Promoting the health and mental health (MH) of the older adults making up a large part of the world’s population in the coming years can provide the necessary conditions for their health and well-being of them. This study aimed to investigate the relationship between the satisfaction of basic psychological needs (BPNs), general health (GH), and some variables in Iranian older adults.

**Methods:** The present descriptive-correlational study was conducted on 780 older adults from Sarpol-e Zahab (Kermanshah) in 2019 including the study by multi-stage cluster random sampling. The data collection tool was BPNs satisfaction and GH questionnaire and a researcher-made questionnaire of individual and background information. Was used for data analysis using the SPSS version 16 program and descriptive statistics and tests Pearson correlation coefficient, chi-square test, independent-sample T-test, and multivariate linear regression.

**Results:** In the present study, participating a total of 780 older adult men aged 73.0 ± 29.32 years. There was a significant relationship between the satisfaction of BPNs and GH (\(p < 0.001\)). Also, 41% of the older adults were in poor GH and 30% were high in BPNs. Multiple logistic regression showed that the BPNs, age, income satisfaction, weather, and war zone were strong predictors of GH. The adjusted R\(^2\) value of 0.55 shows that the model described 55% of changes in the GH score.

**Conclusion:** According to the findings of the study on the relationship between the satisfaction of BPNs and GH, providing insurance, social and economic support by developing health policies, creating supportive health environments, strengthening community action, and developing individual skills in the older adults can help improve their MH and that of the community.

**Keywords:** Psychological needs, Mental health, Older adults, Autonomy, Competence

**Background**

Today, for the first time in human history, the life expectancy of many countries is 60 years or more. In low- and middle-income countries, this increase in life expectancy has been due to a large reduction in...
Social participation provides positive psychological states, such as high self-esteem, a sense of belonging, and purpose in life, and has a positive effect on MH [15]. Social participation also has a protective effect against reduced physical function [18]. In addition, studies have shown that there is a relationship between loss of autonomy, deteriorating health, hospitalization, the onset of depressive symptoms, and apathy [19]. People feel competent when they can participate in experiences and activities in which they use their skills and expertise [20]. The older adults’ sense of competence is affected by changes in cognitive competencies as well as physical limitations and injuries [21]. Accordingly, meeting BPNs, such as autonomy, competence, and relatedness can help reduce mental diseases, such as depression and anxiety, and mobility reduction in older adults.

Psychological problems can be studied from various aspects, including ethnicity and race. Obstacles, such as differences in language and special beliefs in the older adults of specific races and ethnicities can make it difficult to diagnose and interpret psychological disorders. One of the ethnic groups living in Iran is the Kurds, who are the fifth ethnic group in the country in terms of population. Observance of age hierarchy and respect for the older adults are among the ancient customs among them. The Kurdish older adults have special social conditions due to the wars in the early years after Iran's revolution and the 8-year war imposed by Iraq, which undoubtedly affected their MH [22]. War and displacement are among the destructive factors affecting MH [23]. Another factor affecting human MH has been the impact of climate [24]. The importance of environmental risk factors on MH outcomes has been considered [25]. Based on the evidence, exposure to extreme heat has negative effects on MH [26].

According to studies conducted in different parts of the world, older adults have high levels of mental disorders, indicating the need for careful assessment of MH and BPNs [27–31]. Moreover, studies on the self-determination theory and the older adults in nursing homes or hospitals have further emphasized the relationship between the three BPNs, well-being, and depression [32, 33]. However, according to the studies, none of the studies aimed to identify the relationship between BPNs and GH and individual and background factors (climate and war zone) in older adults.

Mental disorders are important in both sexes, but considering that in the Sarpol-e Zahab region (one of the Kurdish and war-torn regions of Iran) men play a major role in providing family income, any physical and mental disorders in addition to threatening the individual's health, seriously affects the health of the family. Therefore, due to the importance of the subject and limited...
Methods

Study area, design, and population
The present descriptive-correlational study was conducted in 2019 on the older adults of Sarpol-e Zahab city of Kermanshah. The older adults were selected from health centers. According to the statistics of the health center of this city in 2019, it had a population of more than 88 thousand people, of which 9054 people are over 60 years old. One thousand three hundred four older adults women and 1280 older adults men live in urban areas and 3515 older adults women and 2913 older adults men live in rural areas. Currently, the integrated care program at the city level is being implemented by 10 urban and rural centers and 50 health centers along with four community health centers some of these care include mental health. The study population is older adults men in Sarpol-e Zahab city.

