

## RESEARCH ARTICLE

# Measuring Stages of Change, Perceived Barriers and Self efficacy for Physical Activity in Saudi Arabia

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## Abstract

**Background:** The benefits of physical activity are well established and recognized to prevent adults from many chronic diseases and particularly some forms of cancers. **Objectives:** The present study was conducted to investigate the present status of physical activity among Saudi adults in Al-Ahsa, and to examine the association between the stages of change for physical activity and perceived barriers, and self efficacy. **Methods:** A cross-sectional study of 242 subjects (118 males and 124 females) attending health centers aged between 20-56 years, were personally interviewed for demographic data, anthropometric measurement, physical activity level, stages of change for physical activity, self efficacy and perceived barriers. **Results:** Forty eight percent of the females were overweight and 16.9% of the males were obese with no significant difference between the genders for BMI categories. More than half of the females were inactive and 39% of the males were physically active with a significant difference ( $P=0.007$ ). Twenty percent of the males were in maintenance stage, while similar percentage of the females were in contemplation stage. However the majority of the subjects were in pre-contemplation stage with a significant difference across the stages. Males had a higher mean score of self efficacy and less external barriers of physical activity. The major barrier among the females was lack of time ( $7.2\pm 1.4$ ) and in the males, lack of motivation ( $7.7\pm 1.4$ ). The females had less internal ( $21.2\pm 3.8$ ) barriers comparable to the males ( $23.08\pm 4.7$ ). Both genders had a significant relationship between stages of changes of physical activity and perceived barriers (internal and external), but in the females no significant difference across the stages was observed for self efficacy unlike the males who had a significant difference for self efficacy and self efficacy categories. **Conclusion:** The present study provided useful data on stages of change for physical activity and some psychosocial factors (self efficacy and perceived barriers) that can help to tailor strategies aiming at increasing physical activity level according to self efficacy and to the barriers detected, to prevent many chronic diseases including certain types of cancer in Saudi Arabia.

**Keywords:** Physical activity - stages of change - self efficacy - perceived barriers - adult Saudis

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## Introduction

Physical activity has been defined as “any bodily movement produced by skeletal muscles that require energy expenditure” (WHO, 2011). This definition encompasses any daily life activity from occupational, household, and other daily tasks to sports and exercise, but lack of physical activity is now a global health hazard and is increasing rapidly in both developed and developing countries. Physical activity important for health and well begin of people of all ages. It has been shown to reduce the morbidity and mortality from many chronic diseases as coronary heart disease, hypertension, stroke, and certain types of cancer.

Cancer is now a major cause of mortality throughout the world, an estimated 10 million new cases and over 7.6 million deaths from cancer in 2008 (WHO, 2011).

About 70% of all cancer deaths in 2008 occurred in low and middle income countries. In Saudi Arabia the total number of cancer incident cases reported to the Saudi Cancer Registry (SCR) between January 1<sup>st</sup> and December 31<sup>th</sup>, 2007 was 11,437. Overall cancer was slightly more in females (52.1%) than in males (47.9%). The common cancer for men is colorectal cancer and among females is breast cancer. The third highest incident rate for the geographic regions was in the Eastern Province 104.4 cases per 100,000 (Al-Eid et al., 2007).

A Landmark reports by the World Cancer Research Fund (1997 and 2007) concluded that cancer is largely a preventable disease if we can change our diet and lifestyle as eating more fruit, vegetable, fibers, reduce fat intake, had a normal weight and be active. Research believed that physical activity has an effect on several functions of the human body that might influence cancer risk, such as

immune, antioxidant defense, endogenous hormones and energy balance (Batty, 2000). Colorectal cancer is the most common cancer in relation to physical activity. According to Carroll (1998), physical activity may specifically influence cancer development of the colorectal through a reduction in abdominal fat mass, which is particularly metabolically active and implicated in carcinogenesis.

