

The Impact of Metabolic Equivalents (METs) on Physical Activity and Occupational Mental Health among IT Professionals Using mHealth

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Abstract Physical inactivity and excessive workload are detrimental to mental health. IT Professionals experience mental health issues particularly after the COVID-19 pandemic like depression and anxiety. The concept of work from home post pandemic has brought immense stress among the working professionals. The American College of Sports Medicine recommends at least 10 minutes of moderate MET level activity towards their recommended daily amounts of exercise. This study assessed the importance of using the concept of metabolic equivalents (METs) during physical activity. 140 participants, aged 25 to 35 using fitness trackers during their physical activity sessions were chosen. Anthropometric measurements, (CESD-R) depression scale, (GAD-7) anxiety scale, METs was used. Data interpreted using mhealth. In our study, Participants in low intensity METs had a significantly increased risk of clinical depression CES-D scale, GAD-7 anxiety scale and lower physical activity energy expenditure compared to participants exercising in Moderate to High Intensity METs with a P-Value of 0.001. Participants engaged in regular physical activity with moderate to vigorous METs had lower levels of depression and anxiety compared to participants who engage in low METs. Occupational mental health is important to the professionals, improving METs and increasing physical activity intensity levels will significantly improve mental health and quality of life. This study will assist health educators in developing exercise or sport participation programmes that focus on mental health for a specific population of interest. METs-based intensity of physical activity will assist them in implementing the various and wider option of physical activity based on intensity to gain the most benefit, particularly mental health.

Keywords: mental health, physical activity, metabolic equivalents, wearable device, mhealth

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1. Introduction

Regular physical activity facilitates to stay healthy and enhance overall health, and it is vital for growth and development across the lifespan of an individual. There is overwhelming evidence that engaging in physical activity enhances health, particularly in the areas of mental health. Physical inactivity and its consequences have a negative impact on mental health. Working professionals, particularly software and IT professionals, are at greater risk of major depressive disorder (MDD) and generalized anxiety disorder (GAD). At a global level, over 300 million people are estimated to suffer from major depressive disorders, equivalent to 4.4% of the world's population [1]. Software professionals often suffer from mental issues such as anxiety and depression as a consequence of excessive workload and physical inactivity, particularly following the COVID-19 pandemic.

WHO estimates that COVID-19 has directly or indirectly contributed to an additional 53.2 million cases of depression and 76.2 million cases of anxiety, an increase of 28% and 26% in prevalence, respectively, since the start of the pandemic [2]. Software professionals constitute as one of a global economic backbone. However, mental health is a significant barrier for these professionals. Recent studies have found that individuals who have experienced COVID-induced economic shocks, such as reduced workload and income loss, were more likely to have worse mental health conditions [3]. In order to overcome barriers in mental health conditions, particularly among working professionals, engaging in regular physical activity will eventually assist them in overcoming mental illness. There is an increasing amount of evidence documenting the beneficial impacts of physical activity on mental health, with studies examining the effects of both brief bouts of exercise and more extended periods of activity [4]. Compelling evidence has demonstrated that physical activity and exercise can also

prevent common mental disorders, such as depression and anxiety disorders, and have multiple beneficial effects on the physical and mental health of people with a wide range of mental disorders [5]. Through various awareness activities, significant organizations around the world focus on mental health in the workplace. Work-related stress can damage a person's physical and mental health and ultimately have a negative effect on job productivity by increasing stress levels [6]. Professionals participate in some kind of leisure time physical activity to counteract stress and pressure in the workplace. Additionally, physical activity can promote healthy cognitive and psychosocial function [7]. Physical activity in both occupational and leisure time is a fundamental means of health promotion [8]. Studies have shown that overweight and physical inactivity are causes of chronic diseases and risk factors for psychological health among workers [9]. In our study, we recruited software professionals who engage in leisure time physical activity. Leisure activities are frequently defined as voluntary non-work activities that are engaged in for enjoyment [10].

