Physical inactivity in Saudi Arabia revisited: A systematic review of inactivity prevalence and perceived barriers to active living

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ABSTRACT

Objectives: Saudi Arabia has recently witnessed enormous economic growth accompanied by undesirable lifestyle behaviors, along with an associated increase in non-communicable diseases (NCD’s). This systematic review presents a comprehensive and an updated overview of the status of physical activity (PA) or inactivity among the Saudi population and examines the major barriers and correlates of PA.

Methods: A systematic search was conducted using MEDLINE and Google Scholar databases. The electronic search yielded an initial 434 articles. However, the majority of these articles were eliminated because they did not meet the inclusion criteria. The remaining relevant papers were 65 articles that became the bases for this review.

Results: The majority of Saudi children, youth and adults were not active enough to meet the recommended guidelines for moderate to vigorous PA. Saudi females were disproportionately less active than males, beginning from early school years. The proportions of Saudis who are at risk of inactivity are exceedingly higher than those at risk for other coronary heart diseases. Active Saudi boys tend to have favorable levels of blood lipids and body composition profile compared to inactive boys. Increased urbanization, crowded traffic, extreme weather, cultural barriers, lack of social support, the absence of female school PA program and lack of time and resources, all make PA a difficult choice for the Saudis.

Conclusion: More intensified efforts toward promoting PA and reducing sedentary behaviors among the Saudi population are needed to curtail the risks of NCD’s.

Keywords: Barriers, exercise, health promotion, inactivity, non-communicable disease, physical activity

Introduction

Physical activity (PA) is a health-enhancing behavior. According to the worldwide health statistics, lack of PA is among the major risk factors for non-communicable diseases (NCDs) and total mortality.[1-3] It is estimated that inactivity is globally responsible for 9% of premature mortality, or more than 5.3 million deaths annually.[5] In contrast, PA is well recognized to have significantly decrease cardiovascular risks, improve lipids profile, control type 2 diabetes, prevent the incidence of some types of cancers, increase bone density, improve psychological health, and well-being and reduce total mortality.[2-4] In 2013, the World Health Assembly agreed on a global voluntary reduction of 10% in insufficient PA by 2025.[3] However, the recent World Health Organization (WHO) reports indicate that policies to address insufficient PA are operational in only 56% of the WHO member states.[1] According to the same WHO report, around 23% of adults aged 18 and over were not physically active enough, with more inactive women than men, while 81% of the adolescent population aged 11–17 years were insufficiently physically active, with adolescent girls as being more inactive than adolescent boys.[1]

Possible barriers to PA must be determined and eliminated to promote active living and reduce inactivity among the population. A number of environmental barriers related to urbanization are believed to be attributed to such global inactivity epidemic, including fear of violence and outdoor crime, high-density traffic, low air quality and lack of suitable exercise places, sports facility, sidewalks, and parks.[1] In developed countries, advancing age and lack of time appear to be among the most commonly reported barrier to PA.[6] Family income may also influence physical inactivity, as lower income people are less likely to meet PA guidelines when compared to higher income people.[7] In addition, as a recent review has demonstrated, the perception of environmental or personal
barriers among adults was inversely related to the levels of PA participation.\(^6\)

Not very long time ago, our ancestors in Saudi Arabia had lived a simple, yet, active life. The physical challenges of daily life and demanding works were sufficient then to maintain a lean body mass and an appropriate level of physical fitness for them.\(^8,9\) However, during the past several decades, Saudi Arabia has witnessed enormous economic growth and prosperity, accompanied by the technological transformation that has led to major negative changes in lifestyle. Consequently, physical inactivity, sedentary behaviors, and consumption of caloric dense diet, and sugar-sweetened beverages went on the increase and became prevalent among Saudi society. This has contributed significantly to an increase in lifestyle-related NCD’s in the country, which includes, obesity, diabetes mellitus, coronary artery diseases \(\text{CADs}\), and hypertension.\(^3,10-12\)

It is a well-recognized fact that to implement effective NCD prevention programs in Saudi Arabia, policy makers and health-care authorities need recent and valid data for the prevalence of physical inactivity and its trends, barriers and major determinants. Early published reviews and articles about PA and health among Saudi population indicated high prevalence of inactivity among every segment of the society.\(^9,13\) However, in the past decade, many PA-related studies have been conducted and published, thus, necessitating an update on the inactivity prevalence in this rapidly growing Middle Eastern country. Therefore, the purpose of this systematic review was to provide a comprehensive and an updated overview of the status of physical inactivity/activity among Saudi population and to discuss major correlates and barriers to PA.

