

PHYSICAL ACTIVITY AND PSYCHOLOGICAL HEALTH IN GERIATRIC POPULATION: A SURVEY STUDY

Mr. Bikash Kumar Gouda

MPT (neurology), Asst. professor, department of physiotherapy, franklin institute of medical science, Bhubaneswar, Odisha, bikashgd4@gmail.com

Mrs. Monalisa Pattnaik

MPT, Asst. Professor, HOD, department of physiotherapy, SVNIRTAR, Cuttack, Odisha
monalisapattnaik8@gmail.com

Dr. PP Mohanty

PhD, Director, SVNIRTAR, SVNIRTAR, Olatpur, Bairoi, Cuttack, Odisha, India
ppmphysio@rediffmail.com

ABSTRACT

Background: Exercise is known to be associated with reduced risk of all-cause mortality, cardiovascular disease, stroke, and diabetes, but its association with mental health remains unclear. We aimed to examine the association between exercise and mental health burden in a geriatric population, and to better understand the influence of exercise type, frequency, duration, and intensity.

Method: A cross-sectional study was conducted among 287 elder peoples, both males and Females in the age group above 60 years. A Self-administered Questionnaire containing 39 questions

Arranged in a systematic manner includes questions related to general details of the respondents, Details of psychological health and details of level of physical activity of subject

In google format was circulated among elder peoples and college students having grandparents online through WhatsApp and emails.

Results: Results showed that 38.3% of participants are low active, 37.3% are moderate active and 24.4% are high active. it also shows that the peoples in between 60-70 are highly active as compared to other groups who are moderately, low active. Females were more physically active than males in moderate and vigorous activity but males were having high walking activities as compared to females. Males are more suffering from anxiety, depression, general health, and have less vitality, positivity and self-control as compared to females.

Conclusion: Socio demographic variables like old age, female gender, widower elderly, and family structure and along with this elderly have a significant influence on mental health of elderly in different domains of wellbeing. Significant reduction of total weekly physical activity energy expenditure in elderly age groups and especially in men, and this reduction negatively affects the psychological well-being. The effect of physical activity in populations was evidenced due to the correlation between METs and vitality, which translates into a better psychological well-being of

individuals. In fact, physical activity has a profoundly positive impact on psychological health, by enhancing self-esteem and resilience to stress and reducing depression and anxiety. The clinical relevance of the present study denotes that maintaining regular physical activity is an important preventive strategy for physical and mental health. Then “stay active to feel better.”

INTRODUCTION

The World Health Organization (WHO) asserts that mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work effectively and productively, as well as contribute to their community.^[1]

The percentage of people over 60 in the globe will nearly double from 12 to 22 percent between 2015 and 2050. Eighty percent of the world's elderly population will reside in low- and middle-income nations by 2050. The pace of population of ageing is much faster than in the past.^[2] insufficient Physical activity and high sedentary behaviour increases psychological distress significantly compared to sufficient Physical activity and low sedentary behaviour.^[3]

The importance of mental disorders for public health is significant. Vigorous physical activity has reportedly been shown to improve mental health in both clinical and nonclinical groups. The strongest evidence indicates that exercise and physical activity may help with mild to severe depressive symptoms, enhance cognition, social skills, and self-esteem, lessen anxiety symptoms, and change coronary-prone (Type A) behaviour and physiological responses to stresses.^[4] Health is crucial for a society's expansion, progress, and productivity as well as for living a happy and fulfilling life anywhere in the world. Even if there are few illnesses that account for a growing death rate, mental problems contribute significantly to morbidity and impairment. As a result of sociodemographic and epidemiological changes, the health of people in India is changing. Illness load from both communicable and non-communicable diseases. It is well established that a complex interplay of biological, social, environmental, cultural, and economic elements contributes to mental diseases. Social determinants of health, such as work, education, living standards, environment, access, equity, and others, have a vital role in both causation and recovery in nations like India. Poverty, low living standards and related factors are implicated in the increased occurrence, but they also vitiate the cycle of poverty and impoverishment.^[5] Recent national studies noted that maintaining adequate vitamin D levels later in life may be achieved by physical activity. Therefore, promoting physical activity in older adults should be a national public health priority^[6]. The anticipated yearly expense for outpatient care would be Rs. 1300 crores divided by 12 months, or Rs. 15,600 crores.^[7] Approximately 0.6 percent of people who receive mental health services could need to be inpatient at least once every year.^[8] According to the Ayushman Bharat Scheme, the daily treatment cost per admission is around Rs. 1500.^[9] Physical inactivity is linked to altered physiological functions that result in muscle wasting, decreased exercise tolerance, insulin resistance, and a changed energy balance.^[10]

Exercise is often the first step in lifestyle modifications for the prevention and management of chronic diseases ^[11]. Exercise may physiologically boost endorphin and brain-derived neurotrophic factor (BDNF) levels, which may improve happiness and reduce stress^[12] Exercise improves the body's immune surveillance capacities, decreases inflammation, lowers the likelihood of acquiring a number of chronic illnesses, and increases overall levels of physical health, disease resistance, and disease prevention^[13]. Playing sports was linked to lower levels of stress and depression among jobless women and middle-aged individuals. Women in blue-collar employment reported feeling more stressed and distressed after doing housework. An inverse relationship between housekeeping and distress was discovered in young people who worked in white-collar employment. Men who work in blue-collar jobs reported feeling more stressed when they bike to and from work.^[14] A higher level of physical exercise helps older people grow more slowly and prevents premature ageing by enhancing their health condition and functional capacities in daily life activities. Regular physical activity is important to ensuring excellent health and a high level of functioning ability for a long period. It can