Leisure Sports are freeform, voluntary and non-competitive activities, which aim to regulate the mental state of people [11]. Participants who engage in Leisure time physical activity were found to exhibit a significant use of health-promoting actions throughout pandemic situation. This is consistent with research showing that leisure activities involving physical activity positively affect quality of life and satisfaction [12]. Even though professionals engage in some form of physical activity, they are unable to benefit from it. There could be a variety of reasons for not benefited from physical activity, including frequency of exercise in terms of consistency, insufficient intensity, duration of exercise, and type of exercise. Metabolic equivalents (METs) can be used to rate the intensity of physical activities. One metabolic equivalent (MET) is defined as the amount of oxygen consumed while sitting at rest and is equal to 3.5 ml O₂ per kg body weight x min [13]. The Metabolic Equivalent may additionally indicate the number of calories we burn while doing physical activity. In accordance with the state of the physical activity, one can choose from an array of exercises to meet their fitness goals. This knowledge provides more simpler way to modify the daily routines to be physically active enough to benefit overall health. Health benefits of physical activity are not limited only to improved cardiorespiratory and muscular fitness, bone and cardiometabolic health, and positive effects on weight status, but it also boosts mental health and social health [14]. The positive effects are not only related to the total energy expenditure, but also attributed to the intensities in which physical activity might be performed [15]. Guidelines have recommended using metabolic equivalent of task (METs) as reference thresholds of absolute intensities (light, <3.0 METs; moderate, 3.0–5.9 METs; vigorous ≥6.0 METs) [15]. The American college of sports medicine guidelines recommends that the moderate aerobic physical activity should be at least 150–300 minutes [16]. The majority of the population does not engage in physical activity of sufficient intensity and volume [17]. Increased exercise intensity burns more calories. When individuals exercise at moderate to vigorous Metabolic equivalents (METs) burn more

calories during their workout routine compared to individuals with low intensity physical activity. Adults reporting engaging in only vigorous-intensity Leisure Time Physical Activity were found to be 37% to 56% less likely to have metabolic syndrome [18]. A pooled prospective analysis including more than 660 000 participants estimated that achieving the recommended range of physical activity levels (7.5-15 metabolic equivalent of task [MET] hours per week) was associated with a 31% lower mortality risk in comparison with participants who did not achieve these activity levels [19]. Individuals' intensity and frequency of physical exercise positively affected their entrepreneurial choice, and exercise frequency had a greater effect on entrepreneurial behavior [20]. People monitor and record their physical activity using a wearable fitness tracker with access to workout summaries in mobile applications. Recent advances in handheld device production, together with the rise of wearable technology incorporated into everyday life of individuals, have given rise to the concept of mobile healthcare (mHealth) monitoring. mHealth has been defined as "mobile computing, medical sensor, and communication technologies for healthcare [21]. mHealth, in the most general way, encompasses the use of wearables, mobile devices and smartphone apps for acquiring information about one's health. Wearable fitness trackers have made it possible for consumers all over the world to monitor their physical activity levels in an array of methods. In addition, when combined with the use of smartphone and computer apps, they may assist users through a range of motivational and tracking tools to better manage their personal health [22]. These devices include GPS and pedometers, allowing users to track their step count and physical activity minutes. Wearable devices include programming that provides feedback to the wearer on calories consumed, intensity level, and distance covered, among other things, allowing them to increase their physical activity levels.

Self-monitoring of one's physical well-being is currently feasible with mobile apps, wearables, and external sensor technology. Individuals are prone to overestimate the duration and intensity of exercise in self-reports; therefore, wearable technology can be used to guarantee accurate assessment of these parameters [23]. Tools for objective assessment of the frequency, intensity, and duration of physical activity in adults and children have largely been developed for short-term use within research or public health surveillance environments [24]. In laboratory-based settings, Fitbit, Apple Watch, and Samsung appeared to measure steps accurately [25]. Recently, there has been exponential growth in the availability of commercial physical activity apps (e.g., Fitbit, Strava, and Garmin). Professionals who use Fitbit, apple watch, and Garmin were chosen for this study, while professionals who use mobile applications such as Strava, apple health, and Garmin connect were chosen. Low-cost measures which are tailored to the demands imposed by contemporary ways of life must be implemented to address physical inactivity in clinical and non-clinical communities.