Physical activity also appears to lower endogenous sex hormones (estrogen, androgen) that could result in lower risk of hormone related cancers such as prostate and breast. Breast cancer is the second common studied, McTiernan et al. (2004), in Women's Health Initiative Observational Study, reported both current exercise and exercise engaged after menopause are associated with a decreased risk of breast cancer, and that the effects appear to be induced even with a relatively small amount of exercise (1.25-2.5 hours per week of brisk walking). According to the American Cancer Society (2012), engaging in at least moderate activity for 30 minutes or more on 5 or more days of the week; 45 minutes or more of moderate to vigorous activity on 5 or more days per week, may enhance the reduction of the risk of breast cancer.

Report from the Health and Development of World Health Organization (WHO, 2003) estimated that worldwide, more than 60% of adult do not engage in sufficient level of physical activity to achieve health benefits. Changes in lifestyle and socioeconomic status in Saudi Arabia had a significant effect on physical activity. With the availability of cars, the increase in electrical home appliances and more involvement in office work life have become more sedentary. Data taken from the National Epidemiological Health Survey carried out between 1995 and 2000 included 17395 Saudi males and females aged 30-70 years reported that females more inactive (98.1%) than males (93.9%) (AL Nozha et al., 2007). AL-Hazzaa (2007) described the physical activity profile of the Saudi adults living in Riyadh using the IPAQ questionnaire. He reported that 40.6% of Saudis were inactive, 34.3% were minimally active and 25.1% were physically active. Amin and colleagues (2012) conducted a cross sectional study among 2176 Saudi adults and found that only 21% of the sample were active and only 10.4% were highly active.

Several theories and models used to understand levels of physical activity among adults. The Transtheoretical model (TTM) or Stages of Change (SOC) is one of the most effective models as it was widely used in exercise program. This model suggested that change does not occur all at once, it is a lengthy process that involves progressing through several stages. There are five stages involved in TTM: Precontemplation (not exercising and not intending to begin exercising), Contemplation (not exercising but considering beginning exercise in the future), Preparation (beginning exercise on a limited or inconsistent basis), Action (exercising on a regular basis for less than six months), and Maintenance (exercising on a regular basis for more than six months) (Prochaska et al., 1992).

The TTM provides a framework for understanding physical activity level, behavior change and presents concrete strategies on how to intervene for specific individuals (Nigg et al., 2011). Also researchers have identified a number of cognitive variables that affected

the physical activity level as perceived barriers and self efficacy (Bandura, 1986; Sallis et al., 1988; Wanda, 2002; Brown, 2005; Daskapan et al., 2006). Perceived barriers refer to an individual's evaluation of the potential obstacles (lack of time or lack of energy) that curtail him or her from engaging in exercise (Wanda, 2002; Brown, 2005; Daskapan et al., 2006). Self-efficacy refer to an individual's confidence in his or her ability to sustain a target behavior in various situations (get up early even on weekends to exercise) (Bandura, 1986; Sallis et al., 1988), and has been incorporated into the TTM model for the effects of progressive movement from stage to stage of behaviors change or the temptation to continue these behavior (Leer et al., 2008).

Self efficacy has also been shown to be a predictor of physical activity in previous researches (Bozoian et al., 1994; McAuley et al., 1994). People with higher self efficacy report a more positive effect, and feel more revitalized during and after exercise. However, research indicates that self-efficacy for physical activity increases as subject's progress through the stages of change and that self efficacy scores highly correlate with stages of change (Herrick et al., 1997).

Few studies were carried out among adults in the Eastern Province of Saudi Arabia to determine the prevalence of physical activity (AL Nozha et al., 2007; Amin et al., 2012), stage of change, perceived barriers and self efficacy (Gawwad, 2008; Amin et al., 2011). Little is known about the reasons why Saudi adults living in Al-Ahsa city engage in physical activity, also about stages of change for physical activity, barriers and self efficacy to be active, though knowledge about that may help in developing effective programs to meet public health recommendations for physical activity (Rocha et al., 2011). The objectives of this study were to investigate the present status of physical activity among Saudi adults, and to examine the association between the stages of change for physical activity and perceived barriers, and self efficacy among adults in Al-Ahsa, Saudi Arabia.

