



Effect of the Leisure Activities on the Level of Psychological stress among the elderly during the Coronavirus Outbreak

Ayed Zureigat ^{1B}, Osama Abdel Fattah ^{2ACD}

¹Faculty of Physical Education, the University of Jordan, Amman, Jordan

²Ministry of Education, Amman, Jordan

Authors' Contribution: A – Study Design, B – Data Collection, C – Statistical Analysis, D – Manuscript Preparation, E – Funds Collection

Abstract

Background: It is well known that advancing age is accompanied by many negative feelings due to the feeling of loneliness and psychological emptiness, which leads to the individual feeling that society does not need him due to his weak physical abilities and thus this, will negatively affect healthy aging. **Objective:** The study aimed to investigate the effect of the leisure activities on the psychological stress among the elderly during Coronavirus (COVID-19) Outbreak. **Design:** To achieve this, we used the quasi-experimental approach on a sample consisting of 54, with the average age of (65.4±2.3) years. Divided into two groups 27 as a control group and 27 as the experimental group and this sample was purposively selected. Because of the home quarantine and to reduce face-to-face interaction, we used a questionnaire to measure the psychological stress level by using the Google form. The study tool consisted of 7 paragraphs associated with depression and 6 paragraphs associated with anxiety, finally 6 paragraphs associated with aggression. Before applying the experiment, the psychological stress was measured among the study sample, and then the leisure activities program was sent to the experimental group by the WhatsApp application. The researchers used means, standard deviations, paired and independent sample t-test by using SPSS version 24 with a confidence level of 95% ($p < 0.05$). **Results:** The results of the study have shown that the level of the psychological stress among both groups came with a high average in the pre-measurement, as well as the anxiety domain that were the most affected in a positive way through leisure activities practicing. Additionally, there were statistically significant differences between the pre and post measurement among experiment group and favor of the post measurement. **Conclusion:** the leisure activities practicing among the elderly have contributed positively to reducing the level of psychological stress represented by depression, anxiety.

Keywords: Psychological stress, Depression, Anxiety, Aggression, Coronavirus.

Address for correspondence: Osama Abdel Fattah - Ministry of Education, Amman, Jordan, e-mail: samhsaf.2811@gmail.com

Received: 15.07.2020; Accepted: 11.10.2020; Published online: 21.04.2021

Cite this article as: Zurigat A, Fattah O. Effect of the Leisure Activities on the Level of Psychological stress among the elderly during the Corona virus Outbreak. Phys Activ Rev 2021; 9(1): 70-78. doi: 10.16926/par.2021.09.09

INTRODUCTION

With the announcement by the World Health Organization (WHO) that the Corona virus (COVID-19) is a pandemic, threatening the planet with 4,815,088 million cases and 318,721 deaths [1]. Noting that the mortality rate of this epidemic is estimated at 2 %, but some researchers estimate the death rate between 0.06-0.03% [2]. The World Health Organization (WHO) indicates that the percentage of elderly individuals in the world over the age of 60 years have increased to 22% in 2050. Consequently, a number of health, social and psychological challenges have emerged because of this high rate [3-5]. While some studies indicate that the percentage of elderly individuals will increase to reach 19.6% in 2030 [6]. Where estimates indicate that more than 20% of the elderly people in the world over the 60 years suffer from mental and neurological disorders, as neuropsychiatric disorders represent 6.6% of the total disability of this group as a result of many reasons, including aging, lack of independence and low physical abilities [7]. In addition to some social problems, which are isolated, social unity and low rates of social participation [8, 9]. Also, some psychological problems and pressures represented in the high indicator of fear of death and high indicators of depression, as a result of their feeling that their role in life has become ineffective in the lives of others, especially with regard to children [10]. Aging is a natural process that results in a set of physical, functional, and psychological changes, which is inevitable and not subject to change or change, but we can limit the impact of those negative changes that may contribute to a lower level of life satisfaction among older individuals [11, 12]. The elderly have also declined in some physical and cognitive functions, and the decrease in social networks, which may affect the health status with the age progress [13]. Also of concern is that the elderly have more free time than other age groups [14].