Postpone age-related changes in the body.^[15] Many chronic illnesses that affect older persons, such as heart disease, stroke, diabetes mellitus, lung disease, Alzheimer's disease, hypertension, and cancer, are made worse by inactivity. Increased obesity in older people has also been attributed to a lack of physical exercise and bad eating habits^[16]. The general population's knowledge of mental disease was relatively low, which suggests the need of putting a major focus on public education to raise mental health literacy among the general public and create a more understanding and accepting attitude toward mental illness^[17]

METHODOLOGY

STUDY DESIGN –

The present study is cross-sectional online survey realized through Google Forms web survey platform (Google LLC, Mountain View, CA, United States). The online survey was communicated through the social media such as WhatsApp and e-mails, it was shared to personal contacts of the research group members and of the college students. Before starting the questionnaire, the online survey, totally anonymous and not traceable to identity of participants, including a brief description of the study, its aim, and the declarations of anonymity and confidentiality as follow: “The data of this survey are anonymous, confidential and their confidentiality will be guaranteed. I remind you that participation is voluntary and therefore, can withdraw or renounce at any time. The participant, informed according to the methods and purposes of the research described above, expresses his/her consent to his/her participation, having the guarantee that his/her personal data will be processed anonymously.” All subjects participating in the online survey gave their informed consent before participation.

STUDY POPULATION – Population who satisfied the selection criteria of the study.

SAMPLE SIZE – Minimum of 150 subjects were selected.

SOURCE OF DATA COLLECTION – People residing in different regions of India.

SELECTION CRITERIA-

INCLUSION CRITERIA -

Participants were included if they were aged ≥ 60 years, had not been diagnosed with COVID-19 or admitted to hospital since July 2021 and were able to give informed consent to complete the questionnaire.

EXCLUSION CRITERIA –

1. Elderly individual who was chronically ill, bed-ridden.
2. Individual with hearing and speech impairments and mental illness.
3. Individuals who were not able to comprehend local language / English or not willing to participate.

Study procedure-: A standardized questionnaire (PGWBI) psychological general wellbeing index and IPAQ (International Physical Activity Questionnaire), October 2002

DATA ANALYSIS

Data collected was entered into excel spreadsheet and analysed using Microsoft office

Excel 2019 and spss 26 (Statistical Package for the Social Sciences) software. Frequency

Tables were used to describe the distribution of study variables. In SPSS software Oneway

Anova test was used to find out the difference between different groups of elderly people with

Physical activity level and psychological health and Pearson's correlation test was done to find out the relationship between physical activity and mental health and considering null hypothesis to be significant if p was set < 0.05 , which is level of significance.

General characteristics of the study populations

Baseline characteristics of the study subjects, the study sample ($n = 287$) comprised 52.6% of females and 47.4% of males. Participants were divided into four age groups: 60-70yrs ($n=123$) 42.9 %, 70-80 ($n=115$) 40.1%, 81-90 ($n=44$) 15.3% and 91-100 ($n=5$) 1.7% The mean age was (72.88 ± 8.23)

Majority of them were living in joint family like 95.1% ($n=273$) in our study, 63.1% ($n=181$) were married and living with their partners, 35.9% ($n=103$) were widower and only 1% ($n=3$) were divorced

About 39.7%(n=114) of the populations were having primary education,16.4%(n=47) were illiterate,16.4%(n=47) were having secondary education,9.8%(n=28) and only 17.8%(n=51) have completed their graduations.

Around 40.4%(n=116) of the population are getting pension from govt.8%(n=23) are doing private jobs,18.5%(n=53) are dependent on their agricultural fields as their way of income and only 5.9%(n=17) are engaged in some petty business.

In financial crisis situation 86.8%(n=249) of the population are depends upon their spouse, children, in laws and grandchildren and 2.4%(n=7) depends on their relative & friends

LEVELS OF PHYSICAL ACTIVITY IN POPULATION

The average physical activity level among the sampled elderly in ‘vigorous activity’ domain was 348.71, in ‘moderate activities’ domain was 406.13 and in ‘walking’ domain was 945.38 MET-min/ week.

ANALYSIS OF PHYSICAL DOMAINS SCORE IN DIFFERENT AGE GROUPS.

The mean score of vigorous activity in age between 60-70yrs. was (513±571) MET-min/wk. and that of other groups are, in 70-80yrs. (303±506) MET-min/wk., and 80-90yrs. (46±185) MET-min/wk. the elderly persons above 91 years were not involved in any moderate and vigorous activities. The mean score of moderate activities in 60-70 yrs. Was (775±431) MET-min/wk., in 71-80 yrs. (184±163) MET-min/wk. The mean score of low activities like walking are. In 60-70 yrs. Was (1746±748) MET-min/wk., in 71-80 yrs. (410±1845) MET-min/wk., in 81-90 yrs. (209±1003) MET-min/wk. and in 91-100 yrs. (19±44) MET-min/wk.