These strategies are frequently implemented in developing countries where the health sector confronts greater challenges. This type of emerging technology may

provide an alternative means of providing ongoing support and motivation to individuals both looking to increase their activity levels or to maintain activity levels following a structured lifestyle intervention [26]. Chronic diseases are frequently linked to an individual's specific principles and way of life. The active management of a person's chronic disease varies and differs in most aspects. Research shows that improving the chronic disease prevention literacy of the population is an effective measure to improve the efficiency of individual self-management behavior [27]. People with chronic medical conditions such as cancer, diabetes, arthritis, obesity are most prone for depression and anxiety. Chronic disease prevention literacy is one of the main contents in health literacy evaluation system. It refers to people's basic knowledge, health behaviours and lifestyles, and chronic disease self-management abilities related to the prevention and treatment of common chronic noncommunicable diseases, which should be possessed by healthy individuals in order to maintain and promote health [28].

Physical inactivity contributes to many metabolic and chronic diseases in life. It also resulted in mental health problems. Research shows that unhealthy behaviours and lifestyles in daily life have adverse effects on health [29]. In our research, The importance of metabolic equivalents (METs) has been emphasized. Because physical activity is an important part of preventing chronic disease throughout one's life. Increasing the intensity of physical activity by selecting appropriate METs will help an individual increase the intensity of physical activity, increase energy expenditure, improve mental health, and get the most out of the exercise performed. And our research focuses primarily on chronic disease prevention and the importance of mental health throughout one's life.

2. Methods

Study Design

The study design involves measuring the intensity of physical activity, energy expenditure, and mental health among software professionals while participating in leisure time physical activity. The study design involves both objective and subjective measures to quantify the intensity of the physical activity. Since, the intensity of the physical activity involves low, moderate, and vigorous intensity, both objective and subjective measures were utilized in this study. The objective measures involve movement monitors such as accelerometers and pedometers via wearable fitness trackers. The subjective measures involve activity questionnaires which included the type of physical activity, frequency, duration, and the intensity of the physical activity done within the time frame of last three months. The study design also involves scales like CESD-R depression scale and GAD-7 anxiety scale for assessing the mental health among the software professionals.

Participants & Recruitment The study characteristics involves the sample size of 140 software professionals working in IT industry. The study was carried out in Chennai, The capital of State of Tamil Nadu, India. In a developing nation such as India, the province of Chennai has been a major hub for the IT industry. Through phone

interviews, IT professionals were selected from leading software companies in the Chennai geographical region. The population characteristics included professionals age between 25 to 35 of both male and female were included in the study.

Inclusion criteria of this study were (i) Young adults aged between 25 to 35 years of both male and female gender were chosen. Since, the targeted population are most prone for occupational mental health issues. (ii) Professionals who used wearable fitness trackers during their leisure time physical activity were chosen. The fitness tracker utilised here are three of the most widely used brands such as Apple watch, Garmin, and Fitbit. (iii) Participants who had engaged in the same type of physical activity during their leisure time with a frequency of 5 days per week for the prior 3 months were chosen for the study. (iv) Participants who engaged in physical activity for minimum of 30 minutes per day for 5 days in a week were alone chosen (v) Professionals who had proper data base summary of their physical activity over the course of three months were alone chosen which included physical activity parameters such as type of activity, workout minutes, Distance walked, Average step count and calories burned. The summary of physical activity was stored in mobile applications like Strava, Apple health, Garmin connect.

The intensity of the physical activity was assessed based on the type of physical activity during leisure time. The intensity of physical activity was light activities (<3 METs), moderate activities (3-6 METs) and Vigorous activities (>6 METs).

The leisure time physical activity involves following activities: - Light activities (<3 METs): - Slow walking 2 to 3 mph, Stretching exercise. Moderate activities (3-6 METs): - Cycling 10 mph, walking 15min/mile, Badminton doubles, Swimming slow pace, Tennis doubles. Vigorous activities (>6 METs): - Running 6 to 10 mph, cycling 12 to 20 mph, Tennis singles, Jogging 12 min/mile, Badminton singles.

Exclusion criteria of the study were (i) Professionals who changed their type of physical activity over the course of 3 months were excluded from the study. (ii) Professionals who did not have a proper data base summary of their physical activity in their respective mobile applications on a daily, weekly, or monthly basis were excluded from the study. (iii) Participants with comorbid conditions like Diabetes mellitus, Hypertension and neurological disorders are excluded from the study. (iv) Participants with any injury of musculoskeletal injury were excluded.

