

Original Research Article

A critical study of the difference in general health between physically active and inactive people: secondary data analysis and report

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Received: 01 July 2022

Revised: 11 August 2022

Accepted: 12 August 2022

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ABSTRACT

Background: The aim of the study was to provide evidence-based information on the difference in the general health of physically active and inactive people considering their physical and mental health and quality of life.

Methods: This study report was prepared using the dataset from the survey of health, ageing, and retirement in Europe (SHARE) after completing three registration steps for data access at <http://www.share-project.org>. The dataset included 77,261 participants, all persons 50 years and above from 28 European countries. SHARE data collection of wave 7 took place in European countries in 2017.

Results: In this study, there was a statistically significant difference in general health between people who are physically active and inactive, considering their mental health (depression, suicidality, sleep, and irritability, fatigue, and concentration levels), physical health (BMI), quality of life, and grip strength. The adjusted odds ratio showed a significant difference between the physical activities regarding depression, suicidality, fatigue, concentration, maximum grip, BMI, and quality of life. Sleep and irritability have no significant impact after adjusting the confounders such as max grip, quality of life, general awareness, and BMI.

Conclusions: The study results support the research hypothesis that there is a statistically significant difference in general health between physically active and inactive people considering their mental health. The results confirm that unsound mental health, unhealthy weight, and poor grip strength were significantly higher among physically inactive people.

Keywords: Grip strength, Mental health, Physical activity, Quality of life

INTRODUCTION

Health and wellness are critical for various stakeholders, including individuals and businesses, countries, and international organizations.¹ According to World Health Organization, mental, cognitive, and physical health scores measure a person's general health and wellness. WHO also defines the correlation between health and

wellness as the relationship between the effectiveness and the availability of health facilities in ensuring people's deteriorating health conditions are successfully reverted to the normal state within a stipulated period.² According to Wang et al, more than 45% of the global population seek medical attention annually.³ This figure increases to 85% among the elderly (65 years and more).^{4,5} Various countries have devised different health insurance

packages for their citizens, with the United States ranking as the leading health insurer globally to improve the population's general health.⁶ According to Sözen, more than 94.5% of the United States population, have access to quality healthcare services at affordable prices, cumulatively higher than the global healthcare access percentage stands at 65%.^{7,8} In turn, many developing countries struggle with bridging a gap between high-income and low-income households regarding access to adequate healthcare services.

Healthcare services increase rapidly due to the ever-increasing global population and emerging healthcare issues requiring a quick response. For example, an outbreak of the COVID-19 pandemic recently presented new challenges for the healthcare system. A respiratory infection has claimed more than 5.4 million lives globally, with 279 million infected reported cases.^{9,10} Although the mortality rate remains below the critical line (1.9%), the disease constitutes a vital health risk that requires an extensive healthcare plan to curb.⁹ Further, the pandemic has increased the need for comprehensive health facilities. Mental health is another essential issue related to general health. Specialists define mental health as depression, suicidality, sleep, irritability, fatigue, and concentration.¹¹ Behavioral risks such as physical activity affect general health too. Further, a person's grip strength could also define their health and quality of life.¹² This study aimed to provide evidence-based information on the difference in the general health of physically active and inactive people considering their physical and mental health and quality of life.

METHODS

Participants/samples

The research presented in this publication was conducted using data from wave 7 of the SHARE population-based study. A biannual international survey on aging is called SHARE. Since 2000, it has gathered data on people 50 and older in numerous European nations and Israel, as previously detailed.¹³ There were 77,261 individuals in the SHARE wave 7 samples. Participants who indicated PA participation and depression symptoms were included in the analysis. Participants in the final sample totaled 77,261 and came from the following 28 EU nations: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. The data collection of SHARE wave 7 took place in 2017.

Sampling techniques

Face-to-face interviews were used to gather the data, which lasted about 90 minutes and were conducted at the participant's home. The questionnaires were translated for

each nation, and pilots were run to improve comparability. The Max Planck Society for the Advancement of Science Ethics Council and the University of Mannheim's Ethics Committee accepted the SHARE protocol after confirming the steps taken to ensure data privacy and confidentiality.