AGE (Binned)		VIGOROUS ACTIVITY	MODERATE ACTIVITIES	WALKING	phy.TOTAL
<= 70	Mean	513.17	775.61	1746.31	3035.09
	N	123	123	123	123
	Std. Deviation	571.05	431.98	748.62	1231.81
71 - 80	Mean	303.65	184.00	410.63	898.28
	N	115	115	115	115
	Std. Deviation	506.32	163.28	1845.80	1883.11
81 - 90	Mean	46.36	.00	209.25	255.61
	N	44	44	44	44
	Std. Deviation	185.21	.00	1003.64	1010.814
91 - 100	Mean	.00	.00	19.80	19.800
	N	5	5	5	5

	Std. Deviation	.00	.000	44.27	44.27
Total	Mean	348.71	406.13	945.38	1700.22
	N	287	287	287	287
	Std. Deviation	524.48	443.89	1495.92	1899.93

Physical activity level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 600	110	38.3	38.3	38.3
	600 - 3000	107	37.3	37.3	75.6
	3000 Above	70	24.4	24.4	100
	Total	287	100	100	

Results of the IPAQ scoring showed that 38.3% of participants are low active (<600 MET–minutes/week), 37.3% are moderate active (>600 MET–minutes/week) and 24.4% are high active (>3000 MET–minutes/week).it also shows that the peoples in between 60-70 are highly active as compared to other groups who are moderately, low active. These results suggest that with increasing age the physical activity level reduces.

ANALYSIS OF PHYSICAL DOMAIN SCORE AMONG FOUR GROUPS OF ELDERLY WITH AGE.

The elderly individuals were divided into 4 groups as per their age, group 1 (60-70 yrs.), group 2 (70-80 yrs.), group 3 (80-90 yrs.) and group 4 (90-100yrs) respectively and their physical domain score were compared by One-way Annova test. There is a significant difference in the score was found between the groups. The mean differences between group 1 with 2, 3 and 4 were 2136.81, (p= .000) ,2779.483, (p= .000) and 3015.29, (p=0.000) respectively, for group 2 with, 3 and 4 mean differences were 642.67, (p= .075) and 878.48, (p= .573) respectively. For group 3 with 4 was 235.81, (p=0.987), This signifies with increasing age the physical activity level reduces.

COMPARISON OF PHYSICAL DOMAINS SCORE BETWEEN MALE AND FEMALE ELDERLY

The mean score for vigorous activity, moderate activity and walking are more in case of female (404.50±583.57), (427.95±430.54), (877.45±960.11) MET/min/week as compared to males (286.76±443.89), (381.91±458.62), (1020.81±1925.00) MET/min/week signifies females are

more physically active than males in moderate and vigorous activity but males were having high walking activities as compared to females

LEVELS OF PSYCHOLOGICAL HEALTH IN POPULATION

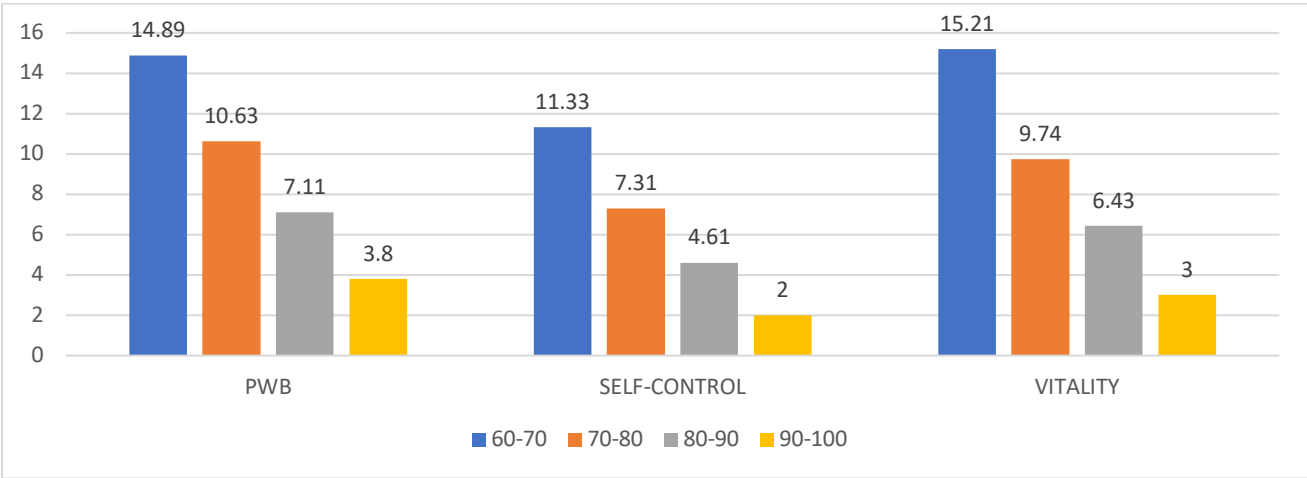
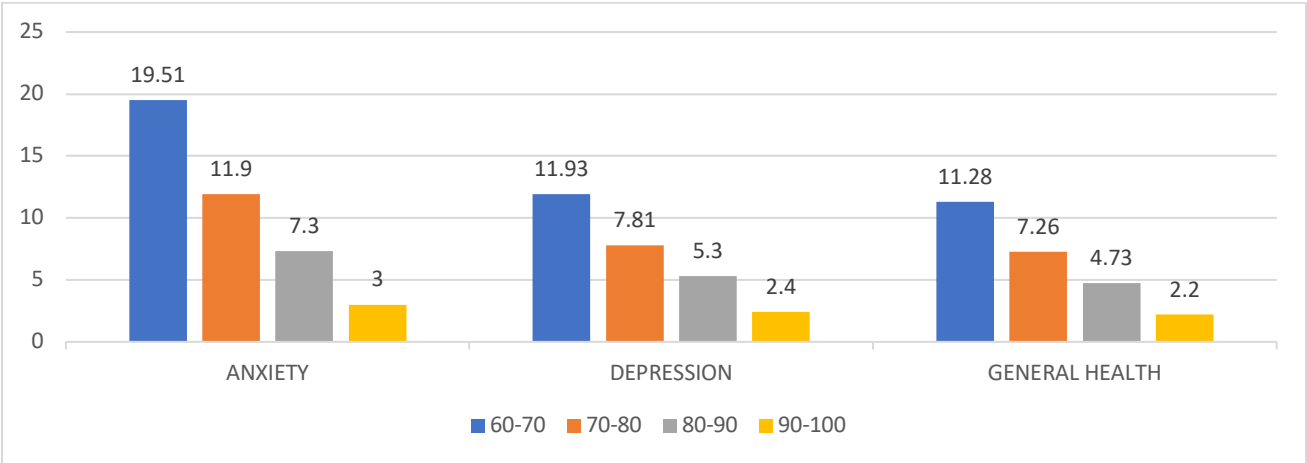
PGWBI scores of six health domains comprising anxiety, depressed mood, positive well-being, self-control, general health, and vitality of participants divided by gender, age, and levels of physical activity are displayed in. The total score of male and low active groups reflected moderate distress, whereas the other groups belong to positive psychological well-being. In the PGWBI, the average score obtained in ‘anxiety’ domain was 14.30 ± 5.307 , in ‘depression’ domain 9.09 ± 3.072 , in ‘PWB’ domain 11.80 ± 3.576 , in ‘self-control’ domain 8.53 ± 3.102 , in ‘health’ domain 8.51 ± 3.060 and for ‘vitality’ domain it was 11.46 ± 4.030 .