**Methods**

**Data sources and search strategy**

A systematic search was conducted using MEDLINE and Google Scholar databases up to January 15, 2018, while utilizing keywords such as PA, exercise, physical inactivity, PA barriers and PA determinants, in combination with the words “Saudi Arabia,” “Saudi population,” and “Saudi people.” In addition to the electronic search, all references of the selected articles were manually examined and identified for possible inclusion as relevant papers in this search. The inclusion criteria were articles in English literature, which included Saudi adults, adolescents or children without orthopedic problems and have a clear description of PA assessment methods and physical inactivity criteria. Full articles were obtained for all the inclusive studies and were then thoroughly read and analyzed.

**Data extraction**

The following information from each study were checked and recorded: The prevalence of physical inactivity, the type of instrument used for measuring PA, the criteria used for quantifying inactivity prevalence, the number of the participants, mean and standard deviation (or range) of age of the sample, sex, the location where sample was selected, and whether the study was conducted at national, subnational, or local level. The initial electronic search yielded 434 articles. The titles and the abstracts of these articles were read and reviewed for possible inclusion. However, the majority of the articles were eliminated because they did not meet the inclusion criteria. The remaining relevant papers were 65 articles, which then became the bases for the initial systematic review screening [Figure 1]. 11 articles were excluded because of duplicates or have no full text. Of the eligible 54 articles, 12 articles were excluded because there were no clear criteria for physical inactivity (not determined) or there was no clear description of the PA instruments used, and the remaining articles became 42 papers.

**Results**

The results of this systematic review are shown in Tables 1 and 2 for the prevalence of physical inactivity, as well as the major reasons for being active and correlates of (or barriers to) PA, respectively. Among those studies that utilized subjective measures of PA assessment, approximately half of the studies in this review have used un-validated PA instruments. As clearly seen from the findings, there are not too many PA studies that have been published locally before the year 2000. In fact, the majority of the published articles, which are related to PA in Saudi Arabia, were published within the past 7 years or so.

**Physical inactivity prevalence and its relation to health indicators**

As shown in Table 1, the prevalence of physical inactivity, in general, ranged from 26% to 85% among Saudi males and from 43% to 91% among Saudi females, depending on the population measured, region, age, gender, the type of PA instrument utilized, and the physical inactivity criteria

![Figure 1: Flow chart showing articles selection process](image-url)
### Table 1: Prevalence of PA among Saudi population

