

The Association between Mental State and Physical Activity during the Quarantine Period due to COVID-19, in Palestinian Citizens

Hashem kilani^{1*}, Eyad Yousef², Moath F Bataineh³, Ali M Al Nawaiseh³

¹Department Kinesiology and Training, School of Sport Sciences, University of Jordan, Amman, Jordan; ²Department of Physical Education, University of Birzeit, Ramallah- Palestine; ³Department of Physical Education and sport sciences, The Hashemite University, Zarqa, Jordan

ABSTRACT

In the last quarter of the year 2019, the Chinese city of Wuhan has encountered a spread of a virus that belongs to the SARS family, and which was identified by scientists as Corona. This virus which has managed to spread inside and outside the borders of China in an unprecedented manner, is known for attacking the respiratory system viciously causing symptoms that vary in their severity, and can possibly stop the breathing and in some cases cause pulmonary edema. The virus has infected millions only in the first half of 2020 and caused the death of hundreds of thousands of people. COVID-19 is one of the most serious crises that the world has encountered; particularly by the Palestinian people and that is in terms of the rapid spread of the virus; which made it into a pandemic resulting in large number of the deaths.

Keywords: Pulmonary edema; Palestinian; COVID-19; Virus

INTRODUCTION

In Addition to that, all past calamities that faced governments around the world were related to economic and financial policies unlike covid-19 which directly and clearly threatens human resources. Moreover, its implications are perceived as the most critical and it requires varied types of policies to tackle. It is certain that the Palestinian people would not be in isolation from what the world is going through. All Countries around the world are employing the whole of their economic, medical and awareness-spreading resources and have sat huge budgets to face the pandemic. When it comes to the Palestinian authority. It is significantly under resourced in addition to being bombarded by the Israeli control over the land and sea exits and its tight restrictions over entry points, imports and exports. Gaza district, specifically, suffers from a suffocating siege that prevents the slightest humanitarian needs from entering. Despite the spread of the virus and its risks on the Palestinian people, the political and security related considerations are still the main deterrent and decisive factors for the Israeli side and not the humanitarian considerations [1].

MATERIALS AND METHODOLOGY

After the discovery of many cases and confirming their infection with this virus on the Palestinian land, the Palestinian government has announced a mass lockdown for the first time, in order to prevent the spread of COVID-19 after it appeared in Bethlehem. The state of emergency was declared for a period of 30 days in all Palestinian provinces and a series of strict precautionary measures were taken to face the spread of the virus and besiege it in the smallest spot considering the difficulty of the situation that was imposed on the Palestinian people as a result of the crisis and working in the frame of a contingency budget that gives the priority for supporting the medical sector and urgent relief programs, especially that the Palestinian income has minimized by at least the half in an economic situation that is heading towards recession and stagnation regionally, locally and internationally.

The state of emergency has been extended till the beginning of august until the facilitation of movement was determined and citizens were permitted to go out of their houses to run their errands and do their jobs, which have restored life back into the normality they have lived pre-pandemic [2].

Corresponding Author: Hashem kilani, The School of Sports Science , University of Jordan, Amman-Jordan; E-mail: hashemkilani@gmail.com

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This in turn has resulted in an increase in the number of cases infected with COVID-19 in all provinces and the hospitals have become crowded with the sick in the light of an increasing burden on the Palestinian modest medical system and deficiencies in medical staff and clinics, in addition to the unavailability of facial masks and gloves for protection and the absence of a vaccine that can stop the infection, or a cure for it. This led the government to announce a second and tight lockdown all over the Palestinian lands including a shutdown of the tourism and leisure sector and a halt on receiving any tourists neither from inside nor from the outside of Palestine, in addition to prohibiting the entry of Palestinian workers into Israel and prohibiting the citizens from leaving their houses, closing Palestinian schools and universities, prohibiting land air and sea travels, closing down gyms and sports halls, prohibiting the visits to houses of worship both mosques and churches, cancelling all types and forms of events and celebrations, closing down all restaurants and permitting only bakeries and pharmacies during the lockdown period, whilst fining anyone who would break those rules a monetary amount equivalent to 100 Jordanian Dinar.