## Materials and Methods

### *Setting and design*

This is an across-sectional study, conducted in Al-Ahsa which is located at The Eastern Province of Saudi Arabia. Al-Ahsa is the largest oasis in The Eastern Province and it is divided into five districts (Alhofuf, Almoubaraz, East villages, North villages and Alhejar).

### *Sample*

Convenience sample of 242 subjects (118 male's and 124 females) from eight health centers (four in Alhofuf, and four in Almoubaraz). The author explained the research purposes and procedures to the heads of the health centers from whom permissions to collect data were obtained. Data collection took place in the health centers from September 2012 to October 2012. Before data collection, the research assistants were trained on data collection policies and procedures, including screening and interviewing techniques. After reading and signing informed consent forms all eligible subjects (Saudi

nationals, age 18 years and above apparently healthy and not pregnant for females) were personally interviewed at waiting areas, and pharmacy waiting areas. Subjects were also informed that individual results would be strictly confidential and anonymous. Forty-two did not completely fill out the questionnaire or quit during the data collection and therefore they were excluded, leaving 242 subjects as the study sample. Completion of the questionnaires took 15-20 minutes

#### Instrument

**Content and face validity:** The questionnaire was developed in English and was evaluated by two health educators for content validity then translated to Arabic by two native speakers and then translated back to ensure validity. A focus group was also held with six subjects at the health center to assess face validity and ensure comprehension of the survey in its intended format. To test reliability, internal consistency was assessed using Cronbach's alpha, an alpha equal to or greater than 0.7 was considered satisfactory.

**Measure:** a multi-section questionnaire was developed to measure the following data

**Demographic data:** Including variables such as age, sex, education, employment status, household income

**Anthropometric data:** Weight and height were measured three times each and the average of each was taken. A digital SECA scale was used to measure weight to the nearest 0.1 kg with the subject in light indoor clothes, with emptied pockets and without shoes. Height without shoes with normal-position shoulders was measured to the nearest 0.1 cm. Body Mass Index (BMI) was calculated from weight (kg)/height (m<sup>2</sup>) and classified according to World Health Organization (1998).

**Physical activity level and Stages of Change:** In the present study we employed the scale made by Martin et al. (2000) and we asked the subjects to select the item that best described their current physical activity level from an eight- item questionnaire and according to their answers we classified them into the five stages of change. Subjects who were participating in moderate physical exercise five or more times per week or in vigorous exercise three to five times per week longer than six consecutive months were categorized them to Maintenance or if it was less than six months to Action stage. Preparation stage was for subjects who were thinking about starting exercise or walk in the near future, or who were doing vigorous exercise less than 3 times per week, or moderate physical exercise less than 5 times per week. Contemplation stage was for subjects how thinking about starting exercise or walk

in the next six months. Subjects who were not thinking about starting any physical activity in the near future were categorized as Pre-contemplation stage. For physical activity level; subjects in Action and Maintenance stages were categorized as physically active subjects, subjects in Preparation stage wer categorized as moderate active, while Contemplation and Pre-contemplation subjects were categorized as low physically active (Table 1).

**Self efficacy:** To measure self-efficacy for exercise we employed the Sallis et al. (1988) scale. The scale focusing on: 1- Set aside time to exercise. 2- Exercising when feeling sad or under stress. 3- Exercising when family or social demands are great, each category consisted of four items. Five point Likert type scale (one score "not at all confident" to five score "extremely confident"). Higher mean scores on the questions indicated higher self efficacy subjects, Cronbach's Alpha for this tool was 0.82.