Inclusion and exclusion criteria
The inclusion criteria consisted of men aged 60 years and older, satisfaction with cooperation, living in Sarpol-e Zahab city for at least 1 year, and no mental problems approved by a doctor. The exclusion criteria were unwillingness to cooperate and incomplete questionnaires.

Sample size estimation and sampling procedure
This study aimed to investigate the relationship between the satisfaction of BPNs, GH, and some variables in male older adults in Sarpol-e Zahab.

Data collection and procedures

Instrumentation
The questionnaires used in this study included the General Health Questionnaire (GHQ-28), Basic Psychological Needs Satisfaction Questionnaire (BNSQ), and a Researcher-made questionnaire of personal and background information.

General health questionnaire (GHQ-28)
This questionnaire was first designed by Goldberg in 1972, and in this study, its 28-item form was used, identifying discomfort in less than a month. It has 4 subscales, including physical symptoms, anxiety, sleep disorder symptoms, social functioning, and depressive symptoms. Each subscale has 7 questions and each of the four domains is given a score and the whole questionnaire (28 questions) is given a score. Thus, this scale gives 5 separate scores. In terms of answering the questions, the subject should complete the questionnaire using a four-point Likert scale (0, 1, 2, 3) according to their health status during the past month. On each scale, score 6 and above, and in total score 22 and above indicate pathological symptoms. Scores in the subscales and the whole questionnaire are “none or minimum (0-6), (0-22)”, “mild (7-11), (40-23)”, “average (16-12), (60-41)”, “severe (21-17), (84-61)” [34]. In Likert scoring, the maximum score is 84 and the cut-off point is 23. The translation, validity, and reliability of this questionnaire have been confirmed by Iranian researchers [35].

Basic psychological Need Satisfaction Questionnaire (BNSQ)
The questionnaire was designed by Guardian, Desi, and Ryan (2000) to measure the sense of support for the needs of autonomy, competence, and relatedness. The questionnaire consists of 21 questions scored on a 7-point Likert scale from absolutely true to not at all true [12]. A higher score in each area indicates a more favorable status. The minimum and maximum scores of the questionnaire are 21 and 147, respectively. Scores of 21 to 42 indicate low BPNs, scores of 42 to 105 indicate moderate BPNs, and scores above 105 indicate high BPNs. The translation, validity, and reliability of this questionnaire have been confirmed by Iranian researchers [36, 37].

Personal and background information questionnaire
This questionnaire includes 11 questions examining the personal and background information of the older adults.
Statistical analysis
The data were entered into SPSS version 16 for statistical analysis. Chi-square, independent t-test, and Pearson correlation coefficient were used. The normality of the data was assessed by the Kolmogorov-Smirnov test and the significance level was less than 0.05 in the tests. Multiple linear regression was used to test the effect of BPNs and personal and background information variables on GH. GH was used as the dependent variable and BPNs and personal and background information variables as the independent variables.

Results
The present descriptive correlational study was performed on 780 older adults men aged 60 to over 70 years. The mean age of the older adults was 73.0 ± 29.32 years. Moreover, 85.64% of the participants were married, 96% were with family and other personal and background information variables are described in Table 1. The mean scores of BPNs and GH and their subscales are shown in Table 2.

The results showed that 41% of the older adults were in poor health status, 30% were high in BPNs, and 70% were at a moderate level. The correlation between the composite score of GH status (healthy and disorder) and the composite score of BPNs (low, moderate, and high) are shown in Table 3, which there was a statistically significant relationship between them (p < 0.001). The percentage of people with high BPNs in people with normal GH is more than people with a GH disorder.

The correlation between personal and background information and the composite score of BPNs is shown in Table 4. There was a significant relationship between the composite score of BPNs and the variables of age, climate, and income satisfaction (P < 0.001). Also, the Chi-square test did not show a significant relationship between the composite score of BPNs and place of residence, marital status, living status, and war zone (P > 0.05).

The correlation between personal and background information and the combined score of GH status is shown in Table 5. There was a significant relationship between GH and age, climate, income satisfaction, living conditions, and war zone (P < 0.001). In addition, the Chi-square test did not show a significant relationship between the combined score of GH status, place of residence, and marital status (P > 0.05).