With the Coronavirus outbreak, it is normal for individuals to feel fear, stress and high levels of anxiety for several reasons, including: the inability to receive medical care in health facilities because fear of contracting this virus, fear of losing livelihoods, also the social isolation that affects people's social relationships and lead to feelings Boredom and loneliness, it is also a new virus and has no vaccine yet [15-17]. Indicates that 53.8% of the study sample in China during the Coronavirus outbreak had negative psychological effects ranging from moderate to severe, 16.5% had a moderate to severe depression, and 28.5% had a moderate to severe anxiety level and 8.6% suffer from moderate to severe stress. Consequently, the level of individuals' respiratory aspects affects the efficiency and effectiveness of their immune system, as this system is affect by many variables, including: social life, mood, depression and anxiety [18]. Where studies indicate that people who have a high level of stress are more susceptible to infection, due to a defect in the regulation of hormonal secretion, and this reduces their immune response as a high level of cortisol hormone contributes to the inhibition of this response [19]. Similarly, the Corona pandemic has also strained mental health, anxiety, fear and behavioral disorders [20].

In light of the Corona pandemic crisis and the application of the home quarantine, the need to care for the elderly has become more urgent than the previous period, as this group is more dangerous to catch this virus as a result of their weak immune system, as recreational activities contribute to improving the cognitive and physical function and mental health of the elderly [21]. Leisure activities are a medium that is define as favourite and enjoyable activities that are share during free time, which is the free time in which the individual is not committed to any formal work, and exercise can be practiced during it [22, 23]. Where studies indicate that the practice of physical activities at least (3) times per week for a period of (30) minutes helps to reduce stress and symptoms of depression, as well as it contributes to facilitating the release of the hormone endorphin, which is linked to the immune system as the immune cells are able to produce this hormone and this reflects the bilateral relationship between the nervous and immune system, which can be improved in response to the practice of physical activities, as well as the exercise of sporting activities contributes to the secretion of the hormone serotonin and this positively effects on the immune system to better deal with the direction of infection from others [24]. Moreover, exercising contributes to controlling the level of the hormone cortisol in the body, which contributes to reducing stress and reducing the risk of depression [25]. Leisure activities provide social support, enrich the meaning of life, recover from stress, restore social status and overcome negative events in life, such as psychological pressures, as these activities

contribute to improving the level of well-being and life satisfaction among the elderly, and it is considered a method to improve the level of psychological aspects [26- 29].

Although the Corona virus can affect all individuals, the possibility of contracting this virus increases with age, due to the weakening of the immune system with age, as well as the elderly suffer from psychological problems such as stress, anxiety, symptoms of depression, anger and fear [30, 32]. In addition, the elderly are among the most affected by the Corona pandemic, both in terms of severity and mortality, and suffer negative psychological effects during the home quarantine period [33]. Where (44) studies indicate that individuals over the age of 60 years were more anxious than the general population and had a negative view of infection with this virus [34, 35]. On the other hand, many studies on the elderly sector indicated an increase in the indicators of overweight, which adds health, psychological and motor burdens for them [36, 37]. The danger in this is that a higher level of depression is associated with an increase in BMI through concern for health and the physical appearance of the body [38]. Therefore, managing stress levels in the elderly are the key to maintaining an optimal level of health and increasing positive life spans, as empirical evidence indicates that leisure time is high and negatively related to stress, as there is a close and the high correlation between leisurely and stress, especially among the elderly [39]. Additionally, that investing leisure time in recreational activities and social support contributes to alleviating the effect of stress among the elderly. Participation in recreational activities can have a positive impact on the mental health of the elderly and improve their quality of life [40, 41]. These activities also contribute to improving social interaction, promoting health and preventing isolation [42]. It also helps deal with stress, improves life satisfaction and mental health [43].

In Jordan, the percentage of the elderly who are 60 years of age and over is 5.4% at the end of 2017, and this ratio is expected to reach 8.6% by 2030, 15.8% at the end of 2050. Therefore, in light of the state's application of domestic quarantine because of the Corona pandemic we need for attention to this group and became urgent because this stage imposed social isolation. It is well known that advancing age is accompanied by many negative feelings due to the feeling of loneliness and psychological emptiness, which leads to the individual feeling that society does not need him due to his weak physical abilities and thus this, will negatively affect healthy aging. The main point in this research is to try to apply leisure activities to the elderly during the period of home quarantine due to the Coronavirus outbreak and know the effect of these activities on the level of psychological stresses they have.

