

## INTERVENTION TO INCREASE PARTICIPATION IN PHYSICAL ACTIVITY AMONG SEDENTARY ADULTS

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### ABSTRACT

*The aim of the study was to increase the level of physical activity among sedentary and fulltime employed adults. This study using time series design with single subject with twelve weeks of intervention. Twenty-two participants completed the study that met the criteria (the inclusion criteria was sedentary i.e. did not participate in regular moderate or vigorous exercise or physical activity for 30 minutes two or more times a week for at least 6 months), inactive and fulltime employed adult. The intervention consisted personal exercise plan handbook, face to face interaction and telephone calls. Assessments occurred at four observation point over time with 12-weeks interval. Data were obtained with wearing pedometer for 7-day and a battery of psychosocial questionnaires. Data were analyzed using descriptive analysis and repeated measure ANOVA. There is significant increase in steps counts (min=8036 steps), self-efficacy and social support after receiving the intervention ( $p < 0.001$ ) when compare to baseline data. Intervention designed to increase participation in physical activity found modestly effective. Intervention emphasized tailored individual behavioral strategies. The results suggest that in future studies, learning element could be implement to all ages and population.*

**Keywords:** Sedentary, physical activity, intervention, self-learning.

### 1. INTRODUCTION

Obesity and rates of non-communicable disease linked to level of physical activity have increased dramatically over the past decades because of urbanization and modernization. Malaysia is identified as one of the less physically active countries in the world. According to the National Health and Morbidity Survey

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census data gathered in 2011, it was estimated that over 70% Malaysian adults aged 20 years and above became sedentary and inactive with advancing age (Teh, Lim, Chan, Azahadi, Hamizatul-Akmar, Ummi-Nadiah, ..... & Fadhli, 2014). Adults spends at least eight hours in workplace and sit a long time could potentially contribute to sedentary lifestyle and suffer from range of potential health risks (Bauman, Schoeppe, Lewicka, Armstrong, Candeias, & Richards). Sitting for a long time is a major cause adults become sedentary. Employed adults has been identified as a risk group because they spend half of the day in sitting position (Clemens, O'Connell, & Edwardson, 2014; Tudor-Locke, Johnson, & Katzmarzyk, 2010; Matthews, Chen, Freedson, Buchowski, Beech, Pate, & Troiano, 2008).

Sedentary lifestyle contributes the increase in non-communicable diseases that can be prevented. Sedentary behavior is one of the causes the cause of death and various risks connected with the behavior in physical activity (Samitz, Egger, & Zwahlen, 2011). Adequate physical activity is linked with important health outcomes, included reduction in cardiovascular (Amin-Shokravi, Rajabi, & Ziaee, 2011), type 2 diabetes (Knowler, Barrett-Connor, Fowler, Hamman, Lachin, Walker, & Nathan, 2002), obesity (Jakicic & Davis, 2011), osteoporosis (Nordstrom, Tervo, & Hogstrom, 2011), some risk of cancer (McTiernan, 2006) and depression (Schuch & Fleck, 2013). Despite of this, proportion of these adults do not meet the recommended levels of physical activity shown less benefit to the health as a whole.

Malaysian adults over the age of forty years began suffering from various diseases due to risk behavior of sedentary and less involvement in physical activity (Cheah, 2011). Full time employed adults have been identified adopt sedentary behavior during working hours (Pinto, Ki, & Power, 2012). Previous studies claim that sedentary lifestyle caused by socio-economic factors, psychosocial work and working a long period of time (Konevic, Martinovic, & Djonovic, 2015).

The purpose of this study was to develop a sense in the employed adults and sedentary persons of Malaysia to increase participation in physical activity. The intervention will be emphasizing on self-learning element and to engage the adults in moderate intensity physical activity, depending their current physical fitness level. Therefore, sedentary and fulltime employed adult has been identified as a critical target for the delivery of interventions designed to reduce chronic disease among adults' population. Ideally, this intervention programme must not interfere with work, take only a minimal amount of time, incur no financial costs, involve no special equipment and be effective in altering health-related fitness. In addition, this study can explain of psychosocial factors (self-efficacy and social

support) be a strong predictor for adults to build confidence to do physical activity.

