

PERCEIVED PROFILE AND STAGE OF EXERCISE BEHAVIOR CHANGE OF WOLAITA SODO UNIVERSITY EMPLOYEES, ETHIOPIA

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Abstract- Because of different contributing factors such as psychosocial, economic, environmental, and personal factors human beings' physical activity level is declining in the recent years. In order to clearly understand the challenges as well as the opportunities related to exercise behavioral change it is important to study the perceived exercise benefits and barriers and stage of exercise behavior change. Therefore, the major objective of this research was to examine the perceived profile and stage of exercise behavior change of Wolaita Sodo University employees. Population based cross sectional survey study design was employed to achieve its purpose. The data were collected by using standardized exercise benefits and barriers scales (EBBS) and stage of exercise behavior change questionnaire through google form online survey platform. Data analysis was conducted by SPSS Version 25. One-way ANOVA was computed to analyze the differences among stages of exercise behavior change means and Tukey HSD post hoc multiple comparison was conducted to determine which groups mean differ from each other. The distribution of the stages of exercise behavior change is that 42(37.50%) employees reported being in pre-contemplation, 38(33.9%) in contemplation, 20(17.9%) in preparation and 12(10.7%) in action. It was found that employees perceived exercise benefits differs among the stage of exercise behavior change ($F_{3, 108} = 15.70, p < 0.001$); employees in advanced stage of change (action and preparation) has significantly higher perceived exercise benefits than employees' in the primary stages of exercise behavior change (pre-contemplation and contemplation). This study also found that employees who have reported themselves as being in pre-contemplation and contemplation has higher perceived exercise barriers than the employees in the later stages of exercise behavior change. Even though majority of the employees reported being in earlier stages their perceived exercise benefits was higher than their perceived exercise barriers ($t(111) = 8.62, p < 0.001$), and their perceived benefit/barrier ratio was 1.28. All perceived benefits sub-scales were negatively correlated with all perceived barriers subscale.

Index Terms- Employees, Perceived barriers, Perceived benefits, Stages of exercise behavior change

1. INTRODUCTION

Physical inactivity is one of the major public health problems in the 21 century [1]. Physical inactivity is responsible for more than five million deaths globally per year [2]. On the other hand, participation in regular physical activity program can have numerous benefits and well documented in the literature. Regular exercise has many health benefits; it reduces obesity, maintains healthy joints, controls pain, reduces risk of cardiovascular diseases and type 2 diabetes, lower blood cholesterol level, builds stronger bone mass, improve endurance, strength and balance [3, 14]. Phillips and Hill revealed that the likelihood of people achieving the recommended preventative health requirements is influenced by both perceived barriers and benefits of participating in physical activity [4]. According to Lovell and colleagues many individuals do not engage in sufficient physical activity due to low perceived benefits and

high perceived barriers to exercise [5]. Perceived benefits are defined as an individual's evaluation of the potential gains (eg, increased fitness) associated with engaging in a particular health behavior. Perceived barriers refer to an individual's evaluation of the potential obstacles (eg, limited time) that curtail him or her from engaging in a health behavior [6]. Physical activity behavior change and maintenance has proven complex and challenging and is influenced by numerous psychosocial, economic, environmental, and personal factors [7].

The transtheoretical model (TTM) of change in health psychology explains or predicts a person's success or failure in achieving a proposed behavior change, such as developing different habits. It attempts to answer why the change "stuck" or alternatively why the change was not made. The TTM is a theoretical model of behavioral change, and involves both processes of change and a temporal dimension where behavioral change occurs through stages.

The TTM Model stipulates six stages:

(1) Precontemplation - lack of awareness that life can be improved by a change in behavior; (2) Contemplation - recognition of the problem, initial consideration of behavior change, and information gathering about possible solutions and actions; (3) Preparation - introspection about the decision, reaffirmation of the need and desire to change behavior, and completion of final pre-action steps; (4) Action - implementation of the practices needed for successful behavior change (e.g. exercise class attendance); (5) Maintenance - consolidation of the behaviors initiated during the action stage; (6) Termination - former problem behaviors are no longer perceived as desirable (e.g. skipping a run results in frustration rather than pleasure) [8, 9].