MATERIAL AND METHODS

Patients and study design

To achieve the objectives of the study, we used the Quasi- experimental approach and Leisure activities program on a sample that consisted of 54 untrained healthy male, with the average age of (65.4±2.3) years and divided into two groups 27 as a control group and 27 as the experimental group. Noting that this sample was purposively selected and does not suffer from any disease, and they can walk without help and they do not suffer from any psychological disorders. Where the study sample was distributed to the two groups randomly, by giving numbers to the study sample from (1- 54), so that the control group included the individual numbers and the experimental group included the even numbers. To verify the equivalence between two groups (control and experimental), the researchers calculated the means and standard deviations of the psychological stress level in the pre-measurement, and then used a t-test for the independent groups. Where the results of this test showed that the value of $T=0.616$, with $p=0.961$ for the anxiety domain and $T=0.658$, $p=0.514$ for the depression domain, $T=0.099$, $p=0.0921$ for the aggressiveness domain and $T=0.574$, $p=0.589$ for the psychological stress. Accordingly, we find that the significance level values were greater than 0.05, and this is an indication of parity between the two groups in the level of psychological stress in the pre-measurement.

The experiment

Due to curfew in the country and to reduce interaction face to face, an electronic questionnaire was built by using (Google forms), which consist of 19 paragraphs to measure the level of psychological stress (depression, anxiety and aggression) and sending the link by the WhatsApp

application, where the study sample was confirmed after completing the questionnaire, by pressing send. The study tool consisted of 7 paragraphs associated with depression: I feel that my life is empty; I feel empty of energy; I feel dissatisfied with my life; I feel bored often; Often I feel low in spirits; I often feel helpless; I feel worthless. In addition, 6 paragraphs associated with anxiety: I feel dry throat during home quarantine; I couldn't seem to experience any positive feeling at all during home quarantine; I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion) during home quarantine; I feel heart pounding during home quarantine; I feel fear of losing control during home quarantine; I feel that it difficult to relax during home quarantine. Finally, 6 paragraphs associated with aggression: I have increased shouting during the stone home; the use of abusive language increased during home quarantine; I was not helpful during home quarantine; I was generally irritable during home quarantine; Anger became fast during home quarantine; I am throwing things during home quarantine.

Before applying the experiment, the psychological stress was measured for two groups and then the leisure activities program was sent to the experimental group through the WhatsApp application, The recreational program that was presented to the study sample included a group of popular games whose content included poetry, drawing, folk songs, music, and folk games that the researchers were able to implement with simple tools inside the house with the creation of a competitive aspect among those covered by these games. In addition, to the movement activities in the form of competitive games between groups of individuals inside the home to add fun to its practitioners and put them in a state of movement instead of inactivity during the period of total ban for members of society in the state and some household chores (such as maintenance and cooking) as a kind of leisure activity. As it was emphasized to practice these activities for a period of 30 minutes during 3 times a week. The study sample was contacted during the performance of the experiment through Zoom and Skype applications. Where people who are taking psychiatric medications such as antidepressants are exclude. Where the experiment was applied in the period (30 / 30-30 / 4 /2020). Taking into account that the study sample was the parents of a student's group within the recreation course in the Faculty of Physical Education - University of Jordan, which allowed researchers to apply the experiment through the supervision of those students.

Scientific coefficients of the study tool

To verify the validity of the study tool, we presented it to a committee of (five) arbitrators with the competence and experience of the faculty members at the University of Jordan to find out the suitability of paragraphs of this questionnaire and its ability to achieve the goal of the study. In addition, we used the triple Likert scale to measure how participants feel about each paragraph (table 1). To verify the consistency of the study tool, we used the Alpha Cronbach coefficient; where its value reached 0.83, and this value is consider a high indicator of the stability of the study tool.

Ethical considerations

The participants' rights were protected by explaining the purpose and significance of the study. Participants were reassured that their responses would remain anonymous. The clients were informed that their participation in the study would remain anonymous and that their privacy was respected. They were provided with a comprehensive explanation that their involvement in the study was voluntary and that they could withdraw at any time and written approval was obtained from all study participants. As no blood samples were drawn, the experiment was limited to doing leisure activities and answering the paragraphs of the study tool. There was no need for approval from the Ethics Committee at the University of Jordan.

Statistical analysis

To achieve the objectives of the study and answer its questions, the researchers used the Alpha Cronbach coefficient, means, standard deviations, paired and independent sample T-test by using SPSS version 24 with a confidence level of 95% ($p < 0.05$).