| Sample description (publication year) | Region or city | Gender | Number of subjects | Age (years) | Inactivity prevalence (%) | Inactivity criteria | Assessment method | Reference number |
|--------------------------------------|----------------|--------|--------------------|-------------|--------------------------|---------------------|-------------------|------------------|
| **Children**                         |                |        |                    |             |                          |                     |                   |                  |
| Preschoolers (2007)                  | Jeddah         | Male   | 109                | 5.2±0.8     | 72.9                     | < 10000 step counts per day | Electronic pedometer | [14]            |
|                                      | Male           | Female | 115                | 5.2±0.9     | 81.4                     |                     |                   |                  |
| School children (1993)               | Riyadh         | Male   | 212                | 9.5±1.4     | 85                       | Daily heart rate < 159 bpm for at least 20 min/day | Continuous heart rate monitoring | [15]            |
| School children (2002)               | Riyadh         | Male   | 92                 | 9.6±1.5     | 57.1                     | Daily heart rate < 140 bpm for at least 30 min/day | Continuous heart rate monitoring | [13]            |
| School children (2007)               | Riyadh         | Male   | 296                | 10.3±1.3    | 47.1                     | <13000 step counts | Electronic pedometer | [16]            |
| School children (2017)               | Makkah         | Female | 78                 | 8-11        | Low                      | <10000 step counts/day | Accelerometer (Actigraph for 4 days) | [17]            |
|                                       |                |        |                    |             |                          |                     |                   |                  |
| Adolescents                           |                |        |                    |             |                          |                     |                   |                  |
| Adolescents (2003)                    | Riyadh         | Male   | 894                | 15.7±1.8    | 72.3                     | <30 min for < 4 days/week | Questionnaire | [18]            |
| Adolescents (2008)                    | Al-Khobar      | Male   | 1240               | 16.3±1.7    | 54.4                     | <3 times/week | Questionnaire | [19]            |
|                                      | Male           | Female | 1331               | 16.5±1.1    | 66.3                     |                     |                   |                  |
| Adolescents (2011)                    | Riyadh, Jeddah and Al-Khobar | Male | 1401               | 16.7±1.1    | 44.5                     | <1680 METs-min per week | Arab Teens Lifestyle Study Questionnaire | [20]            |
|                                      | Female         |        | 1507               | 16.5±1.1    | 78.1                     |                     |                   |                  |
| Adolescents (2012)                    | Aseer          | Male   | 1249               | 17.2±1.2    | 25.7                     | <30 min of PA in previous week | Questionnaire | [21]            |
|                                      | Female         |        | 620                | (12-19)     | 42.9                     |                     |                   |                  |
| Adolescents (2014)                    | Riyadh         | Male   | 1335               | 13, 14,     | 63.7                     | <60 min, 5 day/week | Health Behaviour in School-aged Children (HBSC) | [22]            |
|                                      |                |        |                    | 17-18       |                          |                     |                   |                  |
| Adolescents (2015)                    | Riyadh         | Male   | 453                | 15-18       | 84.5 (20.1=no exercise at all) | <5 days/week | Questionnaire | [23]            |
|                                      | Female         |        |                    |             |                          |                     |                   |                  |
| Adolescents (2017)                    | Jeddah         | Male   | 405                | 3-18        | Low                      | Sum of moderate to vigorous activity | PA questionnaire for adolescents | [24]            |
|                                      | Female         |        |                    |             |                          |                     |                   |                  |
| Adolescents (2018)                    | Jeddah         | Male   | 410                | 17.2±1.2    | 86.1                     | <150 min per week | Questionnaire | [25]            |
|                                       | Female         |        |                    |             |                          |                     |                   |                  |
| **Adults**                            |                |        |                    |             |                          |                     |                   |                  |
| College students (1990)               | Riyadh         | Male   | 362                | 21.9±2.1    | 78.2                     | No regular activity | Questionnaire | [26]            |
| College students (2008)               | Abha           | Male   | 456                | 17+         | 83.3                     | <3 times/week | Questionnaire | [27]            |
| College students (2008)               | Riyadh         | Male   | 150                | 21.4±1.8    | 72                       | <3 days/week | Questionnaire | [28]            |
| College students (2013)               | Abha           | Female | 663                | 20.4±1.5    | 37.6                     | <150 min/week | Arab teens lifestyle study questionnaire | [29]            |
| College students (2014)               | Abha           | Male   | 426                | 17-25       | 56.1                     | <600 METs-min per week | IPAQ | [30]            |
|                                           | Female         |        | 831                |             | 58.8                     |                     |                   |                  |
| College students (2015)               | Dammam         | Female | 215                | 19.3±0.95   | 72.5                     | <1 time per week | Questionnaire | [31]            |
| College students (2015)               | Riyadh         | Female | 94                 | 18-22       | 44                       | <600 METs-min/week | Arab Teens Lifestyle Study Questionnaire | [32]            |
| Medical students (2012)               | Madinah        | Male   | 98                 | 21.1±1.9    | 63.8                     | <150 min/week moderate activity or <60 min/week vigorous activity | IPAQ | [33]            |
|                                      | Female         |        | 100                |             | 65.0                     |                     |                   |                  |
Table 1: (Continued)