**Perceived barriers:** This part consisted of 12 items. Contents of the items were based on previous studies among adults (Wanda, 2002; Brown, 2005; Daskapan et al., 2006). The items were divided into two categories: A- The internal barriers were grouped to three categories: lack of energy, lack of motivation and lack of self-confidence. B- External barriers were grouped into 3 categories: lack of resource, lack of social support and lack of time. Titles in these categories were established in the literature (Sallis and Hovell, 1990; Sallis et al., 1992). Each category consisted of two items and rates of questions were summed up to find the score of the category. Lower mean scores on the questions indicated lower internal and external barriers. Five point Likert type scale was used to rate the items, Cronbach's Alpha for this tool was 0.75.

**Data analysis:** Data were analyzed by the SPSS program (version19) and other specific methods used as follows; 1) The general characteristics of subjects were analyzed by frequency and percentage. 2) The stages of exercise behavior change of subjects were analyzed by frequency and percentage 3) One-way ANOVA was used to analyze the differences in processes of change, self-efficacy, and perceived barriers that were involved with the stages of exercise behavior change of subjects. Post hoc test was used for Bonferroni comparison.

## Results

The mean age was almost similar among males and females (33.6±7.6, 31±7.8; respectively) and that indicates that our subjects were in prime age, more females (85.5%) than males (64.4%) were married with low proportion still single (males 35.6%, females 14.5%) with a significant difference between them(P=0.00). More than 70% of both

**Table 1. Stages of Change Categorized with each Physical Activity Level**

1. "I am currently not participating in regular physical exercise or walk and not thinking about starting in the near future".	Pre-contemplation
2. "I am currently not participating in regular physical exercise but thinking about starting in the next six months".	Contemplation
3. "I am currently not participating in regular physical exercise or walk but thinking about starting in the near future".	Preparation
4. "I am doing vigorous exercise less than 3 times per week, or moderate physical exercise less than 5 times per week"	
5. "I am currently participating in moderate physical activity five or more per week for less than six consecutive months since starting".	Action
6. "I am currently participating in vigorous exercise three to five times per week for less than six consecutive months since starting".	
7. "I am currently participating in moderate physical activity five or more per week for longer than six consecutive months".	Maintenance
8. "I am currently participating in vigorous exercise three to five times per week for longer than six consecutive months".	

groups had university education, but 43.5% of the females and 18.6% of the males did not work with significant difference (P=0.00). The majority of the groups had monthly income range between 5001-10,000 SR (males 33.6%, females 33.9%) which is remain high.

However males had higher weight and BMI (79.1kg, 26.8BMI) comparable to females (59.6kg, 25.2BMI) with significant difference (P=0.00, 0.036 respectively), both groups had overweight BMI. Almost half of the subjects had overweight BMI, 39% of the males and 32.3% of the females were in normal weight category, while 16.9% of the males were obese and only 8.1% of the females were underweight without significant difference.

*Stages of change by gender*

The proportions at each stage of change differ significantly between males and females (P=0.019). The higher percentage was in pre-complementation stage for males (28.8%) and females (35.5%), more females (21%) than males (11.9%) were in complementation stage, in the preparation stage; there were almost a similar percentage of males and females (20.3%, 22.6%; respectively). High proportions of males were in action (18.6%) and maintenance (20.3%) stages comparable to females.

*Physical activity level by gender*

Thirty nine percent of the males were more physically active than females (21%), whereas females had a higher percentage of moderate active (22.5%) than males (20.3%). However the majority of the groups were in the low active category (males 40.7%, females (56.6%) with a significant difference between them (P=0.018).

*Self efficacy and barriers of physical activity by gender*

Self efficacy and the self efficacy categories for the physical activity are shown in Table 2. There was a significant difference between the groups: males had score of self efficacy (33.1±6.9) higher than females (29.3±7.4), also they had a higher mean score of exercising when feeling sad or under stress (12.3±3.5) and exercising when family or social demands are great comparable to the females group. In general the mean score of perceived internal barriers to physical activity were in males higher (23.1±4.7) than females (21.2±3.8) with a significant difference between them. However the internal barriers lack of self-confidence was the most important barriers among females (7±1.6) and males (7.9±2.03), while lack of energy score was higher in males with significant difference between the groups and no significant difference in lack of motivation scores. Regarding the total score of external barriers and the three categories, females had higher rates than males with a significant difference between them. Females suffering from lack of resources to exercise (6.3±1.5), lack of social support (6.6±1.7) and lack of time to exercise (7.2±1.4), while these barriers had lower scores in males group (Table 2).