Table 1. The estimation scale of the study sample responses.

The response	Degree	Average	Level
Completely apply to me	5	More than 4.20	Very high
Greatly apply to me	4	3.40- less than 4.20	High
Moderate apply to me	3	2.60- less than 3.40	Moderate
Low apply to me	2	2.60- less than 1.80	Low
Never applies to me	1	Less than 1.80	Very low

Table 2. Results of paired sample t-test for the psychological stress domains among the control and experimental groups (n=54).

Groups	Variables	Pre- measured		post- measured		df	p-value
		Mean	SD	Mean	SD		
Control	Depression	3.90	0.88	3.74	0.38	26	0.162
	Anxiety	4.10	0.79	3.58	0.81	26	0.462
	Aggression	3.90	0.68	3.42	0.23	26	0.617
	Psychological stress	3.96	0.73	3.58	0.73	26	0.761
Experimental	Depression	3.95	0.7	2.15	0.76	26	0.000*
	Anxiety	4.25	0.76	2.10	0.55	26	0.011*
	Aggression	4.10	0.82	2.20	0.70	26	0.016*
	Psychological stress	4.10	0.87	2.30	0.81	26	0.007*

*significant at $p < 0.05$; df - degrees of freedom

Table 3. Results of independent sample t-test for the psychological stress among the control and experimental groups in post measurement (n=34).

Variables	Mean		df	T	p-value
	Control	Experimental			
Psychological stress	3.58	2.30	52	14.95	0.011*

*statistically significant $p < 0.05$; df - degrees of freedom; T - t-test statistic

RESULTS

Table 2. Indicates the mean of psychological stress domains in the pre- post measurement among two groups. Where the level of significance was to Shapiro-wilk test $p=0.855$ for control group and $p=0.782$ for experimental group which a greater than 0.05 and an indication of the homogeneity of the study sample in the pre-measured for both groups. Table 3 indicates the results of independent sample T. test for the psychological stress among the control and experimental groups in post measurement.

DISCUSSION

Corona pandemic imposed on all countries of the world to take many strict procedure's, such as home stone, which has many negative effects such as physical isolation, loneliness and high level of anxiety, stress and negative feelings. By reviewing the values of means among the control and experimental groups in the pre- measurement for the psychological stress domains, we see that ranged between (3.90 -4.25) with a high degree. Schyns et al. [29] indicates that home stone is tense and anxious because of the distance from friends and lack of clarity of the individual's vision about the time return to normal life. This explains the reason for the increasing demand of the individuals for counselling from psychiatrists online. By reviewing the mean values of the depression, aggression and psychological pressure level among the study sample in the pre-measurement, we note that it came with a high degree (3.90-3.95, 4.10-4.25, 3.90-4.10), respectively, and it came with a very high degree of anxiety (4.10-4.25). As well as, there were also statistically significant differences between the pre and post-measurement in the satisfaction of life level among the experimental group and in favour of

post-measurement. As the rapid of the Coronavirus outbreak and the lack of a vaccine for it and the accompanying preventive measures such as imposing curfews and increasing social estrangement contributed to this, as this virus is new and we do not have much information about it. Additionally, there was an improvement in the psychological stress level among the control group, but it was not statistically significant, the researchers believe that with the passage of time, an adaptation to stresses occurs and the vision becomes clearer with regard to this virus, and the procedure's taken by the state may have contributed to this.

This may contribute to a set of negative effects on individuals from various aspects, including psychological and social. Especially the elderly, it is known that more than 20% of the elderly in the world who are over the 60 years suffer from mental and neurological disorders, as neuropsychiatric disorders represent 6.6% of the total disability of this group due to many reasons, including age, lack of independence and low Physical abilities, in addition to some social problems, which are isolation, social unity, and low rates of social participation, which were reinforced by governments in imposing quarantine. The problem here is that some individuals may resort to increasing eating as a means of escaping stress, which doctors and specialists call emotional eating where the dietitian indicates a strong relationship between exposure to stress and weight gain can be explained that during increased level of stress accompanied by increased of cortisol hormone in the body where it is considered to be a light of appetite and thus may lead to the accumulation of fat in the body and thus the metabolism becomes slower.