| Sample description (publication year) | Region or city                  | Gender | Number of subjects | Age (years) | Inactivity prevalence (%) | Inactivity criteria                                      | Assessment method       | Reference number |
|--------------------------------------|---------------------------------|--------|--------------------|-------------|---------------------------|---------------------------------------------------------|-------------------------|------------------|
| Primary care physicians (1998)       | Riyadh                          | Male   | 98                 | 42.0±6.5    | 76.5                      | No regular activity                                     | Questionnaire           | [34]             |
| Physicians and non-physicians (2013)| Riyadh                          | Male   | 100                | 20±years    | 41                        | No PA                                                   | Questionnaire           | [35]             |
| Primary care professional (2014)     | Riyadh                          | Male   | 127                | 39.2±8.9    | 78.7                      | Active category                                         | “How physically active are you” questionnaire | [36]             |
| Primary care patients (1998)         | Eastern province                 | Male   | 90                 | 41.5±11.2   | 43.3                      | <3 times/week for 20 min                                | Questionnaire           | [37]             |
| Primary care patients (2009)         | Riyadh                          | Male   | 144                | 33.3±13.3   | 71.5                      | <150 min/week                                           | Questionnaire           | [38]             |
| Family medicine clinics (2010)       | Taif                            | Male   | 190                | 43.1±9.3    | 46                        | <150 min/week moderate activity or <60 min/week vigorous activity | IPAQ                    | [39]             |
| Primary health-care participants (2011)| Al-Hassa region            | Males  | 1209               | 32.8±10.1   | 50.5                      | <600 METs-min/week                                      | Global PA Questionnaire | [40]             |
| Lowlanders and highlanders (1995)    | Aseer province                   | Male   | 905                | 16-60       | 59.4                      | No strenuous exercise for ≥3 times per week             | Lipid Research Clinic Questionnaire | [41]             |
| Military personnel (2013)            | 5 region of Saudi Arabia        | Male   | 10229              | 18-50       | 30.8                      | < 30 min per day                                        | WHO step-wise questionnaire | [42]             |
| Adult population (2001)              | Riyadh                          | Male   | 1333               | 41.1±9.7    | 80.9                      | No regular activity                                     | Questionnaire           | [43]             |
| Adult population (2007)              | Riyadh                          | Male   | 702                | 15-78       | 43.7                      | <600 METs-min per week                                  | IPAQ                    | [44]             |
| Adult population (2007)              | National sample                 | Male   | 17395              | 30-70       | 84.8                      | <600 METs-min per week                                  | Leisure- and sport-related physical activities questionnaire | [45]             |
| University employee (2014)           | Al-Hassa                        | Male   | 691                | 40.4±9.8    | 73                        | <600 METs-min per week                                  | WHO step-wise questionnaire | [46]             |
| Adults (2015)                        | National sample                 | Male   | 3240               | 15-64       | 66.6                      | <600 METs-min/week of moderate, or <60 min/week vigorous activity | Global PA Questionnaire | [47]             |
| Adults (2015)                        | National sample                 | Male   | 5432               | 15-65+      | 50.0                      | 15-17: <420 MET-min/week; 18+: <150 MET-min/week        | IPAQ                    | [48]             |
| Adults (working women) (2016)        | Riyadh                          | Female | 420                | 31.7±8.3    | 52.1                      | <600 METs-min per week                                  | Modified ATLS questionnaire | [49]             |
| Adults (physicians) (2016)           | Riyadh                          | Male   | 222                | 24-65       | 36.9                      | MVP A                                                  | Modified STEPwise questionnaire | [50]             |
| Adults (control group) (2017)        | Tabuk                           | Male   | 97                 | 20-65+      | 86.7                      | <30 min/day, 5 days/week                                | Questionnaire           | [51]             |