ANALYSIS OF PSYCHOLOGICAL DOMAINS SCORE IN DIFFERENT AGE GROUP.

The mean score of **ANXIETY** in age between 60-70yrs. was (19.51 ± 2.29). and that of other groups are, in 71-80yrs. (11.90 ± 1.98), 81-90yrs. (7.30 ± 1.88). And in 91-100yrs. (3 ± 1.41). The mean score of **DEPRESSION** in age between 60-70yrs. was (11.93 ± 1.88). and that of other groups are, in 71-80yrs. (7.81 ± 1.04), 81-90yrs. (5.30 ± 1.53). And in 91-100yrs. (2.40 ± 1.14). The mean score of **PWB** in age between 60-70yrs. was (14.89 ± 2.11). and that of other groups are, in 71-80yrs. (10.63 ± 1.72), 81-90yrs. (7.11 ± 1.9). And in 91-100yrs. (3.80 ± 0.837). The mean score of **SELF CONTROL** in age between 60-70yrs. was (11.33 ± 1.88). and that of other groups are, in 71-80yrs. (7.31 ± 1.44), 81-90yrs. (4.61 ± 1.08). And in 91-100yrs. (2 ± 0.7). The mean score of **GENERAL HEALTH** in age between 60-70yrs. was (11.28 ± 2.0). and that of other groups are, in 71-80yrs. (7.26 ± 1.14), 81-90yrs. (4.73 ± 1.38). And in 91-100yrs. (2.20 ± 0.837). The mean score of **VITALITY** in age between 60-70yrs. was (15.21 ± 2.39). and that of other groups are, in 71-80yrs. (9.74 ± 1.60), 81-90yrs. (6.43 ± 1.56). And in 91-100yrs. (3.00 ± 1.22).

AGE (Binned)		ANXIETY	DEPRESSION	PWB	SELF CONTR OL	GENER AL HEALTH	VITALITY	Psycho.TOTAL
<= 70	Mean	19.51	11.93	14.89	11.33	11.28	15.21	84.15
	N	123	123	123	123	123	123	123
	Std. Deviation	2.292	1.882	2.116	1.889	2.002	2.393	9.212
71 - 80	Mean	11.90	7.81	10.63	7.31	7.26	9.74	54.65
	N	115	115	115	115	115	115	115
	Std. Deviation	1.984	1.042	1.724	1.447	1.140	1.606	5.198

81 - 90	Mean	7.30	5.30	7.11	4.61	4.73	6.43	35.48
	N	44	44	44	44	44	44	44
	Std. Deviation	1.887	1.534	1.907	1.083	1.387	1.561	5.441
91 - 100	Mean	3.00	2.40	3.80	2.00	2.20	3.00	16.40
	N	5	5	5	5	5	5	5
	Std. Deviation	1.414	1.140	.837	.707	.837	1.225	2.408
Total	Mean	14.30	9.09	11.80	8.53	8.51	11.46	63.69
	N	287	287	287	287	287	287	287
	Std. Deviation	5.307	3.072	3.576	3.102	3.060	4.030	20.640



COMPARISON OF PSYCHOLOGICAL DOMAINS SCORE BETWEEN MALE AND FEMALE ELDERLY

The mean anxiety score of male and females are (13.93 ± 5.42) and (14.64 ± 5.194) respectively and that of depression (8.89 ± 3.203) and (9.28 ± 2.94) . PWB male (11.55 ± 3.749) , female (12.02 ± 3.411) . self-control males (8.39 ± 3.278) , female (8.66 ± 2.939) . in general health males (8.37 ± 3.23) females (8.64 ± 2.89) and in vitality males were (11.10 ± 4.26) , females (11.78 ± 3.78) indicates males are more suffering from anxiety, depression, general health, and have less vitality, positivity and self-control as compared to females.