In a previous study conducted by the researchers, its results showed that the social relations field is the most affected during the period of home quarantine, and often-new viruses are frightening because we have little or no protective immunity against these viruses and we do not have vaccines. Also, it must be noted that there is a group of interacting the various body systems, for example the high level of some psychological aspects contributes to increasing the secretion of some hormones in the body and this would reduce the effectiveness of the immune response in individuals, and the effect of this immune system's ability to produce a hormone endorphin have an efficient killer cell that is found in the immune system. In addition, it can negatively effect on the bilateral relationship between the nervous and immune systems, it is necessary to control the level of psychological aspects of individuals because it is link to healthy aging. Undoubtedly, the major focus of the various media of this crisis, in addition to rumours on all social media, may contribute to the high level of some psychological aspects, and this reflects negatively on the various aspects of mental health. Also, the aging is a natural process that results in a set of physical, functional, and psychological changes, which is inevitable and not subject to change or change, but we can limit the impact of those negative changes that may contribute to a lower level of life satisfaction among older individuals [11, 12]. The elderly have also declined in some physical and cognitive functions, and the decrease in social networks, which may affect the health status with the age progress [9]. Also of concern is that the elderly have more free time than other age groups [13].

There were also statistically significant differences between the two groups in the level of psychological stress in post- measurement and in favour of the experimental group. Where the leisure activities contributed to a decrease in the psychological stress level, which came with a low degree, where the anxiety domain was the most affected and positively, followed by the aggression domain and finally the depression domain. The researchers attribute this to the positive impact of leisure activities on individuals, which included social, physical, mental, and small games. Where there are interrelationships between physical activity and the regulation of the level of hormones in the body and the efficiency of their immune system. As the regular exercise of physical activities reduces stress and symptoms of depression. As the regular practice of physical activities contributes to reducing stress and symptoms of depression, it also contributes to facilitating the release of the hormone endorphin, which is linked to the immune system as the immune cells are able to produce this hormone and this reflects the bilateral relationship between the nervous and immune system, which can be improved in response to the practice of physical activities with no Ignore its role in secreting the hormone serotonin, and this positively affects the immune system to better deal with the infection direction than others. Moreover, it contributes to controlling the level of cortisol in the body, which leads to reducing stress and the risk of depression, in addition to improving the level of self-confidence and improving mood. Also, while not neglecting the positive role of regular physical activity on brain

health, thus improving motor communication networks. Where leisure activities provide social support, enrich the meaning of life, recover from stress, restore social status, and overcome negative events in life, such as psychological pressures, as these activities contribute to improving the level of welfare and quality of life of the elderly [26-28]. Therefore, these activities are considered a main link between physical health and well-being, leading to improving self-esteem and improving life satisfaction [27].

CONCLUSION

In light of the state's application of domestic stone because of the Corona pandemic, we need for attention to this category became urgent because this stage imposed social isolation. It is well known that advancing age is accompanied by many negative feelings due to the loneliness and psychological emptiness, which leads to the individual feeling that society does not need him due to his weak physical abilities and thus this, will negatively affect healthy aging. The main point in this research is that the leisure activities practicing among the elderly has contributed positively to reducing the level of psychological stress represented by depression, anxiety and aggression due to the regularity in the practice of leisure activities that include social and physical activities and small games that provided social support and enriched the meaning of life for them and thus helped them to overcome negative life events, such as psychological pressures, have helped them to improve their view of life by raising the level of life satisfaction through the positive investment of their free time.