Statement of the Problem

Participation in regular physical activity and exercise are essential for good health and wellbeing for people of all ages. In this century there has been a significant increase in sedentary lifestyles due in part to the expansion in technology, changing family responsibilities, lengthy commutes and longer work hours [10]. Even though the scientific evidence of the benefits derived from living a healthy lifestyle continues to mount each day and the data are impressive, most people still don't adhere to a healthy lifestyle. The stages of change describe the underlying processes that people go through to change most problem behaviors and adopt healthy behaviors [11]. Health belief model (HBM) and transtheoretical model (TTM) was employed to consider the sampled population perceived profile and the employees' current stages of exercise behavior change. Therefore, this research attempted to examine the perceived profile (perceived benefits and barriers) and stage of exercise behavior change of Wolaita Sodo University employees.

Objectives of the study

The major objective of this study was to examine the perceived profile and stage of exercise behavior change of Wolaita Sodo University employees.

The specific objectives were to:

- Describe the employees' levels of perceived benefits and barriers sub-scale to exercise based on stages of exercise behavior change;
- Compare the total perceived benefits and barriers of exercise difference among the stages of exercise behavior change of the employees;
- Identify what the University employees perceived to be the highest benefits and barriers of exercise;
- Evaluate whether the employees had greater total perceived benefits or barriers to exercise;
- Explore the relationship between employees' perceptions of benefits from exercise to their perceptions of barriers to exercise.

2. MATERIALS AND METHODS

Population based cross sectional survey study was conducted between September to October 2017. Data were collected through questionnaire which was sent to randomly selected employees to their email. The questionnaire was sent to the employees with clear instruction. Among 140 sampled populations 112 of them return the questionnaire which had 80% response rate.

Research Instrument and Data Collection Procedure

A three-sections questionnaire was developed for the study. Section A of the questionnaire requested demographic information of the participants such as sex, age, educational level, marital status and their preferred types of sports. Section B of the questionnaire comprised of questions related to stages of exercise behavior change. Section C of the questionnaire consisted of exercise perceived benefits and barriers scale questions.

Stages of exercise behavior change: This one-item questionnaire asks participants to choose one of five statements that best applies to their current exercise level. According to the definition provided, planned regular exercise (aerobics, bicycling, brisk walking, jogging, rowing, swimming, etc.) was performed as a way of increasing physical fitness. While this exercise should be performed for 20 to 60 minutes three (3) to five (5) times a week, it is not intended to be painful to be effective. Depending on the statement chosen, individuals are determined to be in stage one, pre-contemplation (do not intend to begin exercising in the next six months); stage two, contemplation (intend to begin exercising in the next six months); stage three, preparation (intend to begin exercising in the next 30 days); stage four, action (have been exercising for less than six months); or stage five, maintenance (have been exercising for more than six months) [10].

Exercise perceived benefits and barriers scale: The EBBS adult version was used to assess perceived benefits and barriers to exercise [12]. The scale consisted of 43 (29 benefits and 14 barriers of exercise) that uses a 4-point forced Likert scale ranging from 1 “strongly disagree” to 4 “Strongly agree”. Total scores ranged from 43 to 172 and the benefits (range 29 - 116), with higher scores reflecting more perceived benefits from exercise. Barriers scores ranged from 14 to 56 with a higher score indicating greater perceived barriers to exercise. Test-retest reliability was established with a 0.89 on the total instrument, 0.89 on the benefits Scale and 0.77 on the barriers Scale [12]. For the present study, Cronbach’s alpha value of 0.88 and 0.86 for the barriers and benefits subscales were found respectively. Sub scale mean scores were also calculated (Perceived benefits: life enhancement, physical performance, psychological outlook, social interaction and preventative health; Perceived barriers: exercise milieu, time expenditure, physical exertion and family discouragement).