*Self efficacy and barriers scores by stages of change in the male*

Table 3 shows the relationship between stages of physical activity and self efficacy and perceived barriers

in males. The result revealed that mean score of self efficacy was increasing as the stages increased; males in maintenance stage had the highest score (36.8±6.5) with a significant difference between males pre-contemplation stage (29.2±5.4), the contemplation stage (31.2±7.4), and action stage (36.2±5.9) (P=0.002). Males had higher score of self efficacy in set time to exercise (11.7±2.8) with significant difference between pre-contemplation stage, action stage and maintenance stage (P=0.002). No significant difference between the stages according to family and social demands was observed (P=0.13).

The internal barriers, lack of energy and lack of self confidence scores decreased as the stages decreased, but there were no significant differences between the stages. Only in lack of motivation there was a significant difference between pre-contemplation stage and maintenance stage (P=0.01). External barriers score was higher in pre-contemplation stage (19.5±6.1) with almost similar mean in action (15.9±3.1) and maintenance stages (15.1±4.1), while a significant difference between pre-contemplation stage, contemplation stage (17.7±3.2) and maintenance stage was observed (P=0.003). Lack of resources score was a significant difference between pre-contemplation stage, contemplation stage and maintenance stage also there was a significant difference between contemplation stage and preparation stage (P=0.000), and no significant difference between the stages according to lack of social support was observed (P=0.47).

*Self efficacy and barriers scores by stages of change in the females*

Table 3 demonstrates that females at the maintenance stage perceived greater self efficacy scores and the self efficacy categories as (sit time to exercise, exercise if they were sad or under stress, and when family and social demands are high), while no significant difference observed between females across the stages.

The perceived internal barriers scores and the three categories scores were decreasing as the stages decreased with a significant difference between the pre-contemplation stage score (8.5±1.1) and maintenance stage scores (7.2±1.3) for lack of motivation. The perceived external

**Table 2. Physical Activity Self Efficacy and Perceived Barriers (Mean, s.d)**

	Male (n=118)	Female (n=124)	*P-value
Self Efficacy	33.19 ±6.99	29.37 ±7.42	0.000**
Set aside time to exercise	10.08 ±2.94	8.82 ±3.14	0.523
Exercising when feeling sad or under stress.	12.34 ±3.56	11.25 ±3.06	0.048*
Exercising when family or social demands are great.	10.67 ±3.39	9.29±2.18	0.018*
Perceived Barriers			
Perceived internal barriers.	23.08 ±4.75	21.29 ±3.87	0.001**
Lack of energy.	7.62 ±2.3	6.01 ±1.65	0.04*
Lack of motivation.	7.72 ±1.41	6.93 ±1.46	0.722
Lack of self-confidence.	7.96 ±2.03	7.03 ±1.69	0.101
Perceived external barriers.	16.76 ±4.67	20.24 ±2.91	0.000***
Lack of resource.	4.86 ±1.89	6.31 ±1.58	0.002*
Lack of social support.	5.88 ±2.33	6.67 ±1.71	0.000*
Lack of time.	6.01 ±2.11	7.25 ±1.44	0.000*