Predictors of general health
A multivariate linear regression analysis was used to test the effect of BPNs and personal and background information variables on GH. The dependent variable of GH and BPNs and personal and background information were independent variables. As shown in Table 6, The BPNs and age, income satisfaction, weather, and war zone were strong predictors of GH. the adjusted R2 value of 0.55 shows that the model described 55% of changes in the GH score.

Discussion
The current study aimed to investigate the correlation between the satisfaction of BPNs, GH, and some affecting variables in the older adults. The results showed that there was a significant relationship between the composite score of BPNs and the composite score of GH status. The percentage of people with high BPNs in people with normal GH was more than people with
GH disorders. These findings can be explained by the fact that the satisfaction of BPNs has a positive effect on motivational variables, including intrinsic motivation. In other words, if the needs are satisfactorily met, people will be effectively involved in activities and achieve positive performance. The energy from satisfying psychological needs empowers the personality and the individual spontaneously engages in activities that increase MH [20].

The study by Behzadnia et al. [38] showed that illness and depression are a function of BPNs frustration. In the study by Okun et al. [39], it was reported that low psychological basic need causes poor sleep quality. Li et al. [40] reported that the satisfaction of psychological needs is negatively associated with stress and anxiety.

The present study showed that the GH in half of the older adults was poor. One of the reasons for the increase in GH disorders could be aging, which was also reported

### Table 3: Relationship of basic psychological needs with general health

| Variable          | Subgroup | Basic psychological Needs          | Total | P     |
|-------------------|----------|-----------------------------------|-------|-------|
|                   |          | Low (n = 0) Moderate (n = 546) High (n = 234) |       |       |
|                   |          | F (%) | F (%) | F (%) | F (%) |       |       |
| General health    | normal   | 0     | 271(56.74) | 197(43.26) | 468(100) | <.001 |
|                   | adverse  | 0     | 275(88.57) | 37(11.43)  | 312(100)  |       |
| Total             |          | 0     | 546(69.82) | 234(30.18) | 780(100)  |       |

F: Frequency

### Table 4: Relationship of personal and background information variables with basic psychological needs

| Variable                  | Subgroup | Basic Psychological Needs          | P     |
|---------------------------|----------|-----------------------------------|-------|
|                           |          | Low (n = 0) Moderate (n = 546) High (n = 234) |       |
|                           |          | F (%) | F (%) | F (%) | F (%) |       |       |
| Age (y)                   | –        | 0     | 74.08(8.75) | 71.06(8.38) | <.001 |
| Climate                   | Temperate| 0     | 105(79.55)  | 27(20.45)   | .002  |
|                           | Warm     | 0     | 441(68.9)   | 207(31.1)   |       |
| Income satisfaction       | Yes      | 0     | 125(50.31)  | 109(49.69)  | <.001 |
|                           | No       | 0     | 204(85.99)  | 38(14.01)   |       |
|                           | Somewhat | 0     | 217(71.59)  | 87(28.41)   |       |

a: Mean (SD)

b: Frequency (%)

### Table 5: Relationship of personal and background information variables with general health

| Variable                  | Subgroup | General Health          | P     |
|---------------------------|----------|-------------------------|-------|
|                           |          | Normal (n = 468)        |       |
|                           |          | Adverse (n = 312)       |       |
| Age (y)                   | –        | 72.24(8.06)             |       |
|                           |          | 70.04(7.68)             |       |
| Climate                   | Temperate| 93(70.45)               | .002  |
|                           | Warm     | 375(57.83)              | 273(42.17) |
| Income satisfaction       | Yes      | 167(71.04)              |       |
|                           | No       | 114(46.25)              |       |
|                           | Somewhat | 187(59.88)              |       |
| Type of living            | Living with a non-family | 10(48.81) | 14(51.19) | .02  |
|                           | Living with family | 458(59.62) | 298(40.38) |       |
| War zone                  | Yes      | 423(67.15)              |       |
|                           | No       | 45(29.12)               |       |

a: Mean (SD)

b: Frequency (%)
in the present study. According to Erikson’s stages of psychosocial development and Lazarus and Folkman’s transactional theory of stress and coping, significant differences in stressors are found at different ages [41, 42]. In the study of Luo et al. [43], the deterioration of the quality of life of the older adults related to health (physical and mental) is partly related to the biological weakness caused by their aging. To reduce the possible quality of mental life of the older adults, which may complicate health, prevention, and care of chronic illness and other illnesses, interventions should be made for high-risk individuals, including middle-aged people, before reaching old age.