Data Analysis

Mean, standard deviation, skewness and kurtosis of variables were calculated prior to proceeding with further statistical analysis. SPSS V-25 was employed for the analysis. Frequencies were used as descriptors of the employee population. For each participant, standardized scores were computed for both the total benefits and total barriers scales, as well as for each sub-scale (total score for scale or sub-scale divided by number of items included in that scale or sub-scale). The purpose of this adjustment to the same 1 to 4 Likert scale was to allow direct comparisons between scales and sub scale. The independent variable in the study was the stage of exercise behavior change. One-way analysis of variance was used to compare the mean score of perceived profile across stages of exercise behavior changes. Post hoc comparisons were performed using the Tukey test to find out the mean differences. Paired sample T-test was employed to compare employees perceived benefits with perceived barriers. Correlation analysis using Pearson’s correlation coefficient was used to determine associations between variables. Values are reported as mean (standard deviation, SD). An α -level of significance was set at $P < 0.05$ for all analyses.

3. RESULTS & DISCUSSION

Table 1: Frequency, percentage and mean (\pm SD) EBBS scores by sex, age groups, educational level, marital status, favorite sports and stages of exercise behavior change

Demographic Group	No (%)	Perceived Benefits	Perceived Barriers
Sex			
Male	104 (92.9)	3.05 \pm 0.42	2.35 \pm 0.49
Female	8 (7.1)	2.93 \pm 0.55	2.70 \pm 0.69
Age (Years)			
18-24	2 (1.8)	2.95 \pm 0.22	2.36 \pm 0.33
25-30	8 (7.1)	3.09 \pm 0.49	2.32 \pm 0.51
31-36	92 (82.1)	3.05 \pm 0.45	2.36 \pm 0.53
37-42	7 (6.3)	3.00 \pm 0.34	2.64 \pm 0.47
>43	3 (2.7)	2.95 \pm 0.12	2.54 \pm 0.27
Educational Level			
Diploma	6 (5.4)	3.04 \pm 0.32	2.51 \pm 0.24
Bachelor Degree	11 (9.8)	3.20 \pm 0.36	2.25 \pm 0.46
Master Degree	88 (78.6)	3.02 \pm 0.46	2.36 \pm 0.55
PhD	7 (6.3)	3.09 \pm 0.24	2.58 \pm 0.17
Marital status			
Single, Never married	21 (18.8)	3.14 \pm 0.41	2.28 \pm 0.47
Married	90 (80.4)	3.02 \pm 0.44	2.39 \pm .53
Divorced	1 (0.9)	3.07	2.84
Favorite Sport			
Football	57 (50.9)	3.00 \pm 0.47	2.38 \pm 0.48
Volleyball	44 (39.3)	3.08 \pm 0.40	2.43 \pm 0.60
Aerobics Dance	7 (6.3)	2.96 \pm 0.37	2.21 \pm 0.35
Badminton	4 (3.6)	1.98 \pm 0.40	1.97 \pm 0.39
Stage of Change			
Precontemplation	42 (37.5)	2.85 \pm 0.38	2.65 \pm 0.61
Contemplation	38 (33.9)	2.96 \pm 0.40	2.35 \pm 0.36
Preparation	20 (17.9)	3.24 \pm 0.34	2.15 \pm 0.27
Action	12 (10.7)	3.61 \pm 0.25	1.89 \pm 0.23

Note: Higher benefits scores reflect greater perceived benefits and lower barriers scores reflects greater perceived barriers.

According to the samples, the distribution of the stages of exercise behavior change is that 42(37.50%) of the employees reported being in pre-contemplation, 38(33.9%) in contemplation, 20(17.9%) in preparation and 12(10.7%) in action. None of the participants responded either in maintenance or adoption stage.