\*P<0.05, \*\*P<0.001, \*T-test

**Table 3. Self Efficacy and Perceived Barriers by Stages of Change in the Males (n=118) and Females (n=124)**

		Stage of Change of Physical Activity					F-value	P-value	*Past hoc analysis (Bonferroni)
		PC (n=34)	C (n=14)	P (n=24)	A (n=22)	M (n=24)			
Self Efficacy		29.2±5.4	31.2±7.4	31.8±6.1	36.8±6.5	36.2±5.9	5.29	0.001**	PC<A*, C<A*
	Time	9.1±2.7	9.3±3.3	9.6±2.7	11.6±2.3	11.7±2.8	4.47	0.002*	PC<A*, PC<M*
	Sad or under stress.	9.8±1.7	12.1±3.3	12.3±2.6	13.2±4.4	13.3±4.1	2.78	0.03*	PC<A*, PC<M*
	Family or social demands.	9.7±1.7	10.2±3.5	10.2±2.1	11.7±3.4	11.8±4.4	1.81	0.13	
Perceived Barriers	Perceived internal barriers.	23.2±3.5	23.8±3.1	24.5±5.4	22.2±4.1	22.1±6.6	1.013	0.37	
	Lack of energy.	7.7±1.5	7.7±1.6	7.8±1.8	7.5±3.2	6.9±3.1	0.75	0.55	
	Lack of motivation.	8.5±1.1	7.8±1.4	7.8±1.1	7.5±1.5	7.2±1.3	3.46	0.01*	PC>M*
	Lack of self-confidence.	8.3±1.8	8.1±1.1	7.6±2.2	7.4±2.5	7.2±1.8	1.28	0.21	
	Perceived external barriers.	19.5±6.1	17.7±3.2	16.2±4.8	15.1±3.1	15.1±4.1	4.31	0.003*	PC<M*, C>M*
	Lack of resource.	6.0±1.7	5.4±1.6	4.8±1.5	4.4±1.9	3.1±1.4	7.31	0.000**	PC>M*, C>M**
	Lack of social support.	6.4±2.8	6.2±1.3	6.0±2.8	5.8±1.9	5.2±2.1	0.97	0.47	
Self Efficacy	Lack of time.	7.1±2.2	6.5±1.1	5.4±2.4	5.5±1.7	5.3±1.1	3.64	0.008*	PC>M*, PC>A*
		28.6±8.9	28.3±3.6	29.1±7.2	30.1±7.1	32.8±6.1	0.76	0.59	
	Time	8.8±3.4	8.5±3.2	8.8±3.5	8.8±1.8	9.2±2.5	0.09	0.98	
	Sad or under stress.	10.7±3.2	11.3±2.7	12.2±3.2	10.7±2.8	12.0±2.1	1.41	0.32	
Perceived Barriers	Family or social demands.	8.7±1.6	9.1±3.1	9.0±2.4	9.2±2.8	11.6±6.1	1.98	0.11	
	Perceived internal barriers.	25.0±2.9	21.4±2.5	21.2±2.7	20.6±4.7	20.7±4.1	2.86	0.026*	PC>M*
	Lack of energy.	8.4±1.4	7.2±1.6	6.7±1.8	6.6±0.7	7.2±1.8	2.51	0.045*	PC>A*
	Lack of motivation.	8.2±1.1	7.0±1.1	7.1±1.3	6.7±1.6	6.6±1.6	2.79	0.029*	PC>M*
	Lack of self-confidence.	8.4±1.1	7.0±1.2	7.6±1.4	6.7±2.1	6.3±1.7	2.34	0.058	
	Perceived external barriers.	21.4±1.9	22.3±1.6	20.0±1.7	18.5±2.6	19.5±3.7	3.68	0.007*	PC>A*, C>A*
	Lack of resource.	7.1±0.9	7.9±1.4	6.2±1.3	5.0±1.4	5.9±1.8	5.76	0.000**	C>A**, C>M*
Perceived Barriers	Lack of social support.	7.8±0.4	7.3±1.5	6.8±1.4	6.0±1.4	6.1±1.9	3.93	0.005*	PC>M*
	Lack of time.	8.6±0.8	7.4±0.7	7.5±1.6	5.8±1.6	6.4±1.2	6.06	0.000**	PC>M*, PC>A**, P>M*

\*P<0.05, \*\*P<0.001, \*Significant deference between the stages, PC:Pre-contemplation, C:Contemplation, P:Preparation, A:Action, M: Maintenance

barriers score was the lowest among females in action and maintenance stage, with a significant difference between pre-contemplation stage, contemplation stage and action stage (P=0.007). The mean score for lack of resource and lack of social support were almost similar between action and maintenance stage (5 scores, 6 scores; respectively), with significant difference across the stages. Lack of time to be active was significantly difference across the stages (P=0.000).