In the present study, the total score of BPNs predicted the GH of older adults. Kouros et al. [44] reported that higher levels of autonomy predict lower levels of symptoms of failure and social anxiety among male helicopter parenting. Also, the results of the study by Ng et al. [45] showed that BPNs predict moderate to strong levels of patient well-being including better mental health and higher levels of health behaviors (physical activity and consumption of prescription drugs) that are related to physical health and longevity.

Income inequality in a society is a determining factor in population health and there is an argument that socioeconomic conditions affect health through psychosocial health [46]. According to the present study, income is another factor that has affected the GH of older adults. Also, income satisfaction is also determined as a strong predictor of GH. So people with GH disorders are not satisfied with their income. Studies in high-income countries have shown that improvements in MH and well-being are achieved after retirement (due to good payment) [47, 48]. Boutayeb et al. [49] also reported that there was a relationship between low income and unemployment with the prevalence of several diseases. There is a close relationship between job loss and symptoms of common mental disorders, such as depression and anxiety [50]. The study also showed that the older adults with high BPNs had higher income satisfaction. Di Domenico et al. [51] reported that there was a relationship between higher levels of income inequality and lower levels of estimation of BPNs.

In the present study, the older adults living with families had good GH, but a significant number also reported GH disorders. The older adults who lived with their family but had a GH disorder which could be due to some reasons. Their spouse may have died, they may be living with their children, and they may not have a source of income and their responsibility is with those who they live with, or they have physical and mental problems and it is difficult to keep them at home, which can cause problems for the older adults at home. This issue requires further research. In the study by Drageset et al. [52] and Tiong et al. [53], the home loss was one of the factors that had an adverse effect on the MH of the older adults in nursing homes. The results of these studies are not in line with the present study, which might be due to the fact that these studies included both genders in their study, while in the present study, only male older adults participated. It is possible that the men in this study had GH disorders due to low BPNs and a lack of independence and competence in their families.

Some studies have reported the risks of a wide range of MH-related consequences with high temperatures [54]. The present study showed that the older adults living in warmer climates had more GH disorders than those living in temperate regions. Also in the present study, it was reported that weather is a predictor of GH. In the study by Li et al. [55], it was reported that by increasing temperature, hospitalization in the emergency department due to anxiety, depression, and mental disorders increased. Gao et al. [56] stated that personal characteristics and contextual factors, such as age, gender, socioeconomic factors, and ambient temperature lead to greater vulnerability in individuals.

As shown in the present study, the older adults who lived in war zones had GH disorders and war is a predictor of GH. Children who spent their childhood during the war had a reduced ability to regulate stress and fear responses at later ages, thus increasing their risk of developing mental and behavioral disorders in adulthood [57]. The study by Newnham et al. [58] also reported that psychological trauma increases for populations remaining in the post-war environment.

Accordingly, implementing strategies, such as developing health policies, creating health support environments, strengthening community action, developing individual skills, and nationwide reviewing of health care

### Table 6 Multivariate regression analysis of the predictors of general health in the basic psychological need and personal and background information variables

| Variables                  | 95.0% confidence Interval for B (Lower- upper bound) | S | p value |
|----------------------------|-----------------------------------------------------|---|---------|
| BPNs                       | (22 - 33)                                           | .28 | .025   | <.001   |
| Age                        | (172 - 35)                                          | .26 | .045   | <.001   |
| Climate                    | (−4.77 - 5.54)                                      | −2.64 | 1.07   | .01     |
| War zone                   | (−9.77 - 5.61)                                      | −7.69 | 1.06   | <.001   |
| Income satisfaction        |                                                     |     |         |
| Yes                        | (−4.41 - 29)                                        | −2.35 | 1.05   | .03     |
| Some what                  | (−5.11 - 2.39)                                      | 2.25 | .95    | <.001   |

BPNs: basic psychological needs, S standard error estimation
services providers, are likely to have a significant impact on reducing MH inequalities. There will be the greatest potential for achieving a healthy population, which includes reducing poverty, lifelong social support, reducing inequality, preventing war and conflict, and promoting access to employment.