Most countries around the world have adopted many precautionary measures to control the spread of the pandemic, including the limitations on the movements of individuals, such as quarantine or physical isolation. Those limitations have taken their toll in the form of negative physical and psychological implications, such as increased levels of anxiety and showing signs of depression that could carry on till after the lockdown period. In reality, the physical and psychological implications and the fears related to them are not only a result of the quarantine itself but also a result of the need to adjust to a new reality, therefore, it is crucial to understand the critical effect of those implications, for example, the increased levels of anxiety in different lifestyles individuals adopt such as the changes of sleep quality [3].

It is safe to say, that staying at home is the best option to stop the spread of the virus amongst individuals and despite being a safety measure, it can result in non-direct negative effects, that is due to the fact that extended periods of home confinement lead to inactivity, laziness and extend times of sitting, laying down or playing video games, watching television or excessive use of mobile devices. Moreover, home confinement can lead to a change in the biological clock for individuals, as some would be tempted to sleep more than eight hours due to availability of free time and reduced weekly work hours, sleeping late or taking more than one nap in a day.

World health organization have realized that the precautions related to social distancing might lead to an increase in worry, anger, anxiety, in addition to social disorders and the rise of feelings of isolation amongst individuals. Research has also shown that poor mental health is on the rise during the social distancing related to Covid-19. A study by which was conducted on 932 British adults who were isolated from society as a result of Covid-19, has shown that 36.8% of the sample were suffering from poor mental health state, this was correlated to many factors, such as being female, their age, their annual income, smoking/non-smoking, in addition to whether they suffer from

chronic diseases or not. Some resources also indicate that the mental state is related to the state of mind, body and positive social state. It includes a sense of fulfillment, forming relationships, an ability to handle life turbulences in an effective manner as well as feeling appreciated, however, that doesn't necessarily mean that an individual should feel happy at all times nor that they are not brought down by feelings of sadness, worry, loss or failure.

The role of physical activity is crucial in enhancing the mental health, even a 10 mins jog can increase mental awareness and energy and foster a positive mood as well as enhance one's self-image decrease anxiety and worry and enhance the quality of life for individuals suffering from mental issues. Moreover, there are many studies in the field of physical activity in its varied intensity levels and its effect on temperament, some research has shown that low-intensity cardio for a duration of 30-35 minutes, 3-5 times a week, in a period of 10-12 weeks, scored the best result in enhancing and boosting positive moods, such as vigilance and enthusiasm [4].

Conversely, researchers see that the lockdown and reoccurring home confinement policies as measures to prevent the spread of the virus as well as restrictions on movement have affected the lifestyle of individuals and made them work and learn from their homes. That is added to the constant fear of getting infected with the virus or worrying about their loved ones specifically those who are at high risk. World health organization have also released guidelines and instructions that individuals could followed whilst staying at home, such as washing hands regularly, stopping smoking tobacco in all of its varied forms (As smokers are more likely to get infected with the virus severely, resulting from constant touching of lips as well as weakened respiratory system), maintaining a healthy diet, waking up at regular times as before the pandemic, in addition to designating time for each, work, rest, leisure and playing with children and finally exercising for all age groups.

It is inevitable to expect home confinement to cause unfavorable psychological effects in the short term and maybe the long one, as a result of the well-documented severe impact of the physical activity on the psychological state and the possibility of eliminating the active positive effect it brings. Based on the previous information, researchers see that the state of mental health is essential in our daily lives, especially that there are numerous studies and sufficient research that discussed the subject pre the corona pandemic, each individual has different ability when it comes to dealing with stress and anxiety, this ability is affected by many factors such as physical activity, high quality of sleep, and good nutrition. To put that into perspective, it is essential to refer to WHO's definition of health which involves not only the absence of disease as a condition, but incorporates a state of complete physical, mental, spiritual and social well-being.