Data collection procedure

Data was collected from 140 software professionals using mobile applications such as Strava, Apple Health, and Garmin Connect, as well as wearable fitness trackers such as Apple Watch, Garmin, and Fitbit that were completely accessed and enabled with Bluetooth connectivity throughout their physical activity during leisure time. Data was reviewed and evaluated for consistency in workout summary of daily, weekly, and monthly data for the prior three months, with data including type of activity, average workout minutes, average distance walked, average step count, and average calories burned. The Metabolic equivalents (METs) was calculated based on the physical activity performed. A

semi-structured questionnaire was used. The depression scores from the CESD-R depression scale and the anxiety scores from the GAD-7 anxiety scale were recorded and all the respective collected data entered into a Google form.

Software professionals who used fitness trackers for leisure time physical activity were first screened for eligibility. Through online WhatsApp groups, professionals who used fitness trackers during their physical activity sessions have been identified and found eligible for the study. Totally (n=553) Software Professionals were initially recruited for the study.

Structured telephoned interviews were conducted among those professionals to gather data such as: -

- Overall summary of the physical activity on a daily, weekly, and monthly basis stored in their respective mobile applications.
- The physical activity summary included the type of activity, workout minutes, distance walked, average step count, and calories burned.
- Participants consistently engaged in leisure-time physical activity at least five days per week.
- Totally (n=413) Professionals were excluded from the study who does not meet the above inclusion criteria.

Totally 140 software professionals were included in this study who met all aspects of inclusion criteria in this study

3. Results

Statistical analysis

Data was collected using semi-structured questionnaire from the study participants using google form. It was exported to Microsoft excel and analysed using JASP version 0.8.4 software. Mean $\pm$ SD for continuous variables, Median (IQR) for discrete variables and frequency, percentage for categorical variables was calculated. Chi-square test was applied to find the association between METS and two scales (CESD-R and anxiety scale) proportions and one-way ANOVA test was applied to find the mean difference between various variables such as average step count, distance walked and calories with risk score. And Correlation graph was plotted to find the relation between METS and scales. A p value of <0.05 was considered as statistically significant.

After analysing the data from the study participants, it was determined that those who worked out in low intensity METS had a higher risk of CES-D depression scale than those who worked out in moderate to higher intensity METS during their participation in leisure time physical activity with a (P Value 0.001) was seen (Table 1) and (Figure 3).

Among the study participants, it was determined that those who worked out in moderate to high intensity METS during their leisure time physical activity had only minimal or mild level of GAD-7 anxiety scale. Participants who worked out in low intensity METS had moderate to severe level of GAD-7 anxiety scale during their participation in leisure time physical activity with a (P Value 0.001) was seen (Table 2) and (Figure 4).