Limitations

This study had several limitations. First, this study examined the BPNs and GH as a total score. In order to better understand which BPNs affect the GH of the older adults, income satisfaction, and war experience, it is required to separately examine the relationship of each of the subscales of this need with other variables. Another limitation was that this study was a correlational study and could not infer causal results from it, since each of the variables could have a causal effect on the other or there might be a third variable that has a causal effect on the two variables. In future studies, it is suggested that experimental or longitudinal studies be conducted on the effectiveness of satisfying psychological needs on the GH of the older adults, which can show the causal relationship between the two variables. Moreover, stronger statistical methods, such as structural equation modeling, can be used to show the multivariate relationship between different variables related to GH and psychological needs and other variables.

Conclusion

The present study aimed to find factors related to the GH of the older adults. The results indicated that BPNs are related to GH and the more limited and obstructed the satisfaction of BPNs (autonomy, competence, and relatedness), the more the GH of the elderly decreases. Due to the war experience, unemployment, economic and social problems while living in a border town, such as Sarpole Zahab (Kermanshah), the older adults are less able to experience the satisfaction of BPNs and as a result, have less MH. The findings of this study can also provide a way to conduct research in this area playing an important role in promoting the health of the older adults. The self-determination theory provides a good framework for psychological and social issues. Most importantly, the results of the present study may have important implications for designing effective interventions.

Abbreviations

BPNs: Basic Psychological Needs; GH: General Health; MH: Mental Health.

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Authors’ contributions

HVM, TM and AAP designed the study, performed data analysis, and interpretation, and prepared the manuscript. TM, SY and JSH designed the study, conducted a literature search, and interpreted findings in the drafted manuscript. AR participated in the design of the study, assisted and revised the draft manuscript. SY participated in the design of the study, assisted and revised the draft manuscript. All authors approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the School of Health and Safety, Shahid Beheshti University of Medical Sciences (code IR.SBMU.PHNS. REC.1395.79). All these methods followed relevant guidelines, literature review, and regulations approved by the School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Written informed consent was obtained from all participants prior to taking part in this study.

Consent for publication

Not applicable.

Competing interests

The authors express that they have no competing interests.