## **2. METHODS AND MATERIALS**

### **2.1 Research Design**

The study applied a time series design with single subject. Changes in each participants' behavior that is placed in a situation 'control' and 'intervention' was observed (Gay, Mills, & Airasian, 2012). Several measurements were carried out to determine whether the participant behavior was stable before intervention assigned or changed at the time of measurement after the intervention (Jackson, 2006). Therefore, evaluation of changes in participant behavior can be seen very clear at every stage of observation (Gast, 2010). A replication study was based in determining the reliability of the study.

The study involved four observations in three phases, that were baseline-phase, intervention-phase and followup-phase. The duration of twelve weeks was allotted for each phase. No intervention was given to the participant at baseline and followup-phase. Outcome measures were assessed at the four point measurements.

### **2.2 Participants**

The selection of participants was based on predetermined selection criteria and willingness to participate in this study. The inclusion criteria were sedentary, inactive 20 to 60 years of age and full-time worker. The inactive person were those who did not participate in regular exercise or physical activity. The recruitment of the participants was conducted from January 2013 to February 2014. Meanwhile the exclusion criteria were the staff has been identified as having heart disease and requiring specialist treatment, diagnosed with respiratory problems including asthma which cause chronic pain to do physical activity and pregnant woman. Written informed consent was obtained from each participant.

### **2.3 Tools**

To collaborate self-report physical activity findings, participants were asked to wear pedometer for a seven-day period at four point of measurements. Participants wearing pedometer to measure steps count was measured over 7 days at baseline and again for 7 days immediately after the intervention. Participants were instructed to put on the monitor at the beginning of the day and take it off

before bedtime (excluding shower, and water activities). Participants were given verbal and pictorial description as the correct monitor placement and were called the day prior to wearing the monitor as a reminder. Participants were prompted to follow the same day sequence at all assessment time points during the study. Additionally, participants completed a log documenting the time that they wore the pedometer. The log was returned in person, along with the monitor.

The Self-Efficacy for Physical Activity Scale (SEPA) developed by Bandura (2000) was used. The scale is a ten-item scale with five-point Likert response levels assessing respondents' confidence in their ability to be physically active despite common barriers (adverse weather, lack of time, when tired, in a bad mood, or on vacation). A summary score was calculated by averaging responses to all ten items, yielding a possible range of one to five points. Higher scores reflect higher levels of self-efficacy for physical activity. The SEPA has shown strong internal consistency across multiple studies ( $r=0.76$  to  $0.85$ ) and significantly differentiates individuals in different stages of exercise behavior change. Four week test-retest reliability is  $0.89$ . Construct validity has been supported through association with numerous measures of physical activity (Bauman, 2009).

The Social Support for Exercise Survey (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) measured social influences associated with performance of physical activity. This ten-item questionnaire asks participants to rate their level of agreement using a 5-point likert scale with ten statements regarding how often their family and friends provide support for exercise. The Social Support for Exercise has demonstrated adequate test-retest reliability ( $0.79$  and  $0.77$ ) for the family and friends' scales respectively,  $p<0.00$ ) and had internal consistency estimates (Cronbach's alpha) ranging from  $0.84$  to  $0.95$  in the present study.

## 2.4 Procedure

The intervention was assessed over 12 weeks intervention period to change the behavioural impact. Therefore, data assessment had four point measurements in time series design. The primary outcome measure was pedometer steps count. Pedometer data were collected over a 7-day period. Meanwhile to measure self-efficacy and social support variable, Self-Efficacy for Exercise Regulation and Social Support for Exercise were used.