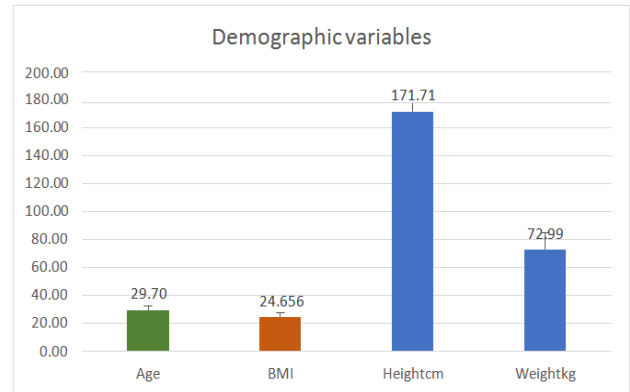


Figure 1. Demographic variables of the study population

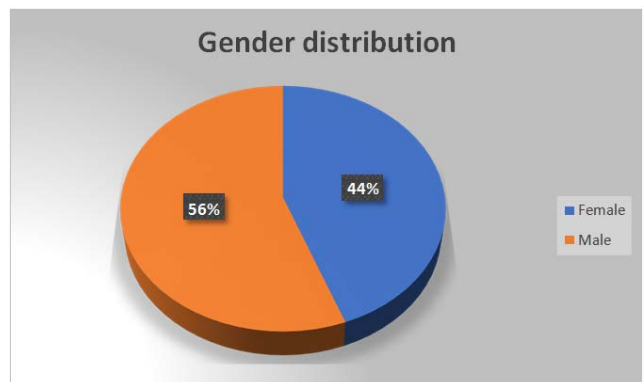


Figure 2. Gender distribution

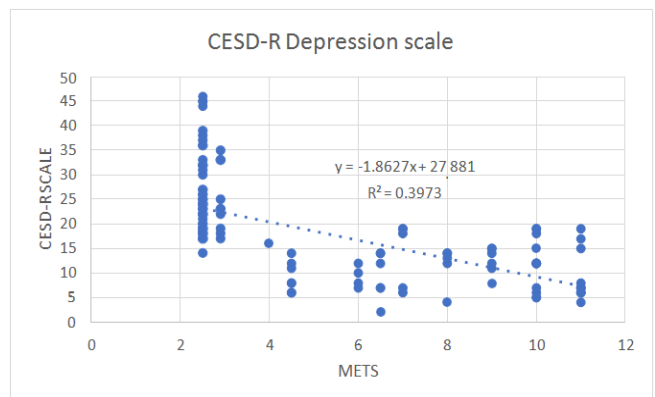


Figure 3. CES-D Depression scale in relation to METS

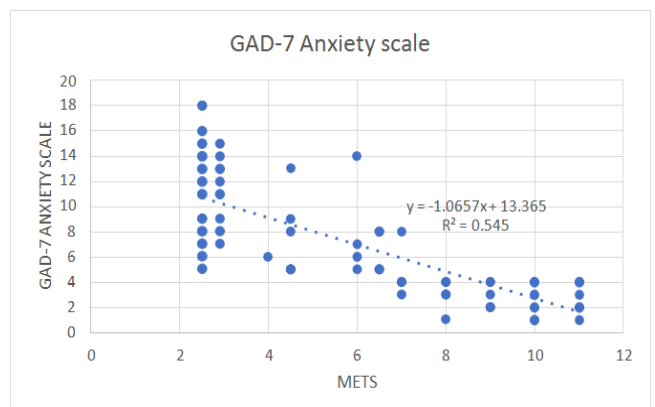


Figure 4. GAD-7 Anxiety scale in relation to METS

Table 1. CES-D Depression scale in relation to METS

CES-D DEPRESSION SCALE	METS		P VALUE (Chi-squaretest)
	Low intensity N (%)	Mod-High intensityN (%)	
Low risk	1 (1.2)	48 (85.7)	0.001
Mild-Moderate risk	34 (40.5)	8 (14.3)	
Major risk	49 (58.3)	0 (0)	
Total	84 (100)	56 (100)	

Table 2. GAD-7 Anxiety scale in relation to METS

GAD-7 Anxiety scale	METS		p value (Chi-squaretest)
	Low intensity N (%)	Mod-High intensityN(%)	
Minimal	0 (0)	38 (67.9)	0.001
Mild	36 (42.9)	16 (28.6)	
Moderate	37 (44)	2 (3.6)	
Severe	11 (13.1)	0 (0)	
Total	84 (100)	56 (100)	

Table 3. Average Calories burned, Average step count, Average distance walked(km) in relation toRisk for Depression

Variables	Low risk	Mild-moderaterisk	Major risk	p value
Average step count/day	9690.94±1842.88	6220.52±3081.33	3951.27±1161.06	0.001
Average distancewalked(km)/day	8.79±1.99	5.41±2.77	3.45±0.95	0.001
Physical activity (mins)/day	54.96±10.73	42.26±10.66	33.35±10.33	0.001
Average calories burned/hr	516.41±158.13	217.86±181.14	112.16±39.97	0.001

Table 4. Average Calories burned, Average step count, Average distance walked(km) in relation toRisk for Anxiety

Variables	Minimal risk	Mild risk	Moderaterisk	Severe risk	p value
Average step count/day	9141.34±2619.84	7137.37±3192.87	4189.23±1619	4348.73±1365.6	0.001
Average distancewalked(km)/day	8.21±2.59	6.39±3.01	3.5±1.37	4.23±1.01	0.001
Physical activity(mins)/day	50±8.82	48.29±14.48	33.62±10.87	34.55±11.42	0.001
Average caloriesburned/hr	576.18±127.61	231.67±165.41	124.1±64.99	106.18±30.87	0.001

Among the study participants, the individuals who burned more calories during their participation in leisure time physical activity had low risk for depression with a (P value 0.001) than those with the participants who burned lesser calories had moderate to greater risk for depression was seen (Table 3). In relation to average calories burned, the participants who had more average step count and average distance walked during their daily routine had a lower risk for depression with a (P value 0.001).