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References

1. World Health Organization (WHO). WHO clinical consortium on healthy ageing: topic focus: frailty and intrinsic capacity: report of consortium meeting, 1–2 December 2016. Geneva: World Health Organization, 2017.
2. Statistical Center of Iran. General population and housing census Iran (Persian), 2016. Available from: http://www.amar.org. ir/Default. aspx?tabid=1191. [cited 5 Nov 2013].
3. Burden of Disease. Our world data. 2016. Accessed: 12 March 2020: https://ourworldindata.org/burden-of-disease.
4. Akishita M, Ishii S, Kojima T, Kozaki K, Kuzuya M, Arai H, et al. Priorities of health care outcomes for the elderly. J Am Med Dir Assoc. 2013;14(7):479–84.
5. Yang G, Wang Y, Zeng Y, Gao GF, Liang X, Zhou M, et al. Rapid health transition in China, 1990–2010: findings from the global burden of disease study 2010. Lancet. 2013;381(9882):1987–2015.
6. Age U. Healthy ageing evidence review. London: Age UK; 2011.
7. Age U, England N. A practical guide to healthy ageing. NHS England; 2015.
8. Xiang P, Ağbuğa B, Liu J, McBride RE. Relatedness need satisfaction, intrinsic motivation, and engagement in secondary school physical education. J Teach Phys Educ. 2017;36(3):340–52.
9. Pous S, Peikani FA, Nourmohammadi H, Sanei P, Tarjoman A, Borji M. Investigating the effect of mindfulness-based training on psychological status and quality of life in patients with breast cancer. Asian Pac J Cancer Prev. 2018;19(7):1993.
10. Santini Z, Jose PE, Cornwell EF, Koyanagi A, Nielsen L, Hinrichsen C, et al. Social connectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. Lancet Public Health. 2020;5(1):e62–70.
11. Sandoval CA, Llanos-Molina C, Frazer D, et al. Identifying support functions in community-dwelling elderly adults. J Am Geriatr Soc. 2012;60(4):696–703.
12. Deci EL, Ryan RM. Handbook of self-determination research. Rochester: The University of Rochester Press, 2004. p. 3–33.
13. Janssen S, van Vuuren M, de Jong MD. Identifying support functions in developmental relationships: a self-determination perspective. J Vocat Behav. 2013;82(1):20–9.
14. World Health Organization. Active ageing: a policy framework. Geneva: WHO; 2002.
15. Tomioka K, Kurumtani N, Hosoi H. Association between social participation and 3-year change in instrumental activities of daily living in community-dwelling elderly adults. J Am Geriatr Soc. 2017;65(1):107–13.
16. Tomioka K, Kurumtani N, Hosoi H. Social participation and cognitive decline among community-dwelling older adults: a community-based longitudinal study. J Gerontol B Psychol Sci. 2016;71(5):800–806.
17. Umberger D, Karaz Monteiro J. Social relationships and health: a flashpoint for health policy. J Health Soc Behav. 2010;51(Supp 1):S54–S66.
18. Tomioka K, Kurumtani N, Hosoi H. Relationship of having hobbies and a purpose in life with mortality, activities of daily living, and instrumental activities of daily living among community-dwelling elderly adults. J Epidemiol. 2016;26(7):361–70.
19. Priha AM, Cosco TD, Dening T, Beekman A, Brayne C, Huisman M. The association between depressive symptoms in the community, non-psychiatric hospital admission and hospital outcomes: a systematic review. J Psychosom Res. 2015;78(1):25–33.
20. Ryan RM, Deci EL. Self-determination theory: Basic psychological needs in motivation, development and wellness. New York: Guilford Press; 2017.
21. Power C, Greene E, Lawlor B. Depression in late life: Etiology, presentation, and management. Mental health illness of the elderly mental health illness worldwide. Singapur: Springer; 2017. p. 187–218.
22. Ghaderi S, Sahaf R, Mohammadi Shahbalaghi F, Ansari G, Gharanjic A, Ashafi K, et al. Prevalence of depression in elderly Kurdistan community residing in Boukan, Iran. Iran J Aging. 2012;7(1):57–66.
23. Hassan Q, Ventevogel P, Jeebe-Bahloul H, Banki-Otto A, Kirmayer LJ. Mental health and psychosocial wellbeing of Syrians affected by armed conflict. Epidemiol Psychiatr Sci. 2016;25(2):129–41.
24. Balbuz J, Cimmins A, Gamble J, Easterling D, Kunik K, Saha S, et al. Climate change and human health. Impacts of climate change on human health in the United States: a scientific assessment, 2016. p. 25–42.
25. DEFRA A. Green future: our 25 year plan to improve the environment. London: UK Department for Environment; 2018.
26. Berry HL, Bowen K, Kjellstrom T. Climate change and mental health: a causal pathways framework. Int J Public Health. 2010;55(2):123–32.
27. Salimi E, Dasht Bozorgi B, Mazfani M, Tabesh H. Investigating mental health status and life satisfaction of retired elderly referred to retirement's centers of the Jundishapur University of medical sciences and shahid Chamran University in Ahvaz. J Geriatr Nurs. 2014;41(1):20–31.
28. Etemadi A, Ahmadi K. The survey of concerns and psychological disorders in elderly sanatorium. J Inflam Dis. 2010;14(1):71–7.
29. Mortazavi SS, Mohammadian K, Aredehli BE, Beni RD, Mahmoodi M, Keshhtari AH. Mental disorder prevention and physical activity in Iranian elderly. Int J Prev Med. 2012;3(Suppl 1):S64.