MVPA: Moderate to vigorous intensity physical activity, PA: Physical activity, IPAQ: Global physical activity questionnaire
Moreover, the vast majority of the PA activity studies were conducted in urbanized areas of the country, apart from the few national studies, and very limited studies that included samples from rural areas. The findings from national or subnational studies indicated that the mean physical inactivity prevalence ranged from 50% to 85% among males and from 73% to 91% among females. In regard to regional variations, one national study, involving participants aged 15–64 years, observed that northern and central regions have the highest prevalence of physical inactivity. Another national study conducted on Saudis between the ages of 30 and 70 years, indicated that inactivity was the highest in the central region and the lowest in the southern region of Saudi Arabia. Among Saudi adolescents sampled from three major locations in the country, PA was also found to be lower in the central region as compared with the eastern region, and there was a significant PA interaction between location and gender.

Moreover, the majority of Saudi children and youth were not active enough to meet the minimal weekly requirements of moderate to vigorous PA (MVPA) that was recommended by international guidelines. In fact, data from the recent Arab teens lifestyle study (ATLS), which was conducted on a large group of adolescents from three major cities and which used a validated PA questionnaire, indicated that PA levels were somewhat moderate (averaged prevalence was 55.5%) among adolescent males and very low among females (average prevalence was 21.9%). The cutoff score that was used in this study corresponds to 1 h per day of moderate-intensity (4 metabolic equivalents [METs]) PA. This level of activity is equivalent to the amounts of energy expenditure which corresponds to 1680 METs-minutes per week (60 min of activity per day × 7 days per week × 4 METs).

Figure 2 illustrates the PA levels, based on step counts, for Saudi preschool children aged 4–6 years along with daily television viewing time. As can be clearly seen, while PA was declining by 23.4% from age 4 to age 6, the screen time was similarly increasing by 22.5% during the same period. Moreover, the prevalence of physical inactivity/activity and sedentary behaviors among a subnational group of Saudi adolescents is shown in Figure 3. The proportion of Saudi adolescents who were considered inactive, especially females, is quite high. In addition, sedentary behaviors appear to be highly prevalent among Saudi adolescents, as 84% of males and 91.2% of females spent more than 2 h of screen time daily. High prevalence of both inactivity and sedentary behaviors is considered a double risk for their future health. Unhealthy lifestyle habits, including inactivity, high screen time, and inappropriate dietary habits seem to cluster among Saudi adolescents; as PA has been shown to correlate with healthy dietary habits while sedentary behaviors were associated with unhealthy dietary intake. Indeed, a logistic regression analysis conducted on 2886 Saudi adolescents from three major urbanized areas of the country revealed that active adolescents exhibited significant associations with higher consumption of healthy dietary habits (breakfast, fruit, vegetables, and milk intakes), whereas higher screen time was significantly associated with greater consumption of sugar-sweetened drinks, fast foods, cake/doughnuts, and energy drinks.

This review has also shown that the proportions of Saudi children, youth, and adults who are at risk of physical inactivity are exceedingly higher than those people who are at risk for hypertension, hypercholesterolemia, hypertriglyceridemia, cigarette smoking, or obesity. Such findings emphasized the importance of lowering inactivity prevalence to reduce the population attributable fraction to several NCD due to physical inactivity among Saudi people. Indeed, a logistic regression analysis conducted on young Saudi medical students, the most common risk factors of coronary heart disease were high fat intake (73.4%), physical inactivity (57.9%), and overweight or obesity (31.2%). In addition, active Saudi boys tend to have favorable levels of serum triglycerides and high-density lipoprotein cholesterol.
compared with inactive boys.\textsuperscript{[57,59]} Active Saudi adolescents and adults also tend to have favorable anthropometric and body composition profile compared with inactive peers,\textsuperscript{[13,45,57]} as illustrated in Figures 4 and 5. Further, inactive Saudi boys, aged 8–12 years, were also fatter by more than 17%, compared to their active peers (fat% = 25.3% vs. 21.6%). However, there were no significant differences in this study between the two groups in fat-free mass.\textsuperscript{[16]}