Table 2: Perceived benefits and barriers mean distribution among stages of exercise behavior change of the sample

Benefits Sub-scales	Stages of Exercise Behavior Change				
	Pre-contemplation	Contemplation	Preparation	Action	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Physical performance	2.84 (0.46)	3.15 (0.40)	3.39 (0.36)	3.69 (0.24)	3.13 (0.49)
Preventive Health	2.94 (0.56)	3.02 (0.55)	3.38 (0.44)	3.70 (0.29)	3.12 (0.56)
Life Enhancement	2.96 (0.52)	3.00 (0.62)	3.20 (0.57)	3.53 (0.43)	3.08 (0.58)
Psychological Outlook	2.85 (0.45)	2.91 (0.48)	3.11 (0.43)	3.52 (0.42)	2.99 (0.50)
Social Interaction	2.71 (0.49)	2.72 (0.54)	3.12 (0.54)	3.61 (0.23)	2.89 (0.57)
Barriers Sub-scales					
Physical Exertion	2.78 (0.63)	2.44 (0.42)	2.33 (0.41)	1.92 (0.34)	2.49 (0.56)
Exercise Milieu	2.60 (0.65)	2.30 (0.48)	2.18 (0.32)	1.94 (0.33)	2.35 (0.56)
Time Expenditure	2.56 (0.72)	2.40 (0.48)	2.10 (0.38)	1.79 (0.27)	2.34 (0.60)
Family Discouragement	2.67 (0.82)	2.24 (0.39)	2.00 (0.47)	1.89 (0.49)	2.32 (0.67)

Note: Higher benefits scores reflect greater perceived benefits and lower barriers scores reflects greater perceived barriers.

Table 3: One-way ANOVA of total perceived exercise benefits and barriers based on stage of exercise behavior change

Perceived profiles		Sum of Squares	df	Mean Square	F	Sig.
Benefits	Between stages of change	6.32	3	2.12	15.70	.000
	Within stage of change	14.50	108	0.13		
Barriers	Between stages of change	7.20	3	2.39	11.56	.000
	Within stage of change	22.28	108	0.21		

One-way between subjects' ANOVA was conducted to compare the difference in perceived exercise benefits between the four stages of exercise behavior change. There was a significant difference between the stages of exercise behavior change ($F_{3, 108} = 15.70$, $p < 0.001$) (Table 3). Post hoc comparisons using the Tukey test were carried out and employees in action stage ($M = 3.61$, $SD = 0.25$) of exercise behavior change felt significantly higher perceived benefits than employees in preparation ($M = 3.24$, $SD = 0.34$, $p = 0.033$), contemplation ($M = 2.96$, $SD = 0.40$, $p < 0.001$) and pre-contemplation stages ($M = 2.86$, $SD = 0.38$, $p < 0.001$). There was also a significant difference between employees in preparation, contemplation and pre-contemplation stages with employees in preparation stage ($M = 3.24$, $SD = 0.34$) felt greater perceived benefits than employees in contemplation stage ($M = 2.96$, $SD = 0.40$, $p = 0.033$) and pre-contemplation stage ($M = 2.86$, $SD = 0.38$, $p = 0.001$). There was no significant difference between the employees in

contemplation and pre-contemplation stage ($p= n.s$) of exercise behavior changes. This results clearly shows that the employees perceived exercise benefits differs among the stage of exercise behavior change; employees in advanced stage of changes (action and preparation) has significantly higher perceived mean score than employees' in the primary stage of exercise behavior change (pre-contemplation and contemplation). The finding of this study is consistent with the result reported by Salehi and colleagues [13].

One-way ANOVA analysis was also conducted to compare the difference in perceived exercise barriers between the four stages of exercise behavior change. There was a significant difference between the stages of exercise behavior change ($F_{3, 108} = 11.56, p<0.001$) (Table 3). Post hoc comparisons using the Tukey test were carried out. Employees in pre-contemplation stages ($M = 2.65, SD = 0.61$) of exercise behavior change felt significantly higher perceived exercise barriers than employees in contemplation ($M = 2.34, SD = 0.36, p=0.016$), preparation ($M = 2.15, SD = 0.27, p = 0.001$) and action stage ($M = 1.89, SD = 0.23, p<0.001$). There was also a significant difference between employees in contemplation and action stages with employees in contemplation stage ($M = 2.34, SD = 0.36$) felt greater perceived exercise barriers than employees in action stage ($M = 1.89, SD = 0.23, p<0.001$). There was no significant difference between the employees in contemplation and preparation ($p= n.s$) as well as employees in preparation and action stage ($p= n.s$) of exercise behavior change regarding the employees perceived exercise barriers. This finding reveals that employees who has reported themselves as being in pre-contemplation and contemplation has higher perceived exercise barriers than the employees in the later stages of exercise behavior change.