This report was prepared using the survey of health, ageing, and retirement dataset in Europe (SHARE) after completing three-step registration for data access at <http://www.share-project.org>. First, the "sharew7_rel7.1.1" dataset was downloaded in SPSS format from the SHARE data center (<https://releases.sharedatportal.eu/releases>). Then the specific output files "gv_health.sav" were selected from the dataset. Next, mental health, physical health, grip strength, and quality of life were four variables to measure general health. Here, the mental health-related variables measured with the Europe Depression scale were labeled as 'euro1=depression, euro3=suicidality, euro5=sleep, euro7=irritability, euro9=fatigue, euro10=concentration,' respectively.^{14,15} For physical health and grip strength, all numerical data of body mass index (BMI) and maximum grip strength measure (max grip) were taken from the dataset. In addition, the dataset's index scores of CASP-12 and the revised 12-item version of CASP-19 were also taken from the dataset to measure the quality of life and well-being.¹⁶ Finally, the data collected for physical activity from the dataset were grouped into two as those who are physically active and inactive.

Assessment of dataset's relevancy

The data of the Survey of Health, Ageing, and Retirement dataset in Europe (SHARE) collected at the 7th wave were preliminarily assessed for whether these were relevant for addressing the researchers' statement of purpose; "How different the general health is between two groups who are physically active and inactive?"

Further, both types of quantitative and qualitative data could precisely capture the quality of life (CASP index), physical health (body mass index), grip strength (maximum of grip strength measure), mental health (depression, suicidality, sleep, irritability, fatigue, and concentration) and physical activity. Additionally, the researcher ensured the assessment of the dataset's quality considering the names and their affiliations of dataset creators (the survey of health, ageing, and retirement dataset in Europe (SHARE), the principal purpose of dataset creators (to evaluate the effects of policies relating to health, socioeconomic and environment on the European life-course), place of data collection (28 European countries: Finland, Sweden, Denmark, Estonia, Latvia, Lithuania, Germany, Poland, Netherlands, Belgium, Czech Republic, Slovakia, Hungary, Austria, Switzerland, France, Slovenia, Croatia, Romania, Bulgaria, Greece, Italy, Spain, Portugal, Malta, Cyprus, Israel, and Luxembourg) and date of data entry (2017).

Definitions

Physical active: Any body movement in which the skeletal muscles must be exercised for at least 30 minutes 3-4 times a week for more energy expenditure (for example: running, walking, cycling, wheeling, swimming, active recreation, playing, dancing, yoga, gardening, etc.).

Physical inactive: Resting without any body movement or body movement for less than 30 minutes less than three times per week (for example, sitting, lying, watching TV, etc.)

Physical health: Measured by means and standard deviations of body mass index (BMI) and maximum grip strength (max grip) of the study participants who were physically active or inactive.

Mental health: Determined by six categories such as depression, suicidality, sleep, irritability, fatigue, and concentration, the frequencies of the study participants were manipulated to provide the particular prevalence among those who were physically active or inactive.

Quality of life: Certain feelings and conditions were self-completed by the study participants on a 4-point scale of CASP-12, in which very high QoL was rated for the study participants with 39-41 scores of CASP-12, high QoL for the study participants with 37-39 scores, moderate QoL for the study participants with 35-37 scores and low QoL for the study participants with less than 35 scores.

General health: Determined by three dimensions: physical health (BMI and max grip), mental health (six categories), and quality of life (CASP-12).

Statistical analysis

The study used SPSS (V25, IBM statistics) for statistical analysis. In descriptive statistics, means, standard

deviations, and 95% confident intervals (95% CI) were computed to state the summary of physical health (BMI), grip strength (max grip), and quality of life (index of CASP) among the total sample population as well as frequencies, percentages, and 95% CI for the variables of mental health status. In analytical statistics, this report applied the Chi-square test to determine the effect of physical activity on mental health and the independent samples t-test to examine mean differences in physical health (BMI), quality of life, and grip strength between physically active and inactive participants. In addition, crude odd ratios (CORs), adjusted odd ratios (AORs), and 95% confidence intervals (95% CI) were calculated.