Furthermore, longitudinal assessment of Saudi youth indicated that the percentage of young Saudi males, who were at risk for CAD, increased substantially at early adulthood as compared with childhood.\textsuperscript{[27,60]} Most notably is the fact that the increases in levels of obesity, physical inactivity, low cardiorespiratory fitness, hypertension, low HDL-C, and screen time were seen. Further analysis of the data showed that the tracking coefficients from childhood (with mean age = 9.5 years) to adulthood (with mean age = 20.5 years) for body fat content, blood pressure and most of blood lipids appeared to be fairly strong ($r = 0.42–0.58$); however, tracking coefficients for vigorous ($r = 0.02$), moderate ($0.22$), and light ($0.37$) intensity PA were varied and declining with increasing activity intensity.\textsuperscript{[27,60]} In another study using Kaiser’s PA Survey and Godin’s Leisure Time Exercise questionnaire and the non-laboratory-based Framingham risk, cardiovascular disease (CVD) risk scores, Alquaiz et al. found that activities such as households and strenuous exercises had a protective role against CVD risk among Saudi females.\textsuperscript{[61]}

Studies using objective assessments of PA indicated a significant correlation coefficient ($r = 0.48$; $P < 0.05$) between Saudi children’s activity levels during physical education lesson, and activity levels outside of school time.\textsuperscript{[13,62,63]} This means that boys who were active during physical education classes were likely to be active during outside school time, and vice versa. It is also interesting to note that the heritability coefficient of PA between brothers is higher for vigorous-intensity compared with moderate intensity PA. The analysis of PA data for a group of 40 prepubescent brothers (at age $8.5 \pm 1.0$ vs. $10.8 \pm 1.0$ years, for the younger and older brothers, respectively), revealed a heritability coefficient of 0.52 ($P < 0.01$) in the percentage of active time spent at heart rate above 159 bpm. However, the heritability coefficient was somewhat lower for a moderate level of PA ($r = 0.28$). These findings may indicate that vigorous PA exhibits familial resemblance in prepubescent boys.\textsuperscript{[13,64]}

Furthermore, it was very noticeable from the findings of this review that Saudi females were much less active than males. This finding applies to studies involving children and adolescents,\textsuperscript{[14,19-21,52,64]} as well as to those studies reporting PA data for adults.\textsuperscript{[28,30,37,38,41,45,47,48,65,66,67]} In one study involving females from Riyadh between 19 and 44 years, the mean daily step counts were considerably low (5114 steps).\textsuperscript{[67]} Such low mean daily steps placed them in the low active category, according to some proposed pedometer-determined PA standards.\textsuperscript{[68]} In addition, it appears that the difference in PA levels between Saudi males and females may be due more so to leisure-time PA, as findings from a large subnational study conducted on adolescents in secondary schools showed that males spent more time per week in leisure PA than females, while there was no significant difference in non-leisure-time PA relative to gender.\textsuperscript{[69]} As to the PA levels relative to the type of schools that students were attending, PA studies from Saudi Arabia indicated, in general, that, male students in public schools were more active than those in private schools, whereas, the opposite was true for female students.\textsuperscript{[52,53]} However, Taha has reported no significant differences in inactivity prevalence between students sampled from intermediate and secondary public or private schools in Al-Khobar.\textsuperscript{[19]}

![Figure 4: Activity energy expenditure (METs-minutes per week) among Saudi adolescents ($n = 2906$) relative to waist/height ratio (WHtR) category (below or above 50% of WHtR). Data are from reference\textsuperscript{[71]}](image)

![Figure 5: Body mass index (in kg/m$^2$; $*P = 0.001$) and waist circumference (in cm; $*P = 0.005$) among active (>600 METs-minutes per week) and inactive (<600 METs-minutes per week) Saudi adults aged 30–70 years old ($n = 17395$). Data are from reference\textsuperscript{[45]}](image)
The present review found that the prevalence of physical inactivity appears to increase with advancing age, whether in studies involving adolescents,[14,16,20] or adults.[43-45,47-49] However, there appear to be some interactions between age and gender among adolescents between 15 and 19 years old, as the time in minutes spent weekly in PA declined in males with advancing age, but stayed almost the same in females.[52,53] Furthermore, the high prevalence of physical inactivity seems to have occurred at a rather early age among Saudi children.[14,16] PA among children in these studies was objectively assessed by an electronic pedometer. The cutoff used when calculating inactivity prevalence among Saudi preschool children was <10,000 steps per day,[14] whereas for older boys aged 8–12 years, the cutoff score was 13,000 steps per week,[16] as previous research has shown that boys who accumulated 13,000 steps per day were engaged in 60 min or more of at least moderate-intensity PA.[70]