Therefore, the purpose of this study is to define the frame of physical life-styles, and the extent of the role that physical activity play in enhancing the mental state during the covid-19 pandemic, as a result of this we assume that good levels of physical activity is correlated positively with better mental state.

THE STUDY DESIGN

This study is a cross-sectional study, it started as a questionnaire in Arabic language which was distributed to the sample of individuals of the study online through social networks, (Facebook, WhatsApp and LinkedIn), in the duration between 17th April and the 24th of April 2020. The questionnaire took the form of a Google form that was sent as a hyperlink to be completed during home confinement. The questionnaire was sent to all employees, workers, and the faculty members as well as students in the Palestinians universities which acclimated to (360) participants aged between (18-70 years old) from those who were committed to the measurements of home confinements that the Palestinian government has imposed. The questionnaire has inquired about the demographics of the participants, and included an evaluation of the levels of physical activity. The participants were informed of the purpose and goals of the study at the beginning of the questionnaire, and their consent to take part of the study was obtained, they also were given the freedom to answer the different parts of it and the liberty to withdraw from the study or leave any parts unanswered. The questionnaire completion period was around 10 minutes and was to be finished and sent back by pressing a designated button done. No personal information (such as name, e-mails or date of birth) was asked to be disclosed by the participants, maintaining the anonymity of the participants in respect of the participants' privacy. Moreover, the participants were not compensated financially in return of their participation. The questionnaire was answered by 378 participants, whilst the questionnaires that included insufficient or incomplete answered were not included or considered. The information of 360 answered questionnaires therefore, was only considered for analysis in this study (184 females, 176 males) (Table 1) [5].

Variables	Total (360)	Female (184)	Male (176)	T value	Statistical significance
Age	28.9 ± 11.1	27.0 ± 9.7	30.8 ± 12.1	-3.240	0.001
BMI	24.5 ± 4.2	23.5 ± 3.8	25.6 ± 4.2	-5.077	0.0001>
MET Score	229.4 ± 254.5	169.0 ± 207.2	292.4 ± 283.0	-4.703	0.0001>
Mental state score	14.2 ± 4.4	13.1 ± 4.5	15.3 ± 4.0	-4.744	0.0001>

Table1: The evaluation of the mental state variables in association with the chosen life-style related and demographic variables presented as Chi-square test was used for Categorical variables

The researchers calculated the stability factor for the study method questionnaire by applying the questionnaire on a pilot sample that included participants from the community of the study and outside the study sample, then reapplying it again after a week of the first application to ensure the internal and

external consistency of the questionnaire and to ensure the clarity of the different parts of the questionnaire before they were applied to the sample, whereas the data obtained from the pilot sampling was not included in the final statistical analysis. The pilot sampling and the test of internal consistency has scored reasonable result of and external consistency scored on the total and individual levels.

Description of the study sample, the physical activity and the mental state:

The participants have answered the parts of the questionnaire that were distributed electronically through the internet after it's rigor was verified and it was edited to be suitable to the Palestinian society, the sub-measures of the study included the demographic and cultural information, the WHO index of mental state, and the brief module of the International Physical Activity Questionnaire (IPAQ). Added to that, was the demographic information of the study sample (Age, sex, weight, height, education level, social status, health status, the use of different tobacco products, area, accommodation, profession and the presence of chronic diseases). This Data was obtained through a personal estimation measure specific to the sample, the Body Mass Index (BMI) was measured through dividing the weight by the square of the height in meters. The body mass index of the participants was used to classify the participants to many categories, below normal, normal, over-weight and obese. The mental state was evaluated through the measurement tool, which is built on five dimensions, how to measure those dimensions was clarified previously, the scored points representing those dimensions were calculated to a maximum of 25 points, and the participants who scored more than 13 point on the scale were regarded to enjoy a good mental state [6].