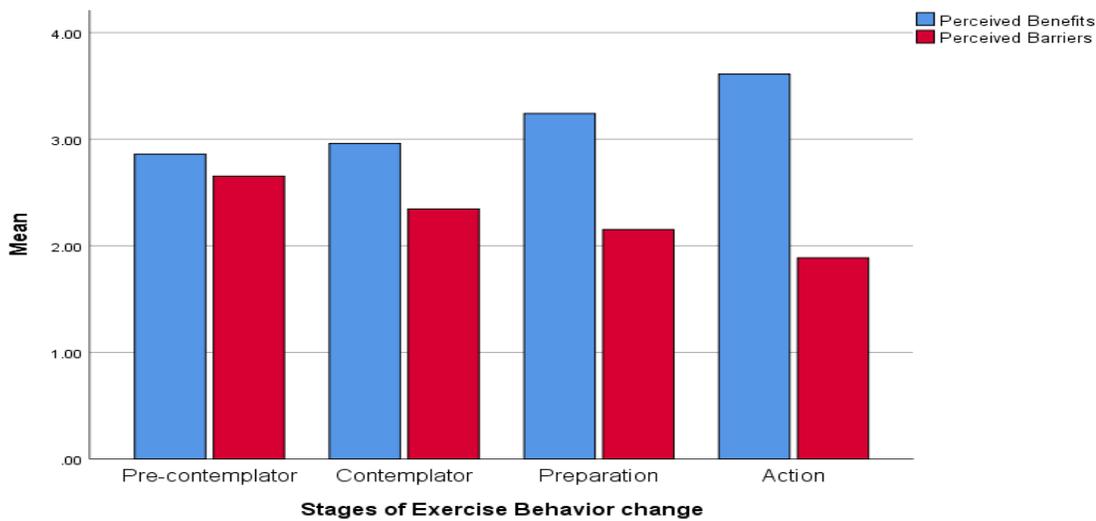


Figure 1: Perceived benefits and barriers mean score across stages of exercise behavior change

The greatest perceived benefit from exercise was physical performance ($M = 3.17, SD = 0.56$) followed by life enhancement, psychological outlook, and social interaction (Table 4). The Table shows that physical performance was rated significantly higher than the three perceived benefits sub-scales. Employees did not rate physical performance and preventive health significantly different, although both were rated significantly higher than life enhancement, psychological outlook, and social interaction. Life enhancement was also rated significantly higher than psychological outlook, and social interaction. Only physical performance, preventive health, and life enhancement demonstrated standardized means >3 which represented 'true' agreement that these statements comprised of factors that the sample viewed as benefits. Psychological outlook ($M = 2.99$) also demonstrated marginally standardized mean.

Table 4: Perceived benefit and barrier sub-scale means and standard deviations and *t*-test values for multiple comparisons.

Sub-Scales	Sub-Scales [†]					
	Mean (SD)	1	2	3	4	5
Benefits (M = 3.05, SD = 0.54)						
1. Physical performance	3.17 (0.50)	--	1.03	2.09*	4.63 *	6.05*
2. Preventive health	3.13 (0.56)		--	1.10	3.40*	4.52*
3. Life enhancement	3.08 (0.58)			--	2.30*	4.40*
4. Psychological outlook	2.99 (0.50)				--	2.43*
5. Social interaction	2.90 (0.57)					--
Barriers (M = 2.30, SD = 0.56)						
1. Physical exertion	2.41 (0.54)	--	2.08*	4.34*	4.49*	
2. Exercise milieu	2.33 (0.54)		--	2.21*	2.61*	
3. Time expenditure	2.24 (0.53)			--	0.70	
4. Family discouragement	2.20 (0.64)				--	

For all sub scales, possible scores range from 1 to 4, where 4 represents the highest perception of both benefits and barriers; [†]Values in the cells of these columns are actual *t*-test values; *Indicates that the means of the sub scales that are being compared were significantly different, at critical *p* value (*p* < 0.05) for benefits and barriers.