COMPARISON OF PHYSICAL ACTIVITY LEVEL AND PSYCHOLOGICAL HEALTH IN DIFFERENT GROUPS OF ELDERLY BASED ON MARRIATL STATUS

The elderly individuals were divided into 3 groups according to marital status group I (married), group II (widowed), group III (divorced) respectively and their physical activity level were analysed.

One-way Anova test shows significant differences in both physical activity level and psychological score between married and widowed groups with mean score difference of 725.22 MET-min/wk. ($p=0.005$), 9.383 ($p=0.001$) respectively. There is no significant difference has been found in other groups, indicating married peoples are more active than widowed and have good mental health than others.

Participants had to give information (before and during the COVID-19 quarantine) related to vigorous and moderate-intensity physical activity as well as walking activity and sedentary behaviours. Vigorous-intensity physical activities comprising heavy lifting, use of home gym machines, work out/courses on the online platform and others fitness instruments, demand a hard physical effort that increases the breathing rate more frequently than normal. Moderate-intensity physical activities can include carrying a light load or performing aerobic exercises at a modest intensity. Examination of the total physical activity in MET– minutes/ week demonstrated a statistically significant difference between different age groups

The mean differences between group 1 with 2, 3 and 4 were 2136.81, $p= .000$, 2779.483, $p= .000$ and 3015.29, $p=0.000$ respectively, for group 2 with, 3 and 4 mean differences were 642.67, $p= .075$ and 878.48, $p= .573$ respectively. For group 3 with 4 was 235.81, $p=0.987$, This signifies with increasing age the physical activity level reduces.

Results of the IPAQ scoring showed that 38.3% of participants are low active (<600 MET–minutes/week), 37.3% are moderate active (≥ 600 MET–minutes/week) and 24.4% are high active (>3000 MET–minutes/week). These results suggest that with increasing age level of physical activity reduces. Regarding gender classifications, total physical activity of female in 1709.09 MET–min/week are larger than males 1689.42 MET–min/week

CORRELATION BETWEEN PHYSICAL ACTIVITY AND PSYCHOLOGICAL WELL-BEING

PGWBI scores of six health domains comprising anxiety, depressed mood, positive well-being, self-control, general health and vitality of participants divided by gender, age, and levels of physical activity. The total score of female and low active groups reflected moderate distress, whereas the other groups belong to positive psychological well-being. To evaluate if changes in physical activity levels affect psychological well-being, a Pearson's correlation was run to determine the relation between Δ -MET-min/week and total PGWBI score.

		Psycho.TOTAL	phy.TOTAL
Psycho.TOTAL	Pearson Correlation	1	.611**
	Sig. (2-tailed)		.000
	N	287	287
phy.TOTAL	Pearson Correlation	.611**	1
	Sig. (2-tailed)	.000	
	N	287	287
**. Correlation is significant at the 0.01 level (2-tailed).			

A significant positive correlation was found between the variation of physical activity and mental wellbeing, suggesting that reduction of total physical activity is related to worse status of psychological well-being ($r = 0.611$, $**p < 0.001$).

a strong positive correlation was detected between the variation of total activity and PGWBI score in females with age group 91-100 yrs. ($r = 1.000$, $**p < 0.01$), moderate to low significance in 81-90 yrs, and 60-70 yrs. ($r = 0.587, 0.271$) with $p < 0.05$ respectively. whereas no significant association was found between physical activity and psychological well-being in the other age groups and males.

DISCUSSION

In our opinion, this study is a pioneer in comparing the physical activity with psychological health in geriatric peoples in India.

in present study, we choose to analyse the socio demographic variables like age, gender, marital status, and the family structure in different domains of PGWBI. Their relationship with physical activity level were also included for being considered as a major indicator of wellbeing.

we analysed the total MET-min/wk. and psychological score in different geriatric population in India and assess the relationship with the psychological well-being of 287 participants, of which 24.4% was classified as a highly active group. Certainly, our study sample is very limited as compared to other work present in the current literature, such as the work by Grazia Maugeri and Paola Castro Giovanni et al., (2020) which included more than 2524 individuals, even if the treated topic was different.^[18] Tiwari, S. C., & Pandey, N. M et al., (2012) reported an average of 20.5%

mental health morbidity in older adults. Accordingly, it was found that, at present, 17.13 million older adults (total population, 83.58 million) are suffering from mental health problems in India.^[19]

The World Health Organization (WHO) recommends that older people get at least 150 minutes of physical activity per week. This recommendation applies to everyone over the age of 65, regardless of gender, race, ethnicity, or income level. This also applies to older people with chronic illnesses. In contrast, our results suggest that the majority of older Indians are physically inactive: only 11% of men and 19% of women engage in strenuous activity at least onppmphysio@rediffmail.com with the increasing prevalence of poor mental health condition in India's aging population, efforts are needed to improve health behaviours, especially physical activity.