The level of the physical activity was measured for each participant using the data that was gained through the participants answers to parts of the questionnaire that included the brief model of the International Physical Activity Questionnaire (IPAQ). This brief model consists of 7 paragraphs that gives away information about three levels of physical activity (walking, mid-intensity physical activity and high-intensity physical activity) which are represented by Metabolic Equivalent (MET) in a week (MET min/week), moreover, the tool provides information about sitting time. The MET was used to classify the sample into categories in accordance to the physical activity (low, medium, highly active), as described before.

The demographic properties of the (360) participants (184 female/176 male) who provided answers to the questionnaire are shown. Generally, most of the participants live in Palestinian cities and the participation of females was higher than that of males. The results have shown that obesity and weight gain are widely spread, and that is seen significantly more in males than females ($p<0.0001$) whilst the physical activity level as well as the mental state level was higher in males compared to females ($p<0.0001$) [7].

STATISTICAL ANALYSIS

The statistical analysis was done using (SPSS Statistics software). The data for the constant variables were presented as mean average standard deviation. And the data from variables related to categories were presented as percentages, as well as clarifying the statistical differences and distinctions using (Independent Sample t-test) for independent samples, in addition to (One-way analysis variance) ANOVA, followed by Tukey's post-hoc test for inconsistent variables. After that, Chi-square test was used for Categorical variables. Pearson Correlation coefficient was used to determine the association between the mental state variable and the level of physical activity, and determining the statistical significance as a value $p < 0.05$ [8].

RESULTS

It shows the level of association between the state of mental health with lifestyle variables and some demographic variables. Generally, 67% of participants showed good levels of mental health, and the male participants were more likely to enjoy good psychological health compared to female participants ($p < 0.0001$). Overall, the participants who enjoyed better psychological health were more inclined to have better quality of sleep ($p < 0.0001$), and better health as shown by their personal-reports ($p < 0.0001$), higher levels of physical activity ($p < 0.0001$), higher levels of education ($p = 0.037$), associated with better nutrition ($p < 0.0001$), however, the levels of psychological health did not have significant association with weight, age, geographic location, social status, or smoking vs non-smoking [9].

The state of psychological state in accordance to physical activity has been classified by WHO. (Low, Medium, High), the shows the results of the one-way analysis of variance, as there were differences of significance in the mental state in accordance to the variance of the physical activity ($2.357 = 46.231$, $P < 0.0001$). High levels of physical activity showed higher levels of mental state compared to medium levels of physical activity ($P < 0.0001$) and higher levels of the low physical activity levels ($P < 0.0001$). Moreover, the shows that medium levels of physical activity are higher than low levels of physical activity, in terms of mental state ($P = 0.028$).

The analysis of Pearson's correlation coefficient showed a significantly meaningful association between the mental state variable and the level of daily physical activity ($r = 0.473$, $P = 0.001$), as it has become clear that mental state scores higher results, the higher the physical activity is.

The results of the one-way variance analysis (ANOVA) have shown significant statistical distinctions in the level of mental state in accordance to the level of physical activity ($F(2,357) = 46.231$, $P < 0.0001$), it was clear in the results of the study has shown, that individuals who fall under the category of high level of physical activity, have scored higher results in the indicator of mental state compared to individuals falling under the category of medium physical activity ($P < 0.0001$), and also those who fall under the category of low level of physical activity ($P < 0.0001$). Those differences have also been significant ($P < 0.0001$) [10].

Moreover, the results of the study have shown significant statistical distinctions in the level mental state ($P = 0.028$) between individuals who fall under the category of medium physical activity and those who fall under the category of low physical activity.

Moreover, despite the males reporting lower levels of physical activity than females, which can be related to the distinctive features between genders in the "age" variable which shows that females belonging to the age group were less than males, which might explain the correlation between gender male and higher levels of physical activity in addition to higher levels of mental state [11].