RESULTS

Tables 1 and 2 present the descriptive statistics for the study variables. The mean BMI was 26.1±7.0, with a 95% CI of 26.08-26.18, and the average max grip was 32.6±10.9 and a 95% CI of 32.52-32.68. When comparing the means of BMI and max grip between physically active and inactive groups, their mean differences (MD) of 2.02 (24.13±10.26 and 26.15±5.84) and 5.74 (26.38±8.99 and 32.12±10.44) respectively. After measuring the categories of mental health, out of the total respondents, 5172 (37.4%; 95% CI: 36.5-38.4%) were in depressive conditions, 4994 (36.5%; 95% CI: 35.5-37.4%) were in the categories of tiredness and weakness due to mental disorders, 4677 (34.2%; 95% CI: 33.3-35.2%) had a sleep problem, 3504 (25.8%; 95% CI: 25.0-26.7%) had an abnormal and excessive excitability, 2696 (9.7%; 95% CI: 19.0-20.5%) had the concentration difficulty and 918 (6.8%; 95% CI: 6.3-7.3%) were at risk of suicide. Further, regarding depression, suicidality, sleep problem, fatigue, low concentration and irritability, their particular prevalence were 35.43%, 5.19%, 32.39%, 32.09%, 16.21% and 24.46% among those who were physically active and 54.39%, 16.98%, 46.69%, 66.56%, 44.11% and 34% among inactive respondents.

Table 1: Descriptive statistics of physical health, quality of life, and grip strength.

Variables	Summary measures	95% CI
Body mass index (mean±SD)	26.1±7.0	26.08-26.18
CASP index for quality of life and well-being (mean±SD)	36.7±6.3	36.68-36.77
Max of grip strength measure (mean±SD)	32.6±10.9	32.52-32.68

Table 2: Descriptive statistics of the mental health variables.

Variables	Frequency (n)	Percent	95% CI
Depression	5,172	37.4	36.5-38.4
Suicidality	918	6.8	6.3-7.3
Sleep disturbance	4,677	34.2	33.3-35.2
Irritability	3,504	25.8	25.0-26.7
Fatigue	4,994	36.5	35.5-37.4
Concentration	2,696	9.7	19.0-20.5
Physical inactivity	11,956	85.7	85.0-86.3

The average CASP index for quality of life and well-being was 36.7±6.3 and 95% CI 36.68-36.77 among all study respondents. The mean index scores of CASP-12 were 32.21±6.50 among those who were physically inactive and 37.65±5.97 among those who were physically active.

Differences in general health

Differences in physical health status

When analyzing if the physical health (BMI and max grip) is different between physically active and inactive, mean differences and statistically significant associations were noted. For example, the BMI of the physically inactive respondents was more likely to be in the overweight range (25-29.9) and obese range (30-39.9), while the BMI of the physically active respondents was likely to be in the healthy weight range (18.5-24.9) and the overweight range (25-29.9) (p<0.001). In another

way, the mean value of maximum grip strength was more likely to be healthy among the respondents who took regular physical activity (32.12±10.44). In contrast, the mean value of maximum grip strength was less likely to be healthy among those without taking regular physical activity (26.38±8.99) (p<0.001).

Differences in mental health status

Table 3 reveals the differences in the prevalence of mental health variables between physically active and inactive. Here, there were significant differences between physical activity and all categories of mental status. For depression, a lower prevalence (35.43%) was found among those who were physically active compared to their counterparts (54.39%). Also, a statistically significant association was noted between physical inactivity and depressive condition (p<0.001). Those who took physical activity regularly were less likely to be a low prevalence (5.19%) of suicidality.

Table 3: Effect of physical activeness on mental health.

Variables	Physically active (%)	Inactive (%)	Chi-square value	P value
Depression	35.43	54.39	283.53	<0.001**
Suicidality	5.19	16.98	343.16	<0.001**
Sleep disturbance	32.39	46.69	141.75	<0.001**
Irritability	24.46	34	74.19	<0.001**
Fatigue	32.09	66.56	797.02	<0.001**
Poor concentration	16.21	44.11	754.45	<0.001**

**p<0.01, *p<0.05

Table 4: Mean difference in physical health (BMI), quality of life, and grip strength between physically active and inactive people.