Among the study participants, the individuals who burned more calories during their participation in leisure time physical activity had minimal to mild risk for anxiety with a (P value 0.001) than those with the participants who burned lesser calories had moderate to severe risk for anxiety was seen (Table 4). In relation to average calories burned, the participants who had more average step count and average distance walked during their daily routine had a lower risk for anxiety with a (P value 0.001).

4. Discussion

In our study all the subjects were software professionals involved in leisure time physical activity.

This was supported by Ryan M. Hulteen et al., In their study revealed Global participation rates reflected a consistent pattern of participation in lifelong physical

activities (e.g., swimming, running, walking) and soccer among adults [30]. Walking has been a major leisure activity by the subjects and this was corroborated by a study conducted by Sandra A Ham et al., In their study affirmed that

Promoting walking has been identified as a viable public health strategy due to its popularity [31]. In this Study data collection of subjects was done using mhealth technology. This was evidenced by Milena Soriano Marcolino et al., In their study on mhealth revealed that mHealth PA research has demonstrated some efficacy for measuring PA and for influencing PA behavior and sedentary behavior change [32]. Mobile journals and questionnaires were found to be effective for PA measurement compared to validated PA measurement tools [33].

The purpose of this study is to determine the influence of METS during physical activity energy expenditure and mental health. The MET system is an easy approach applied by medical professionals to establish and recommend physical activity levels as well as to determine the energy cost of these activities. The metabolic equivalent of task (METs) of absolute intensities are (light, <3.0 METs; moderate, 3.0–5.9 METs; vigorous ≥6.0 METs) respectively. The influence of Metabolic equivalents (METS) on energy expenditure while on physical activity and mental health during participation in leisure time physical activity was determined in our study.

The present study evaluated validity parameters of thresholds based on absolute physical activity intensities (expressed in METs) according to the current guidelines [34]. In our study, The leisure time physical activity involve following activities: - Light activities (<3 METS): - Slow walking 2 to 3 mph, Stretching exercise. Moderate activities (3-6 METS): - Cycling 10 mph, walking 15min/mile, Badminton doubles, Swimming slow pace, Tennis doubles. Vigorous activities (>6 METS): - Running 6 to 10 mph, cycling 12 to 20 mph, Tennis singles, Jogging 12 min/mile, Badminton singles. The Metabolic equivalents (METs) used in this study was corroborated by Marcio de Almeida Mendes et al., In their study affirmed that slow walking 3mph with mean METS of 3 and for brisk walking of 6 mph with a mean METS of 5.4 and with running 8mph with a mean METS of 8.2. All estimates for moderate intensity were higher than 3.0 METs and The higher threshold identified for vigorous physical activity was among participants with high physical fitness (8.2 METs) [35].

In this study, CES-D depression scale was used to identify professionals with a cut off score for low risk <16 and mild to moderate risk from 16 to 23 and major risk of > 23 respectively. Arguably, the Center for Epidemiologic Studies Depression Scale (CES-D) [36] is one of the most widespread brief scales for assessing depression. The accuracy and validity of the CESD-R was supported by Nicholas T. Van Dam et al., in their study affirmed that the exploratory and confirmatory factor analyses, assessment of internal consistency, and exploration of convergent and divergent validity all suggest the CESD-R has strong psychometric properties, making it a useful tool for assessing depression in the general population [37]. The Reliability and Validity for (CES-D) was further supported by Lijun Jiang et al., in their study, The results indicate that the CES-D is a reliable and valid instrument for assessing subthreshold depression in Chinese university students [38]. In this study, Participants with low intensity METS had moderate to severe risk for Depression compared to participants with moderate to high intensity METS who had mild risk for depression. This was supported by Ben sigh et al., in their study they affirmed that our findings showed that moderate-intensity and high-intensity PA modes were more effective than lower intensities [39]. PA improves depression though various neuromolecular mechanisms including increased expression of neurotrophic factors, increased availability of serotonin and norepinephrine, regulation of hypothalamic–pituitary– adrenal axis activity and reduced systemic inflammation [40]. Therefore, low-intensity PA may be insufficient for stimulating the neurological and hormonal changes that are associated with larger improvements in depression and anxiety [41].