The intervention consisted personal exercise plan guideline handbook, face-to-face interaction and telephone calls. This guideline handbook guided participants to choose activities that took into account their health, preferences, and abilities. It offered information on ways for them to exercise safely, motivate

themselves, overcome barriers, and develop a balanced exercise regimen. Participants were requested to engage in moderate-intensity physical activity and increase their current physical fitness level.

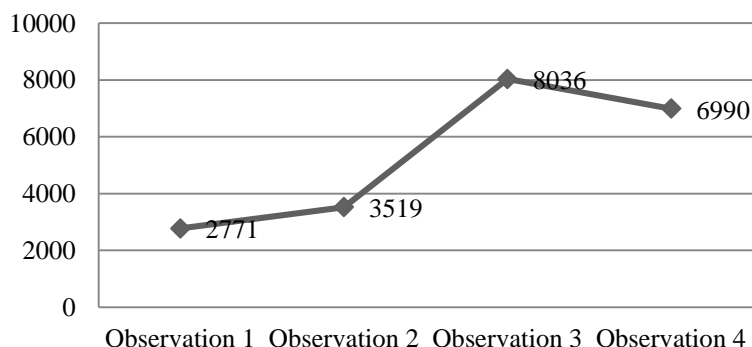
Participants received a 30 minute physical activity consultant (face-to-face interaction and counselling session) in week one from the trained member. Minimum amount of face-to-face and counselling contact was necessary for behaviour change. Moreover, the potential for greater participant adherence exists, because participants are able to engage in the intervention at their own convenience. The participants were motivated by trained member to incorporate lifestyle physical activity. Personal exercise plan handbook was adopted as a motivational and feedback tool to monitor their daily physical activity and their current fitness levels. Following the 12-week intervention program, participants were received five short telephone consultation. Participants received individual physical activity consultation focusing on relapse prevention strategies, encouragement and maintenance of activity. The main self-learning elements of the brief were goal setting and self-monitoring to increase their participating in physical activity.

## 2.5 Statistical Analysis

All analyses were reported at the level of the individual. Data analysis was performed with SPSS 20.0 for Windows (SPSS, Inc., Chicago, IL). All statistical tests were two-sided and the significance level was set at  $p < 0.05$ . Confidence intervals were estimated at the level 95% level. For these characteristics the four-point time were analyzed with descriptive statistical and repeated measures ANOVA were used to evaluate the effects on change over time.

## 3. RESULTS

**Figure 1: Steps counts**



**Table 1: Tests of within-subject contrasts of self-efficacy**

Observation Phase	<i>df</i>	<i>F</i>	<i>Sig.</i>
Observation 1 (O1) vs Observation 2 (O2)	1	3.22	0.083
Observation 2 (O2) vs Observation 3 (O3)	1	8.05	0.010
Observation 3 (O3) vs Observation 4 (O4)	1	6.57	0.018

Significant at level  $p < 0.05$

Table 1 reported significant difference self-efficacy for the pair (Observation 2 - Observation 3) after receiving the intervention [ $F(1,21)=8.05, p<0.010$ ] and also for the pair (Observation 3 - Observation 4) were reported [ $F(1,21)= 6.57, p<0.018$ ]. There was no significant difference for baseline data (Observation 1 - Observation 2) reported [ $F(1,21)= 3.32, p>0.083$ ].

These finding showed that the participants have the confident to overcome obstacles to increase participating in physical activity. Self-efficacy has been proven is an effective and convenient method to motivate participants to become active. Personal exercise plan handbook is a major contribution to give knowledge and specific skills. This suggest that that participants have the confident and ability to do physical activity with self-monitoring. Self-efficacy has a strong influence not only to make decision about changing but also commit the time and effort to force a change behavior.