In our study we found that females are more active than males the reason may be change in everyday schedules and habits. Females remaining at home spend much more time in low-intensity activities like housework (cooking, washing dishes or gardening). Another reason could be the greater female presence in the study that is generally more prone to do low-intensity activities. Similar results were found in research done by W Li & E Procter-Gray et al., (2017) ^[21]. results showed that, the married individuals were more likely to be active than their single counterparts similar results were also shown by Kelley K. Pettee et al., (2006) ^[22]

Our results also showed that the reduction of physical activity levels is ever related to the worse status of psychological well-being. The positive effects of regular physical activity on psychological health are indisputable in the field of modern medicine. Regular exercise improves one's self-esteem and a sense of well-being. Individuals who exercise regularly exhibit fewer depressive and anxiety symptoms, thus supporting the concept that physical activity provides a beneficial effect against the development of mental disorders by Agnes van Minnen et al., (2010) ^[23]

Analysing our results and comparing them with the literature, we noted that high intensity levels confirmed that a higher level of training indicated a better psychological well-being, especially in anxiety, where moderate correlations were found between study participants.

When comparing the factors with the six dimensions of psychological well-being we noted that the 1st group age (60-70 yrs.), due to their physical activity levels, had higher values in the positive aspects, which translated into lower levels of anguish. Regarding the sex differences, a higher level of distress was found among males, which could suggest that they were more affected however, it is important to clarify that there is no knowledge of their previous mental health conditions, so we believe these statements was given with caution, encouraging more studies in this regard.

Sprangers et.al (Sprangers et al., 2000) showed that factors such as old age, female gender, not having a partner, living in a nuclear family are related to low levels of mental health. Moreover, other studies also controlled these socio demographic variables.

So, in present study, we choose to analyse the socio demographic variables like age, gender, marital status (with or without partner) and the family structure in different domains of PGWBI

and their relationship with physical activity level were also included for being considered as a major indicator of wellbeing.

When we compared the physical domain score between the four groups of elderly; group 1 (60-70), group 2 (70-80) and group 3 (80-90), group 4 (90-100) we observed that there was significant effect of increase in age on different domains of IPAQ. the reduction in physical activity level and functional fitness was nearly equal for both men and women and was due to the aging process. These differences between young and old elderly people were due to the reduction of muscle strength in both upper and lower limbs and changes in body-fat percentage, flexibility, agility, and endurance.^[24] similarly in psychological score of different domains like anxiety, depression, general health, positive wellbeing, self-control, and vitality decreases indicating anxiety, depressions and general health increases whereas self-control, and positivity and vitality reduces with increasing age.

system involved in stress The anti-anxiety effects of regular exercise are associated with changes in the hypothalamic-pituitary-adrenal (HPA) axis and mediation of the endogenous opioid reactivity, anxiety, mood, and emotional responses have been shown in several studies ^[25,26,27]. In addition, physical activity is involved in regulating various nutritional factors such as, Brain-derived neurotrophic factor (BDNF). BDNF, whose levels are upregulated after exercise, is the most abundant neurotrophin in the brain, positively impacting both anxiety and depressive disorders ^[28]. We found that the correlation between the reduction of physical activity and psychological well-being is stronger in the female group. Previous research has explored gender differences between measures of physical fitness and life satisfaction, one of the central components of the field of positive psychology. Although most of them do not reflect differences in gender and life satisfaction, some studies show higher life satisfaction scores for women compared to men. It has been suggested that reduced levels of physical activity may affect mental health primarily in groups of women ^[29,30,31,32]. Significant correlations were also shown between changes in total activity and PGWBI scores in subjects classified as the most active and youngest age groups. The latter finding is supported by previous studies showing strong associations between physical activity and mental health in this age group ^[32].

Although the negative effects of reduced physical activity levels on mental health are well established, the literature currently conducted in Canada does not support current findings on worsening psychophysical conditions during periods of mandatory rest. There is only one study available. Because of the pandemic ^[33]. The benefits of exercise have proven to be very helpful, especially during times of anxiety, crisis and anxiety. There are concerns that lifestyle-based pre-existing illnesses, such as the onset or exacerbation of them, are leading to challenges to the immune system and physical health. Lack of access to exercise and physical activity also affects mental health, increasing stress and anxiety that many have experienced in the face of isolation from normal social life.

The present study concluded that socio demographic variables like old age, female gender, widower elderly, family structure and along with this elderly have a significant influence on mental health of elderly in different domains of wellbeing. In conclusion, our results, have shown that a significant reduction of total weekly physical activity energy expenditure in elderly age groups and especially in men, and this reduction negatively affects the psychological well-being. The effect of physical activity in populations was evidenced due to the correlation between METs and vitality, which translates into a better psychological well-being of individuals. In fact, physical activity has a profoundly positive impact on psychological health, by enhancing self-esteem and resilience to stress and reducing depression and anxiety. The clinical relevance of the present study denotes that maintaining regular physical activity is an important preventive strategy for physical and mental health. Then “stay active to feel better”.