Variables	Physically active mean±SD	Inactive mean±SD	MD	T value	P value
Max grip	32.12±10.44	26.38±8.99	5.74	-23.11	<0.001**
CASP	37.65±5.97	32.21±6.50	5.44	-37.15	<0.001**
BMI	24.13±10.26	26.15±5.84	2.02	-12.54	<0.001**

Table 5: Impact of physical activity on mental health, physical health, and quality of life.

Mental health variables	Crude OR	95% CI of COR	Adjusted OR	95% CI of AOR
Depression	2.17	1.97-2.4***	1.86***	1.68 - 2.07
Suicidality	3.74	3.32-4.33***	3.02***	2.59 - 3.53
Sleep disturbance	1.83***	1.65-2.02	1.62***	1.46 - 1.80
Irritability	1.6***	1.43-1.77	1.53***	1.37 - 1.71
Fatigue	4.2***	3.78-4.68	3.60***	3.23 - 4.01
Poor concentration	4.08***	3.67-4.54	3.60***	3.22 - 4.01
Unhealthy weight	0.91	0.81-1.02	2.35***	2.13 - 2.58
Poor QOL	6.96	5.85-8.27	3.34***	2.74 - 4.07

*Physical activeness as a reference variable. *** p<0.01, ** p<0.05.

In comparison, those without regular physical activity were more than three times more likely to be a high prevalence (16.98%) of suicidality (p<0.001). When comparing the majority of sleep problems between physically active and inactive, more prevalence (46.69%) of sleep problems was likely to occur among those who

were lying, watching TV, and sitting at desks compared to their counterparts (32.39%) (p<0.001). In addition, those who did not take regular physical activity were 1.39 times more likely to be suffered from irritability than those who took regular physical activity (p<0.001). Concerning tiredness or weakness, the prevalence of

fatigue among physically inactive respondents (66.56%) was double compared to that prevalence (32.09%) among physically active respondents ($p < 0.001$). Regarding concentration power, the prevalence of low concentration power was about three times among those who spent most of their time in sedentary lifestyles (44.11%) compared to those with non-sedentary activities (16.21%) ($p < 0.001$).

Differences in quality of life (QoL)

According to the CASP-12 measurement in this analysis, the total score of QoL ranged from 30.4 to 43. The physically active group had very high (39-41) and high (37-39) QoL scores (mean QoL scores- 31.68 to 43.62). In contrast, the physically inactive group had moderate (35-37) and low (less than 35) QoL scores (mean QoL scores- 25.71 to 38.71). Accordingly, we conclude that the hypothesis:

H₁: There is a statistically significant difference in general health between people who are physically active and inactive, considering their mental health (depression, suicidality, sleep, irritability, fatigue, and concentration levels), physical health (BMI), quality of life, and grip strength is accepted.

Impact of physical activity on general health

The researcher used bivariate and multivariate analysis to determine if physical activity impacts general health. The physically inactive respondents were 2.17 times more likely to be depressed (COR: 2.17, 95% CI: 1.97-2.4 and AOR: 1.86, 95% CI: 1.68-2.07), 3.74 times more likely to be suicidality (COR: 3.74, 95% CI: 3.32-4.33 and AOR: 3.02, 95% CI: 2.59-3.53), 1.83 times more likely to be sleep disturbance (COR: 1.83, 95% CI: 1.65-2.02 and AOR: 1.62, 95% CI: 1.46-1.80), 1.6 times more likely to be irritability (COR: 1.6, 95% CI: 1.43-1.77 and AOR: 1.53, 95% CI: 1.37-1.71), 4.2 times more likely to be fatigued (COR: 4.2, 95% CI: 3.78-4.68 and AOR: 3.60, 95% CI: 3.23-4.01) and 4.08 times more likely to be poor concentration (COR: 4.08, 95% CI: 3.67-4.54 and AOR: 3.60, 95% CI: 3.22-4.01), than those who are physically active. Besides, among the physically inactive respondents, the likelihood of unhealthy weight was 2.35 times (AOR: 2.35, 95% CI: 2.13-2.58), and the likelihood of poor QoL was 3.34 times (AOR: 3.34, 95% CI: 2.74-4.07) compared to the physically active respondents.