Furthermore, the analysis of Pearson's correlation coefficient has shown significant correlation between the mental state variable and the physical activity level, as it's become clear that mental state is better, the higher the levels of weekly physical activity ($r = 0.473$, $P = 0.001$).

Our current study focusses on the level of association between physical activity and mental state, since the involvement in physical activity can affect the mental state during the period of home confinement related to covid-19. There were many studies that have shown that continuous and regular physical activity is related to better mental state in individuals. There are also many pieces of evidence to support the idea that physical activity can be preventative factor against depression regardless of age and geographic location. A study by has shown that the involvement in physical activity protects against anxiety symptoms and disorders, and that there is a positive correlation between physical activity and mental state. Another study conducted by has indicated no association between mental health and physical activity amongst young children, however, children aged between (13-15) who have had high levels of physical activity faced less emotional turmoil after three years of the study. Our study also corresponds with a study by, indicating that physical activity can help citizens eliminate the pressures caused by home confinement and improve the mental state.

Despite that, researchers see and based on previous research that physical activity is proven to enhance the mental state and is supposedly capable of providing protection against the deterioration of the mental state of the study sample, especially females, who are highly pressured by home confinement. A study by showed that there is a correlation between high level of physical activity and the decrease of anxiety and depression, in return, stretching and resistance exercises were negatively correlated with each, anxiety and depression, whilst house chores were negatively correlated with depression [12].

WHO have discussed the subject of physical activity as a health-related subject entailing its psychological, physical, mental and social effect, as well as the effected resulting from the lack of it, and it's positive influence on the mental state of an individual. Moreover, so many people regard physical activity as a way to boost confidence and to gain social support. As it affects the individual's mood by increasing the level of the neurotransmitter (Serotonin) which impacts the individual's temperament when exercising, increases levels of self-respect and their acceptance in society, and decreases symptoms of

depression, as cardio and strength exercises are beneficial in enhancing the state of individuals. Moreover, it improves the function of the heart, vessels and muscles, as well as preserves the health of the bones. It could also decrease the chances of suffering from many conditions such as high blood pressure, chronic cardiac illnesses, strokes, diabetes, breast cancer, colon, and depression.

Physical activity also affect common psychological disorders as well as depression symptoms positively through inducing the release of beta endorphins, after an exercise, endorphin is connected to positive mood and a sense of better mental state. Physical activity also helps in relaxation. It's important to also point that there are many hurdles that can stop individuals from exercising, some are psychological (depression, lack of motivation, lack of self-confidence, insomnia), some are social obstacles (such as lack of social support, bad environment, lack of time), whilst others are physical obstacles (sickness, tiredness) [13].

Despite home confinement being the best course of action and the most important recommendation made by the World Health Organization, to stop the infection of Covid-19 virus, it still can have its side effects on other aspects of individual's health, especially because of the sudden start of home confinement which crucially changes people's lifestyles to include pattern of behaviours that could jeopardise routinely practiced physical activity by increasing immobility sitting time. Most people are spending longer hours facing screens, whether to check the news via mobile phone, joining a zoom call with the family, watching an interesting Netflix series or spending extra hours staring at a computer during working from home. This can mean an increase of social distancing between family members, in addition to negative psychological effects of home confinement such as Posttraumatic stress disorder, confusion, anger, fear or infection, frustration, and boredom, many studies have shown a negative correlation between the length of the home confinement and the weakness of the mental state of the participants as well as signs of posttraumatic stress disorder. A study by has also shown that those who have been quarantined for more than 10 days have shown more evident signs of post-traumatic stress disorder than those quarantined for less than 10 days.