30. Aasun B, Huozh M, Santos-Olmo AB, Perez-Santos E, Castellanos MA. Prevalence of mental disorders in the elderly in the community of Madrid: results of the Mentdis_ICF65+ study. Span J Psychol. 2017;20.E6.
31. Andreas S, Schultz H, Volker J, Ludemann J, Dehoust M, Selsner S, et al. Incidence and risk factors of mental disorders in the elderly: the European Mentdis_ICF65+ study. Aust N Z J Psychiatry. 2021;55(5):S1–9. https://doi.org/10.1177/00048674211025711.
32. Ferrand C, Martineinet G, Durmaz N. Psychological need satisfaction and well-being in adults aged 80 years and older living in residential homes: using a self-determination theory perspective. J Aging Stud. 2014;30:104–11.
33. Suesmes G, Martineinet G, Ferrand C, Jiaog, geriatrics. Perceived autonomy support, psychological needs satisfaction, depressive symptoms and apathy in French hospitalized older people. Arch Gerontol Geriatr. 2016;65:70–8.
34. Roh YS, Lee WS, Chung HS, Park YM. The effects of simulation-based resuscitation training on nurses’ self-efficacy and satisfaction. Nurse Educ Today. 2013;33(2):123–8.
35. Besharat MA. The basic needs satisfaction in general scale: reliability, validity, and factorial analysis. J Educ Meas. 2013;4(14):147–58.
36. Tajiri KZ, Besharat MA, Pourshoobooli S, Larijani R. Psychometric properties of a Farsi version of the basic needs satisfaction in general scale in a sample of Iranian population. Proc Soc Behav Sci. 2011;30:221–5.
37. Eskandari A. Relationship between satisfying basic psychological needs and quality of life in the elderly in Isfahan. J Res Behav Sci. 2021;19(10).
38. Behzadnia B, Deci EL, Delhaan CR. Predicting relations among life goals, physical activity, health, and well-being in elderly adults: a self-determination theory perspective on healthy aging. Self-determination theory and healthy aging. Springer Nature Singapore Pte Ltd.; 2020. p. 47–71.
39. Okun ML, Mancuso RA, Hobel CJ, Schetter CD, Coussons-Read M. Poor sleep quality increases symptoms of depression and anxiety in postpartum women. J Behav Med. 2018;41(5):703–10.
40. Li C, Ivarsson A, Sun J. Basic psychological needs satisfaction and stress, frustration, and sports injury among university athletes. A four-wave prospective survey. Front Psychol. 2019;10:6665.
41. Erikson E. The life cycle completed. A review. New York & London: W. Norton & Comp.[1980] (1946)Ego Development and Historical Change; 1982.
42. Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. J Health Soc Behav. 198021:199–39.
43. Luo Y, Xu J, Granberg E, Wentworth WM. A longitudinal study of social status, perceived discrimination, and physical and emotional health among older adults. Res Aging. 2012;34(3):275–301.
44. Kourois CD, Prutt MM, Ekas NV, Kinaki R, Sundenland M. Helicopter parenting, autonomy support, and college students’ mental health and well-being: the moderating role of sex and ethnicity. J Child Fam Stud. 2017;26(3):939–49.
45. Ng YJ, Ntoumanis N, Thaergensen-Ntoumani C, Deci EL, Ryan RM, Duda JL, et al. Self-determination theory applied to health contexts: a meta-analysis. Perspect Psychol Sci. 2012;7(4):325–40.
46. Tuters S, Wilkinson, R., & Pickett, K. (2009). The Spirit level: why more equal societies almost always do better. London: Allen Lane. Taylor & Francis; 2012.
47. Gayman MD, Pai M, Kail BL, Taylor MG. Reciprocity between depressive symptoms and physical limitations pre-and postretirement: exploring racial differences. J Aging Health. 2013;25(4):535–73.
48. Latif E. The impact of retirement on psychological well-being in Canada. J Socio-Econ. 2011;40(4):373–80.
49. Boutevay B, Boutevef B, Boutevef W. Multi-morbidity of non communicable diseases and equity in WHO eastern Mediterranean countries. Int J Equity Health. 2013;12(1):1–13.
50. IHE U. The impact of the economic downturn and policy changes on health inequalities in London. London: UCL IHE; 2012.
51. Di Domenico D, Fournier MA. Socioeconomic status, income inequality, and health complaints: a basic psychological needs perspective. Soc Indic Res. 2014;119(3):1679–97.
52. Drageset J, Dysvik E, Espehaug B, Natvig GK, Furnes B. Suffering and mental health among older people living in nursing homes—a mixed-methods study. PeerJ. 2015;3:e1120.
53. Tiong WW, Yap P, Huat Koh GC, Phoon Fong N, Luo N. Prevalence and risk factors of depression in the elderly nursing home residents in Singapore. Aging Ment Health. 2013;17(6):724–31.
54. Mullins JT, White C. Temperature and mental health: evidence from the UK. J Health Econ. 2019;68:102240.
55. Li H, Zhang S, Qian ZM, Xie X-H, Luo Y, Han R, et al. Short-term effects of air pollution on cause-specific mental disorders in three subtropical Chinese cities. Environ Res. 2020;191:110214.
56. Gao J, Cheng Q, Duan J, Xu Z, Bai L, Zhang Y, et al. Ambient temperature, sunlight duration, and suicide: a systematic review and meta-analysis. Sci Total Environ. 2019;646:1021–9.
57. Boyce WT. The lifelong effects of early childhood adversity and toxic stress. Pediatr Dent. 2014;36(2):102–8.
58. Newnham EA, Pearson RM, Stein A, Betancourt TS. Youth mental health after civil war: the importance of daily stressors. Br J Psychiatry. 2015;206(2):116–21.

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