CONFLICTS OF INTEREST AND FUNDING STATEMENT

We declare no competing interests. There are no sources of funding

REFERENCES

1. WHO. (World Health Organization). Mental health and psychosocial considerations during the COVID-19 outbreak. https://www.who.int/docs/default-source/coronavirus/mental-health-considerations.pdf?sfvrsn=6d3578af_2_2020a
2. Nishiura H. The Extent of Transmission of Novel Coronavirus in Wuhan, China. *Journal. Clin. Med* 2020; 9: 330. doi: 10.3390/jcm9020330
3. Kunlin J, James W, Xunming J, Miriam L, Ilia S. "The Critical Need to Promote Research of Aging and Aging-related Diseases to Improve Health and Longevity of the Elderly Population", *Aging Dis* 2015; 6(1): 1-5. doi: 10.14336/AD.2014.1210
4. Incalzi R, Simone S, Giorgio P, Marco S, Claudio P. Chronic Obstructive Pulmonary Disease in the elderly", *European Journal of Internal Medicine* 2014; 25 (4): 320-328. doi: 10.1016/j.ejim.2013.10.001
5. Warburton D.E, Nicol C.W, Bredin S.D. Health benefits of physical activity: The evidence. *CMAJ* 2006; 174: 801-809. doi: 10.1503/cmaj.051351
6. Turner B. S. Can we live forever? A sociological and moral inquiry. New York: Anthem Press. 2009; doi: 10.7135/UPO9781843318064
7. World Health Organization, "Mental health of older adults. Factsheets 2017," <http://www.who.int/news-room/factsheets/detail/mental-health-of-older-adults> 2017
8. Lijun L, Zhenggang G, Junnan Z. Social support mediates loneliness and depression in elderly people", *Journal Health Psychol*, Pii 2014; Epub ahead of print
9. Chen Y, Hicks A, Alison E. "Loneliness and social support of older people in China: a systematic literature review", *Health and Social Care in the Community* 2014; 22 (2): 113-123. doi:10.1111/hsc.12051
10. Judith C, David C, Elizabeth P, Hayden B, Linda K. Does Social Support Buffer Functional Decline in Elderly Patients With Unipolar Depression?", *Am Journal Psychiatry* 2001; 158(11):1850-1855. doi: 10.1176/appi.ajp.158.11.1850
11. Read M, Bridgen J.R, Cummings D.A, Ho A, Jewell C.P. Novel coronavirus 2019-nCoV: Early estimation of epidemiological parameters and epidemic predictions. [Preprint] medRxiv.2020. doi: 10.1101/2020.01.23.20018549

12. Clark D, Patten C, Reid K, Carabello R, Phillips E, Fielding R. "Muscle performance and physical function are associated with voluntary rate of neuromuscular activation in older adults", *Journal Gerontol A Biol Sci Med Sci* 2011; 66 (1):115–121
13. Leitner MJ, Leitner SF. *Leisure enhancement*. 4nd ed. Urbana, IL: Sagamore; 2011
14. Woods J, Should. How can, exercise be done during a coronavirus crisis? *Journal of Sport and Health Science* 2020; 9: 105—107. doi:10.1016/j.jshs.2020.01.005
15. Mohammed A, Sheikh TL, Gidado S. Psychiatric treatment of a health care worker after infection with Ebola virus in Lagos. Nigeria *Am Journal Psychiatry* 2015; 172: 222–4. Doi: 10.1176/appi.ajp.2014.14121576
16. Kinsman J. "A time of fear": Local, national, and international responses to a large Ebola outbreak in Uganda. *Global Health* 2012; 8-15. doi: 10.1186/1744-8603-8-15
17. Cuiyan W, Riyu P, Xiaoyang W, Yilin T, Linkang X. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int. J. Environ. Res. Public Health* 2020; 17: 1729. doi: 10.3390/ijerph17051729
18. Woods J, Lu Q, Ceddia M.A. Lowder T. Special feature for the Olympics: Effects of exercise on the immune system: Exercise induced modulation of macrophage function.2000; 78: 545-53
19. Schmidt F. M, Lichtblau N, Minkwitz J, Chittka T, HormDnn J. Cytokine levels in depressed and non-depressed subjects, and masking effects of obesity. *Journal of Psychiatric Research*, 55, 29-34. doi:10.1016/j.jpsychires.2014.04.021
20. Marčinko D, Jakovljević M, Jakšić N, Bjedov S, Mindoljević A. The importance of psychodynamic approach during COVID-19 pandemic. *Psychiatria Danubina* 2020; 32(1): 15-21. doi:10.24869/psyd.2020.15
21. Yates LA, Ziser S, Spector A, Orrell M. Cognitive leisure activities and future risk of cognitive impairment and dementia: Systematic review and meta-analysis *International Psychogeriatric* 2016; 28: 1791-1806. doi:10.1017/S1041610216001137
22. Chen Y, Feeley TH. Social support, social strain, loneliness, and well-being among older adults: An analysis of the Health and Retirement Study. *Journal of Social and Personal Relationships* 2013; 1–21. doi:10.1177/0265407513488728
23. Depp CA, Jeste DV. Definitions and predictors of successful aging: a comprehensive review of larger quantitative studies. *Am Journal Geriatr Psychiatry* 2006; 14: 6–20. doi:10.1097/01.JGP. 0000 19 2501.03069.bc
24. Jonsdottir IH. Special feature for the Olympics: Effects of exercise on the immune system: Neuropeptides and their interaction with exercise and immune function. *Immunol Cell Biol* 2000; 78:562- 70. doi:10.1046/j.1440-1711.2000.00961.x
25. Bao AM, Swaab DF. Corticotropin releasing hormone and arginine vasopressin in depression focus on the human postmortem hypothalamus. *Vitam Horm* 2010; 82:339-65. doi:10.1016/S0083-6729.(10)82018-7
26. Gautam R, Saito T, Kai I. Leisure and religious activity participation and mental health: Gender analysis of older adults in Nepal. *BMC Public Health* 2007; 7:299. doi:10.1186/1471-2458-7-299
27. Pressman S, Matthews KA, Cohen S, Martire LM, Scheier M. Association of enjoyable leisure activities with psychological and physical well-being. *Psychosomatic Medicine* 2009; 71:725–732. doi:0033-3174/09/7107-0725
28. Janke MC, Nimrod G, Kleiber D.A. Leisure activity and depressive symptoms of widowed and married women in later life. *Journal of Leisure Research* 2008; 40(2): 250–266. doi:10.1080/00222216.2008.11950140
29. Schyns G, Roefs A, Jansen A. Tackling sabotaging cognitive processes to reduce overeating; expectancy violation during food cue exposure. *Physiol Behav* 2020; 222:112924. doi:10.1016/j.physbeh.2020.112924
30. WHO (World Health Organization). Statement-Older people are at highest risk from COVID-19, but all must act to prevent community spread. Ref.: <https://bit.ly/2LGHzi5>. 2020b
31. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry* 2020; 7: 300–302
32. Choi KW, Kim Y, Jeon HJ. Comorbid Anxiety and Depression: clinical and Conceptual Consideration and Transdiagnostic Treatment. *Adv. Exp. Med. Biol* 2020; 1191: 219–235. doi: 10.1007/978-981-32-9705-0_14
33. Castro-de-Araujo LFS, Machado DB. Impact of COVID-19 on mental health in a Low and MiddleIncome Country (LMIC). *Cien Saude Colet* 2020; 25: 2457–2460

34. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu A. nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen Psychiatry* 2020; 33: e10021
35. Bacon AM, Corr PJ. Coronavirus (COVID-19) in the United Kingdom: A personality-based perspective on concerns and intention to self-isolate. *Br J Health Psychol* 2020; 1-10
36. Dababneh B, El-Qudah J. Al-Bakheit A. "Nutritional Status and Obesity among Adults of Amman and Al-Balq'a Governorates", *American Journal of Agricultural and Biological Sciences*, 2011, 6(3), 339-347
37. Zindah M, Belbeisi A, Walke H, Mokdad. A. "Obesity and Diabetes in Jordan: Findings From the Behavioral Risk Factor Surveillance System, 2004, Preventing Chronic Disease, Public Health Research", *Practice and Policy* 2008; 5(1): 1- 8
38. Montazeri S. J. Mousavi S. Omidvari M. Tavousi A. Hashemi Rostami T. "Depression in Iran: a systematic review of the literature (2000-2010)," *BMC Psychiatry* 2013; 6: 567-594
39. Fitzpatrick TR, Spiro IA, Kressin NR, Greene E, Boss R. Leisure activities, stress, and health among bereaved and non-bereaved elderly men: The normative aging study. *Journal of Death and Dying* 2001; 43(3): 217-245
40. Chang L, Yu P. Relationships between leisure factors and health-related stress among older adults. *Psychology, Health, and Medicine* 2013; 18(1): 79-88
41. Lee JW, Lim GH, Kim HR, Bang YK, Lee JY, Cho ML, Yang YA. The correlation between cognition, depression and leisure activity of elderly people. *The Korean Journal of Health Service Management* 2014; 8(1): 65-73
42. Kahng SK. Overall successful aging: Its factorial structure and predictive factors. *Asian Soc. Work Policy Rev.* 2008; 2: 61-74
43. Van Solinge H, Henkens K. Couples' adjustment to retirement: A multi-actor panel study. *Journal Gerontol. Ser. B* 2005; 60: 11-20