LIMITATION

Our findings may contain several limitations that should be discussed and considered for future research. The nature of the study, which is a cross-sectional and self-reported survey, has certain weaknesses, as it may prevent the detection of a possible bias in the physical activity measures. Although the volume of physical exercise of each participant in the study was obtained from standardized questionnaires, in the absence of physiological measures of physical condition, we cannot rule out some inaccuracies in the time or intensity of the exercise performed. We have analysed only 287 respondents' information, which could not show generalized effect.

FUTURE RECOMMENDATIONS

Qualitative studies, as in-depth interview, can be used to have better understanding of the factors affecting the mental health in elderly.

REFERENCES

1. World Health Organization. Promoting mental health: concepts, emerging evidence, practice (Summary Report) Geneva: World Health Organization; 2004. [Google Scholar] [Ref list]
2. Ageing and Health, WHO, <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
3. Uddin, R., Burton, N. W., & Khan, A. (2020). Combined effects of physical inactivity and sedentary behaviour on psychological distress among university-based young adults: a one-year prospective study. *Psychiatric Quarterly*, 91(1), 191-202.
4. Taylor, C. B., Sallis, J. F., & Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public health reports (Washington, D.C.: 1974)*, 100(2), 195–202.
5. Lund, C., Breen, A., Flisher, A. J., Kakuma, R., Corrigall, J., Joska, J. A., Swartz, L., & Patel, V. (2010). Poverty and common mental disorders in low- and middle-income

- countries: A systematic review. *Social science & medicine* (1982), 71(3), 517–528. <https://doi.org/10.1016/j.socscimed.2010.04.027>
6. Orces C. H. (2019). Association between leisure-time aerobic physical activity and vitamin D concentrations among US older adults: the NHANES 2007-2012. *Aging clinical and experimental research*, 31(5), 685–693. <https://doi.org/10.1007/s40520-018-1031-9>
 7. Math SB, Srinivasaraju R. Indian psychiatric epidemiological studies: Learning from the past. *Indian J Psychiatry*. 2010;52: S95–103.
 8. Harrison P, Cowen P, Burns T, Fazel M. 7th ed. United Kingdom: Oxford University Press; 2018. *Psychiatric Services, Shorter Oxford Textbook of Psychiatry*; p. 790.
 9. Home Ayushman Bharat. [Last accessed on 2019 Mar 11]. Available from: <https://www.pmjay.gov.in/> [Ref list]
 10. Biolo, G., Ciochi, B., Stulle, M., Piccoli, A., Lorenzon, S., Dal Mas, V., ... & Guarnieri, G. (2005). Metabolic consequences of physical inactivity. *Journal of renal nutrition*, 15(1), 49-53.
 11. Anderson, E., & Shivakumar, G. (2013). Effects of exercise and physical activity on anxiety. *Frontiers in psychiatry*, 4, 27
 12. Sleiman, S. F., Henry, J., Al-Haddad, R., El Hayek, L., Abou Haidar, E., Stringer, T., Ulja, D., Karuppagounder, S. S., Holson, E. B., Ratan, R. R., Ninan, I., & Chao, M. V. (2016). Exercise promotes the expression of brain derived neurotrophic factor (BDNF) through the action of the ketone body β -hydroxybutyrate. *eLife*, 5, e15092. <https://doi.org/10.7554/eLife.15092>
 13. Shephard, R. J., Verde, T. J., Thomas, S. G., & Shek, P. (1991). Physical activity and the immune system. *Canadian journal of sport sciences = Journal canadien des sciences du sport*, 16(3), 169–185.
 14. Asztalos, M., Wijndaele, K., De Bourdeaudhuij, I., Philippaerts, R., Matton, L., Duvigneaud, N., ... & Cardon, G. (2009). Specific associations between types of physical activity and components of mental health. *Journal of science and medicine in sport*, 12(4), 468-474.
 15. Andrieieva, O., Hakman, A., Kashuba, V., Vasylenko, M., Patsaliuk, K., Koshura, A., & Istyniuk, I. (2019). Effects of physical activity on aging processes in elderly persons.
 16. Elsayy, B., & Higgins, K. E. (2010). Physical activity guidelines for older adults. *American Family Physician*, 81(1), 55-59.
 17. Ganesh, K. J. N. J. C. M. (2011). Knowledge and attitude of mental illness among general public of Southern India. *National journal of community medicine*, 2(01), 175-178.
 18. Maugeri, G., Castrogiovanni, P., Battaglia, G., Pippi, R., D'Agata, V., Palma, A., Di Rosa, M., & Musumeci, G. (2020). The impact of physical activity on psychological health during Covid-19 pandemic in Italy. *Heliyon*, 6(6), e04315. <https://doi.org/10.1016/j.heliyon.2020.e04315>