## Discussion

The benefits of physical activity are well established and recognized to prevent adults from many chronic diseases, but trying to get inactive adults to start exercising and active adults to keep exercising remains the challenge in a culture that is becoming increasingly automated (Marcus and Forsyth, 1997). This study identified the level of physical activity among males and females in prime age. Our findings indicated a significant difference in the level of physical activity; while more males than females were physically active, with a high proportion of females inactive (56.5%) which is consistent with previous studies conducted in Saudi Arabia. ALQuaiza and Tayel (2009) reported higher percentage in both genders (females 87.6%, males 71.5%) than our finding, but Amin et al. (2012) reported in their study that the prevalence of inactive adults (males, females) was 48% which is similar to our prevalence in males (40.7%) but not in females. In general, females were less active than males. a review study of adults' physical activity pattern has shown that females were more inactive than males in 44 of the 51 countries analyzed, the difference in physical inactivity between genders exceeds 10 % in some countries (Guthold et al., 2008).

The present study had positive finding according to the stages of change among males, while one fifth of them in maintenance and preparation stages with almost the same percentage in action stage (18.6%). Females showed a different finding with more than one third of them in pre-contemplation stage and more than one fifth in contemplation and preparation stages which means that more than half of females do not exercise at all, with only 8% significant difference in maintenance stage between genders. Consistent with our study Mori and colleagues (2009) found that 29% of the Japanese females and 27.4% of the Japanese males in pre-contemplation stage. They reported more males (39.4%) in preparation stage (counteractive results), but females at the seam stage had almost similar result reported in the present study (23.5%). Another study reported a higher percentage of females in contemplation stage (29%) and the lowest in action stage (11.8%) among Korean females which is different from the results reported in the present study (Lee et al., 2006). In younger age group (Saudi university students) Gawwad (2008) reported that the majority of the males (42%) and females were (44.7%) in action stage, however a previous study conduct in European Union (15 countries) reported that younger age group (14-25 years) are usually in action and maintenance stages than other age groups (Kearney et al., 1999).

In addition, males had higher mean scores of self efficacy and self efficacy categories, as they are more confident to set time to exercise when they are feeling sad or under stress, and can exercise with greater social and family demands, unlike the females, who have low mean scores of internal barriers and the three barriers category. The present study finding consistent with results from a previous research (Eyler, 2003; Daskapan et al., 2006; ALQuaiza and Tayel, 2009), females had much energy

and motivation to exercise than males and less internal barriers than males. For the external barriers and the three categories females reported more barriers than males with lack of time as the majeure external barrier which is predictable, while almost 90% of them were married and almost two third were employed, suffering from lack of social support and lack of resource.

In Saudi Arabia, as many Middle East countries, females have lower participation in any physical activity because of cultural barriers such as the need for gender segregation while wearing sports clothes where skin may show (Walseth and Buckworth, 2003). Women may feel that wearing athletic clothing is inappropriate. Jordanian women are also often placed into the traditional role of homemaker if they are married, and helping other women in their family if they are not married (mother, sister, grandmother, etc.), thereby limiting their time to participate in physical activity (Madanat and Merrill, 2006).

In other parts of the world, females have the same barriers. In The United States the most frequently reported physical activity barriers are insufficient time (23.3%), and lack of motivation (14.2%) (Brownson et al., 2001). A study conducted among employed females found that insufficient time, owing to work responsibilities and lack of motivation are barriers to exercise (Ball et al., 2006). Lack of social support when females are feeling guilty when they are exercise which is takes time away from family responsibilities without any supports from their families (Eyler, 2003). Lack of resources was a barrier for the females such as enough sport clubs for females, swimming pools or exercise facilities at work. Similar findings were found by other studies (Wiesemann et al., 2004; Jilcott et al., 2006). At this time, there are many free sidewalks around the city, but hot and dusty weather limit walking to four months in the years. However, males were not facing these barriers in our study and they had low mean scores for the external barriers.