With reference to perceived barriers, the greatest perceived barrier to exercise was physical exertion (M = 2.41) followed by exercise milieu (M = 2.33), time expenditure (M = 2.24), and family discouragement (M = 2.20) (Table 4). Physical exertion was rated significantly higher than all other barriers. Exercise milieu was also rated as perceived barriers significantly higher than time expenditure and family discouragement. There were no significant differences between time expenditure and family discouragement sub-scales (Table 4). Mean scores for all four perceived exercise barriers were between 2 and 3 which equated to between ‘agree’ and ‘disagree’ on the EBBS scoring scale, which can be interpreted to mean neutral.

Table 5: Paired sample t-test of total perceived benefits and barriers subscales

Variables	Mean (SD)	Mean Difference	t-test	Df	Sig.
Perceived Benefits	3.04 (0.43)	0.66	8.62	111	0.000*
Perceived Barriers	2.38 (0.51)				

Paired sample t-test revealed that the perceived benefits and barriers of the sample was statistically significant different (t (111) = 8.62, *p*<0.001). The employees’ total perceived benefits (M = 3.04, SD = 0.43) was higher than the employees total perceived barriers (M = 2.38, SD = 0.51) with large mean difference of 0.66 and their perceived benefit/barrier ratio was 1.28. These results suggest that the employees perceive the benefits of regular exercise higher than the barriers to exercise. This result is also in agreement with the finding reported by Lovell and her colleagues [5].

Table 6: Pearson correlation coefficients between perceived benefits and barriers of exercise sub-scales.

Benefits Sub-scale	Barriers Sub-scale			
	Physical Exertion	Exercise Milieu	Time Expenditure	Family Discouragement
Physical performance	-.386**	-.359**	-.332**	-.334**
Preventive Health	-.480**	-.438**	-.435**	-.365**
Life Enhancement	-.251**	-.271**	-.243**	-.222*
Psychological Outlook	-.375**	-.407**	-.300**	-.293**
Social Interaction	-.248**	-.301**	-.354**	-.264**

Correlation is significant at the 0.01 level (2-tailed).**
Correlation is significant at the 0.05 level (2-tailed).*

To determine the relationship between the perceived benefits and barriers subscales Pearson product moment correlation analysis was conducted. Even if the strengthen of the relationship varies; all the five perceived benefits sub-scales were negatively correlated with all four perceived barriers subscale (table 6). Physical performance, preventive health and psychological outlook were medially, negatively related with all perceived barriers subscale ($p < 0.001$). Except the social interaction subscale relationship with time expenditure which was medially, negatively correlated; the life enhancement and social interaction subscale were also shown small negative correlation with all perceived barriers subscales.

4. CONCLUSIONS

More than 70% of the sampled population are in pre-contemplation (37.5%) and contemplation (33.9%) stage which shows that the sampled subjects are not intending to participate in regular physical activity program i.e. they are not considering or do not want to change a specific behavior and although they are not quite ready for change yet, they are weighing the pros and cons respectively [11]. The greatest perceived benefit from exercise was physical performance followed by life enhancement, psychological outlook, and social interaction. the greatest perceived barrier to exercise was physical exertion followed by exercise milieu, time expenditure, and family discouragement. This study found that in the primary stages of exercise behavior change low perceived benefits and high perceived barriers towards exercise could lead to lower levels of physical activity. On the other hand, as expected employees in the advanced stages of exercise behavior change has higher perceived benefits and lower perceived barriers. Even though majority of the employees reported being in earlier stages their perceived exercise benefits was higher than their perceived exercise barriers and their perceived benefit/barrier ratio was 1.28. This research also found that all perceived benefits subscales were negatively correlated with all perceived barriers subscales.

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