19. Tiwari, S. C., & Pandey, N. M. (2012). Status and requirements of geriatric mental health services in India: an evidence-based commentary. *Indian journal of psychiatry*, 54(1), 8–14. <https://doi.org/10.4103/0019-5545.94639>
20. World Health Organization, T. (2010). Global recommendations on physical activity for health. World Health Organization.
21. Li, W., Procter-Gray, E., Churchill, L., Crouter, S. E., Kane, K., Tian, J., Franklin, P. D., Ockene, J. K., & Gurwitz, J. (2017). Gender and Age Differences in Levels, Types and Locations of Physical Activity among Older Adults Living in Car-Dependent Neighborhoods. *The Journal of frailty & aging*, 6(3), 129–135. <https://doi.org/10.14283/jfa.2017.15>
22. Pettee, K. K., Brach, J. S., Kriska, A. M., Boudreau, R., Richardson, C. R., Colbert, L. H., ... & Newman, A. B. (2006). Influence of marital status on physical activity levels among older adults. *Medicine and science in sports and exercise*, 38(3), 541–546.
23. van Minnen, A., Hendriks, L., & Olff, M. (2010). When do trauma experts choose exposure therapy for PTSD patients? A controlled study of therapist and patient factors. *Behaviour research and therapy*, 48(4), 312–320. <https://doi.org/10.1016/j.brat.2009.12.003>
24. Milanović, Z., Pantelić, S., Trajković, N., Sporiš, G., Kostić, R., & James, N. (2013). Age-related decrease in physical activity and functional fitness among elderly men and women. *Clinical interventions in aging*, 8, 549–556. <https://doi.org/10.2147/CIA.S44112>
25. Crews, D. J., & Landers, D. M. (1987). A meta-analytic review of aerobic fitness and reactivity to psychosocial stressors. *Medicine and science in sports and exercise*, 19(5 Suppl), S114–S120.
26. Bodnar, R. J., & Klein, G. E. (2005). Endogenous opiates and behavior: 2004. *Peptides*, 26(12), 2629–2711. <https://doi.org/10.1016/j.peptides.2005.06.010>
27. Rimmele, U., Zellweger, B. C., Marti, B., Seiler, R., Mohiyeddini, C., Ehlert, U., & Heinrichs, M. (2007). Trained men show lower cortisol, heart rate and psychological responses to psychosocial stress compared with untrained men. *Psych neuroendocrinology*, 32(6), 627–635. <https://doi.org/10.1016/j.psyneuen.2007.04.005>
28. Phillips C. (2017). Brain-Derived Neurotrophic Factor, Depression, and Physical Activity: Making the Neuroplastic Connection. *Neural plasticity*, 2017, 7260130. <https://doi.org/10.1155/2017/7260130>
29. Grazia Maugeri, Paola Castro Giovanni, Giuseppe Battaglia, Roberto Pippi, Velia D'Agata, Antonio Palma, Michelino Di Rosa, Giuseppe Musumeci, The impact of physical activity on psychological health during Covid-19 pandemic in Italy , *Heliyon* , Volume 6, Issue 6, 2020, e04315, ISSN 2405-8440. <https://doi.org/10.1016/j.heliyon.2020.e04315>.
30. Pedišić, Ž., Greblo, Z., Phongsavan, P., Milton, K., & Bauman, A. E. (2015). Are total, intensity-and domain-specific physical activity levels associated with life satisfaction among university students? *PloS one*, 10(2), e0118137.
31. Busing, K., & West, C. (2016). Determining the relationship between physical fitness, gender, and life satisfaction. *SAGE Open*, 6(4), 2158244016669974.

32. Grant, N., Wardle, J., & Steptoe, A. (2009). The relationship between life satisfaction and health behavior: a cross-cultural analysis of young adults. *International journal of behavioral medicine*, 16(3), 259-268.
33. Lesser, I. A., & Nienhuis, C. P. (2020). The impact of COVID-19 on physical activity behavior and well-being of Canadians. *International journal of environmental research and public health*, 17(11), 3899.
34. Balaji, B. L., & Pyari, D. (2023). Reforming Early Childhood Education Programs in Rural Areas of India: Equity in Preschool Education. *International Society for Technology, Education, and Science*.
35. Vandana, D. P., & Kumar, R. (2023). The relationship between physical health and psychological impact of happiness in teachers. *Journal for ReAttach Therapy and Developmental Diversities*, 6(5s), 431-440.
36. Dayal, P. (2022, November). Psycho-socio and biographical variables: Scientific aptitude and secondary school students. In *AIP Conference Proceedings* (Vol. 2481, No. 1). AIP Publishing.
37. Chahar, D. A Study Of Teachers Collective efficacy In Relation To Certain Psychosocial Attributes And Demographic Variables Of Teachers In Secondary Schools.
38. Pyari, D. (2011). Theory and distance education: At a glance. In *2011 5th International Conference on Distance Learning and Education IPCSIT* (Vol. 12, pp. 94-99).
39. Muddgal, A., & Pyari, D. (2016). A Comparative Study of Anxiety, Depression and Stress among medical and engineering students. *International journal of scientific research*, 5(3), 41-44.
40. Pyari, D. (2011). Environmental stewardship and religion. *International Journal of Educational Research and Technology*, 2(1), 26-35.
41. Pyari, D., & Muddgal, A. (2017). Effect of Emotional Intelligence: Academic Achievement and Higher Secondary Students. *Asian Journal of Research in Social Sciences and Humanities*, 7(10), 127-141.
42. Balaji, B. L., & Pyari, D. (2023). Reforming Early Childhood Education Programs in Rural Areas of India: Equity in Preschool Education. *International Society for Technology, Education, and Science*.
43. Joshi, K. A., Pyari, D., & Shukla, N. K. (2022). Incorporating Idealistic Approach Of Curriculum Transaction In Schools With Technology To Inculcate Ethics Among Students To Reduce Future Misconducts. *Journal of Pharmaceutical Negative Results*, 3824-3828.