The stages of change construct have been used to develop physical activity community campaigns (Bauman et al., 2001) and intervention (Marcus et al., 1998). Based on a meta-analysis of 71 published studies, authors concluded that there is sufficient evidence to confirm that stages of change is associated with different levels of physical activity, self-efficacy, perceived barriers (Marshall and Biddle, 2001).

In line with this, the self efficacy scores of the males in the present study varied at each stage for physical activity. Males identified in the earliest stages of change (pre-contemplation and contemplation) had low confidence in their ability to be active when they were faced with certain constraints including setting time or exercising when being under stress. Self efficacy scores increased in maintenance and action stages, but decreased among males in earlier stages. The present results reveal a consistent positive relationship between self efficacy of physical activity and stages of change. In agreement with studies conducted in Japan and in the United States (Purath and Miller, 2005; Mori et al., 2009). Therefore, it is believed that self efficacy could in a work more positive way for regular physical activity. In addition, self efficacy enhancement

for exercise behaviors could be considered to be the most important variable in designing the intervention programs for prime aged males.

Males in pre-contemplation stage perceived significantly greater scores for lack of motivation than males in maintenance stage. The internal barriers and, the lack of energy and self confidence were decreasing in the late stages which is similar to Mori et al. (2009) study among Japanese males but with a significant difference for physical barriers across the stages, which is counteractive to the present study. For external barriers, males in pre-contemplation and contemplation stages perceived significantly greater scores for the total external barriers and lack of resources than males in maintenance stage. Regarding lack of time, pre-contemplators had significant difference mean score comparable to action and maintenance stages.

The females identified in the maintenance stage, expressed the highest score of self-efficacy and self efficacy in different situations without a significant difference across the stages. Contradictory to our results, Korean females reported different results. That; self efficacy significantly increases as it progressed from pre-contemplation through the stages until maintenance stage (Lee et al., 2006). In a study conducted among Japanese females the authors found a strong positive relationship between self efficacy and stages of change (Nishida et al., 2003). There is a significant difference across the stages for internal barriers, lack of energy and lack of motivation. That; female in pre-contemplation stage were significantly different from females in maintenance stage for motivation and energy, and between preparation stage and maintenance stage for the internal barriers. These results demonstrates the importance of implementing intervention for females in pre-contemplation stage focusing on who can be active in the daily life as using stairs instead of the elevator in the work or doing stretching exercises when watching TV in the home or during a break at work.

The present study reported a significant difference for the external barriers and the three categories across the stages, while lack of time had the highest mean score comparable to the other barriers. However, females in the 30s had family and were employed and therefore it is difficult for them to sit time to exercise specially if they did not have social support and lack of resources, consistent with our finding Nishida et al. (2003) and Brownson et al. (2001) in which lack of time was the major barrier among Japanese females and American females.

There are some limitations to this study. First, the small number of subject who have been selected from only eight health centers may not be representative of the general Saudi population. Second, actual levels of physical activity were not measured, but the current physical activity behavior, and that may have resulted in some misclassification unlike the previous studies which have shown the reliability of self-reported current physical activity behavior (Iwai et al., 2001). Finally this study was cross-sectional which precludes conclusions about causal relationships.

The present study has provided useful data on stages

of change for physical activity and some psychosocial factors (self efficacy and perceived barriers) that can help in increasing the physical activity across the stages among Saudi adults in prime aged highly educated, employed and physically inactive, the majority of whom at pre-contemplation stage for physical activity with more external barriers and less self efficacy among females comparable to males. Future research should tailor strategies aiming at increasing physical activity level according to self efficacy and to the barriers detected, to preventing many chronic diseases as certain types of cancer.

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