DISCUSSION

Over the last decade, studies have shown that physical exercise is vital in maintaining an individual's psycho-physical balance. Long-term physical activity significantly lowers the prevalence of neurodegenerative and neuromuscular illnesses associated with aging by fortifying the immune system.¹⁷ This study evaluates the difference in the general health of physically active and inactive people considering their physical and mental health.

The current study was conducted between 2016 and 2021 by researchers interested in the topic. None of them considers all the factors within one framework. Yet, their insights could be valuable from the perspective of the problem under investigation owing to the emphasis on an explicit link between different factors that the effect of physical activity on general health. Previously several studies evaluated the relationship between quality of life and general wellness among scholars.^{18,19} In this study, people who engaged in various physical activities exhibited statistically significant differences in their mental health, physical health, quality of life, and grip strength. Similarly, a study by Galper et al reported that habitual physical activities are cross-sectionally associated with lower depressive symptomatology and greater emotional well-being.⁸

Additionally, a study by Hibbert reported that the lack of physical exercise explains 95% of cases of chronic infection directly or indirectly.¹⁸ The current research finds that physically active people have a better quality of life than people without physical activity. Previously, several studies identified the correlation between BMI and physical exercise.^{18,20}

DeHood et al reported that physically active people generally have a higher quality of life and wellness score than inactive people, which is similar to the current findings of our study.¹⁷ This study has observed a statistically significant difference between BMI and physical activity. Thus, it could be concluded that physical exercise generally leads to decreased BMI.

Similarly, physical activity showed a significant association with grip strength. NAP defines grip strength as the maximum strength with which a person can grab an item.¹⁹ According to the study, the more physically active a person is, the stronger they can hold an item. This conclusion was formulated based on an analysis using 45 respondents to prove this claim, including 25 individuals registered in gyms and those who did not engage in regular physical activities.

The study found a statistically significant difference in grip strength between people who had visited the gym and those who had not been. NAP, Luzi and Wang et al, conducted similar studies to find a positive correlation between grip strength and physical exercise.^{3,15,19} Therefore, the academic literature fully supports the opinion that increased physical activeness results in higher grip strength.

Similarly, Kanosue et al illustrates that physical exercises positively influence a person's mental well-being.²⁰ In this study, physical activities significantly impact depression, suicidality, sleep, irritability, fatigue, and concentration levels. In particular, the scholar argues that increased physical activity could decrease depression, reduce suicidal thoughts, combat fatigue, enhance

concentration, and improve sleep quality. Similar findings were observed in previous studies.^{21,22} The available evidence provides a compelling reason to believe that the level of physical activeness directly impacts mental health, even though this variable should not be considered a universal remedy for treating mental health conditions.

The current study has some limitations. Firstly, the lack of information on physical activity, such as duration and more detail about frequency. Secondly, depression was not clinically diagnosed. Lastly, the reliance exclusively on the secondary study could also be considered a limitation of the research due to the inability to prove the accuracy of the information.

CONCLUSION

In conclusion, the study results support the research hypothesis that there is a statistically significant difference in general health between physically active and inactive people. Depression, suicide, sleep, irritability, fatigue, concentration levels, BMI, and grip strength affect one's quality of life.

ACKNOWLEDGEMENTS

This study was conducted using the secondary data set from SHARE and fully obliged with the SHARE publication guidelines for publication submission. Also, the authors give special thanks to Fondation Merieux and lecturers from STI university for mentoring and providing input for this publication.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Thiha N, Soe PP, Babin FX, Delorme L, Win HH, Clevenbergh P. A critical study of the difference in general health between physically active and inactive people: secondary data analysis and report. *Int J Community Med Public Health* 2022;9:3404-10.