Recent studies have also shown that home confinement had greater effect on the mental state of females than their males counterparts, researchers have drawn this back to the increase of the load women endure at home in the form of daily chores, including looking after children, performing house chores, and are loaded with financial burden over living decently, in addition to feelings of loss of functional and social position as a result of the inability to go on social visits or attend social events. We see that males have enjoyed better mental state, due to their ability to get out of the house for shopping as well as strolling in the garden, gardening or performing some exercise as they have more free time available, this agrees with the findings of, which indicated the decrease of mental state amongst American females and males by 0.085 as a result of home confinement, and showed that negative implications are suffered by females more than males as a result of the increased

responsibilities inside the house, whilst the effect on males was close to zero. Researchers also see that there is an association between the decrease of mental state as a result of home confinement and the place of residence, as research showed that of the individuals living in countryside enjoy good levels of mental state compared to those living in modern areas cities who suffer from low mental state as a result of insomnia, exhaustion, and anxiety, additionally, those who live in bigger spaces with outdoor areas have shown less levels of anxiety, worry and stress [14].

A study by The Business Standard, which has been performed on children living in modern areas cities with parents, showed that they were more probable to suffer from issues related to mental state compared to those living in countryside, as a result of home confinement, moreover, the study's result have indicated that residents of countryside differ from residents of cities during home confinement in terms of their ability to move and transport, due to the lack of strict measurement and restrictions on their movement. Another study has shown that children growing up in countryside environment, surrounded by animals and bacteria grow up to have stronger immune systems, more capable of defying stress, and are less vulnerable to the development of mental problems than residents of cities, in absence of pets. This study supplements the evidence that supports the "hygiene hypothesis", which assumes that highly sanitized environments can cause health issues.

Furthermore, staying at home for long stretches of time as a result of lockdown and home confinement leads to an increase in idleness, laziness, routine, and a decrease of physical activity levels, and can be a cause of worsened mental state. Despite that, physical activity at home could be a beneficial mechanism in helping individuals maintain and continue guarding their mental state during home confinement. Added to that, physical activity can help students heal from mental state issues they suffered from during quarantine throughout the covid-19 crises. WHO, has announced specific guidelines to people in quarantine, which included recommending at least one high intensity workout that stretches up to 75 minutes a week to adults, or 150 minutes at least of moderate physical activity, or any physical activity that mixes both equally [15].

DISCUSSION

Physical activity can decrease signs of stress/depression through a mix of psychological, social and biological mechanisms, such as increasing Brain Derived Neurotrophic Factor (BDNF), body induced opium (Endorphin), improving the functions of the immune system, and supplementing self-respect. Therefore, moderate to high levels of physical activity can weaken the symptoms and effects of anxiety depression resulting from home confinement through its preventive complicated and strong neural inferences.

Study limitations

The study has been conducted throughout the period of lockdown imposed by the Palestinian government on Palestinian citizens, in the light of sudden and unique circumstances

imposed by the spread of Corona virus, therefore there were no available previous information or data for individuals taking part of the study pre corona, especially relating to the quality of sleep or nature of mental state and nutrition on another level, meaning that there might be individuals who did not involve in physical activity pre the pandemic and were classified under low levels of physical activity throughout the period of home confinement and vice-versa for physically active individuals throughout home confinement that might have decreased their level of activity despite being classified under high levels of physical activity, the same applies to sleep quality and nutrition [16].

CONCLUSION

The results of the current study indicates the presence of correlation between unhealthy mental state caused by home confinement and the lack of physical activity, therefore it is crucial to work on enhancing the psychological and mental state through different physical activities during the period of the expected home confinement as a result of the second wave of the virus, those exercises shall also be available and accessible to all, and can be done in the least amount of time, effort and cost, additionally, individuals shall be aware of the correct scientific ways of involving in such exercises inside and outside their homes by seeking help from certified trainers or watching YouTube videos for famous and well-known instructors, who clarify the right instructions for workouts and their applications, especially if exercises were performed independently by individuals with no previous backgrounds of how to apply those exercises, which can lead to serious implications that could result in stopping them from working out or worse, lead to injuries. It is important to encourage individuals to practice working out everywhere during lockdown, especially outside their homes in seclusion or in gyms, and that is to increase the body's immunity against the possible infection of the virus.

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