In this study, GAD-7 Anxiety scale was used to identify participants with a cuff off Score 0-4: Minimal Anxiety. Score 5-9: Mild Anxiety. Score 10-14: Moderate Anxiety. Score greater than 15: Severe Anxiety respectively. The Validity and reliability of the (GAD-7) was supported by Tahia Anan Dhira et al., in their study provided support for modified unidimensional structure for GAD-7 and showed high internal consistency along with good convergent validity [42]. This was further supported by Ip Hang et al.,

were all psychometric findings presented in their study support the use of the GAD-7 as a legitimate measure of anxiety severity [43]. The GAD-7 Scale has been validated within a large sample of patients in a primary care setting in multiple studies and across numerous nations [44]. In this study, participants with low intensity METS had mild to moderate and severe anxiety levels compared to participants with moderate to high intensity METS had minimal to mild anxiety levels. This was supported by Felipe B. Schuch et al., in their study assessing PA according to the different intensities or METS found that higher intensity or energetic expenditure during PA were significantly associated with reduced incident anxiety [45]. Given the potential for PA to improve physical as well as mental health, PA-based interventions may be an important trans-diagnostic tool with an array of broader benefits to people with anxiety disorders [46].

In our study, participants with a low risk of depression burned more calories during physical activity than participants with a moderate to severe risk of depression, who burned fewer calories. This was corroborated by Jan Wielopolskiwe et al., in their study indicated that the reduced physical activity of depressed patients is better reflected by significantly lower active energy expenditure and metabolic equivalent [47]. In this study participants with minimal to mild risk of anxiety burned more calories during physical activity than participants with moderate to severe risk of anxiety. This was supported by Cornelia Herbert et al., in their study showed that only moderate-to high-intensity aerobic exercise had significantly changed self-reported anxiety symptom [48]. The high-intensity aerobic exercise reduced negative moods such as anxiety [49].

The mental health of working professionals is an important aspect of their daily lives. Regular moderate to vigorous METS intensity physical activity improves mental health and increases physical activity energy expenditure. Professionals who exercise at a low METS intensity can increase their METS and change their physical activity to get the maximum benefit from the exercise. The use of fitness trackers for data collection has made it easier for working professionals to collect consistent data on their physical activity on a daily basis. However, one major limitation is that the generalizability of data collection of physical activity using fitness tracker is limited to other working professionals, particularly in urban and rural working community settings, due to differences in economic status, inaccessibility, and cost effectiveness.

Following the COVID pandemic, major organisations all over the world have focused on mental health through various awareness campaigns. Many multinational corporations have pioneered the work-from-home concept in the aftermath of the pandemic. Adapting to the new normal era through the use of technology-driven approaches improves one's ability to monitor and track physical activity levels as well as improve mental health, both of which are essential. Future directions should concentrate on increasing physical activity levels at a reasonable cost by utilising technology-based approaches. This strategy can encourage diverse communities to engage in physical activity for improved mental health and quality of life.

5. Conclusion

This study focuses on the mental health of working professionals, particularly software professionals. This study emphasised the importance of intensity of physical activity through increasing Metabolic equivalents (METs) rather than just physical activity. Our method of data collection via mobile health technology using fitness trackers will assist health educators in collecting data while focusing on a specific targeted population. In our study, we observed that participants with moderate to high intensity METs had only a minimal or mild level of GAD-7 anxiety and a low level of CES-D depression. This will help health educators in focusing on the intensity of the activity rather than the physical activity alone when prescribing exercise in their respective population of interest.

This study will assist health educators in developing exercise or sport participation programmes that focus on mental health for a specific population of interest. METs-based intensity of physical activity will assist them in implementing the various and wider option of physical activity based on intensity to gain the most benefit, particularly mental health. Using a fitness tracker and mhealth approaches enable health educators to evaluate their interventions for their target populations.

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