**Table 2: Tests of within-subject contrasts of social support (family and friends)**

Observation phase	<i>df</i>	<i>F</i>	<i>Sig.</i>
<b>Family</b>			
Observation 1 (O1) vs Observation 2 (O2)	1	1.36	0.001
Observation 2 (O2) vs Observation 3 (O3)	1	30.86	0.257
Observation 3 (O3) vs Observation 4 (O4)	1	3.17	0.001
<b>Friends</b>			
Observation 1 (O1) vs Observation 2 (O2)	1	14.80	0.001
Observation 2 (O2) vs Observation 3 (O3)	1	3.07	0.047
Observation 3 (O3) vs Observation 4 (O4)	1	21.13	0.001

Significant at level  $p < 0.05$

Table 2 showed that there were significant differences social support (family and friend) at every point of observation ( $p < 0.001$ ). But not for the social support (family) at Observation 2 - Observation 3. The report found that there was no significant difference social support (family) after receiving the intervention ( $p < 0.257$ ).

#### 4. DISCUSSION

Twenty-two (5 men and 17 women) employee volunteer to participate in this study. They were from different educational institutions. Thirteen participants did not complete the study due to different issues such as- withdrawal, missing, pregnancy, other commitments and moving to other places. Participants were predominantly female (77.3%) and male (22.7%), with mean age of 44.73 + 8.51 years old. Most of the participants were Malays (N=21, 95.5%), married (21, 95.5%) and had studied up to a second degree (9, 40.9%). Most of the participants were administration staff (14, 63.6%).

There was a significantly increase number of steps (Observation 2 - Observation 3) after receiving the intervention (min = 8036 steps) when compared with baseline data (min = 2771 steps). However, there was a decline steps count at follow up phase (Observation 3 - Observation 4) the end of the point of time (min = 6990 steps) (Figure 1).

Findings of this study that the participants have a potential to become active in the future with effective strategies. Although the participants could not reach the goal of 10000 steps a day, but still showed a positive sign that clearly demonstrate the effectiveness of the intervention. The participants have a potential to become active in the future. However, according to the US Surgeon General (2010), the number of step counts should be realistic base on the certain groups (Tudor-Locke & Bassett, 2004).

The study suggests, social support (family) was not strong enough to play an important role to motivate participant. However, social support (friend) is a strong mediator who helped participant to increase their involvement in physical activity. Social support has proven is a powerful aspect in increase participation in physical activity among adults.

#### 5. CONCLUSIONS

This study is to increase participation in physical activity among sedentary and full time employed adults. Although an increasing number of steps is small, but still showed a positive sign. This clearly demonstrate the effectiveness intervention strategies to increase knowledge, motivation and confidence using self-learning to increase participating in physical activity. Previous study shown that increasing the number of steps for sedentary and full time employed adults by 2000 to 3000 steps are realistic than reasonable. Sedentary adults have to set a goal of 3000 steps a day for thirty minutes in their daily routine.

Intervention strategies have shown effectiveness in increase motivation and confidence in physical activity. Physical activity that are suggests are simple

and low costs for all ages, especially for adults who have constraint in times doing physical activity. Walking has proven to reduce the risk of cardiovascular disease. Results have shown that adults can increase their participation in physical activity when they receive sufficient self-efficacy and social support. Self-efficacy is a strong mediator that person's believe to achieve their goals in a particular situation. However, adults also realize that behavior change is not a quite simple and take times to change. The development of sense of self-efficacy is important for sedentary adults. Social support from family and friends who are chosen by adults must be strong enough to help adults improve their involvement in physical activity, especially in Malaysian society.

Efforts can be made by employers, schools, and the government to educate adults the benefits of physical activity even small amounts of exercise: Using the stairs instead of elevator or escalator, stretching at work, walking or other exercise during lunch breaks, even exercising in front of the TV can all be encouraged through targeted public service announcements and employer-based programs. Government and researchers should work together to design such programs as well as to quantify their results. A more effective approach should be implement to become more consistent and become one of the best practices.

Intervention needs to be done on promoting exercise and physical activity as enjoyable ways of spending one's time. Whether through encouraging adults to get out and play with their young children, or community-based recreation programs. It is important to help adults to get in the habit of enjoying themselves through benefits of physical activity.

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