**Reasons for exercise and known barriers to PA in Saudi Arabia**

Table 2 illustrates the reasons for being active and the correlates of (or barriers to) PA among Saudis.[14,16,18,19,23,26,28,32,38,40,41,43,45,49,50,53,65] The present review shows that the most important reasons for engaging in PA among adolescents and adults are health, losing or maintaining weight, recreation, and socializing. The most important barriers to PA among adolescents are the lack of time in both males and females, followed by no appropriate place, especially in females and lack of facility and resources.[53,55] It seems that there is a gender difference in reason for being active. In one study, male adolescents reported health benefits as the main reasons for being physically active, whereas, weight loss was the major reason for females to be active.[53] As to the place of exercise among adolescents, females exercise mostly at home. Whereas, males exercise mostly at public areas and they do that commonly with friends.[53] Male and female adolescents in grades 9–12 from Al-Khobar, knew that PA was protective against disease and in preventing obesity, however, they had poor knowledge about the role of PA in preventing diabetes or hypertension.[59]

Among Saudi adults, the most important reason for being physically active was to maintain health or to lose weight, while time constraint and lack of space or facilities seem to be the major factors for not being physically active.[26,28,29,31,32,38,43,50,66,71] Interestingly, adults attending health centers in Al-Ahsa perceived the major barriers to PA as lack of energy (more so in males), lack of motivation, lack of self-confidence, lack of time (more so among females), lack of social support (more so among females), and lack of resources (more so among females).[66] In another study conducted on females (71% university students), daily step counts showed strong correlation ($r = 0.75, P = 0.03$) with self-efficacy.[67] Furthermore, the 1st year female university students from 8 health sciences programs in a major female university in Riyadh reported that the main barriers to PA were the lack of designated areas for PA and low self-efficacy.[12] Students exhibited high awareness of the benefits of PA for health. There was no lack of knowledge about the importance of PA for health. These females did not agree that family or Islamic related reasons were barriers to PA.[12]

In western Saudi Arabia, students from the Health Colleges at King Khalid University indicated from top downward that barriers to PA were time limitation, followed by lack of suitable sport places, lack of social support (from family and friends), lack of safe place, lack of motivation, and finally lack of sport skills.[30] In addition, among patients attending primary care clinic at university hospital in Riyadh, the major barriers to PA were said to be lack of resources (80.5%), especially among low-income people, lack of will-power (76.8%), and lack of skills (43.5%), especially so among females and lack of energy, which was reported by more females than males. Surprisingly enough, lack of time was not significantly reported by this sample, and this can be explained by the fact that more than 50% of the females were not working.[38] In Dammam, in eastern Saudi Arabia, the major reason for not exercising among female university students was lack of time (57%), while the most important reasons for exercising were for health (40.7%), for weight loss (32.9%), and for enjoyment (17.9%).[31]

As to correlates of physical inactivity, the level of activity was associated with obesity (BMI) and abdominal obesity (waist circumference [WC]) among Saudi adult population,[45] as well as among children and adolescents,[14,16,72] Furthermore, PA seems to be negatively influenced by age among adults[43,45,47,48] and adolescents.[32,53] Furthermore, a review of the factors negatively affecting PA participation in Saudi children and adolescents concluded that the most influencing determinants appear to be age, obesity, low cardiorespiratory fitness, high television viewing, and poor physical education program.[71] Another study conducted on a large sample of Saudi adolescents from three major cities in the country showed that gender, vegetable and fruit intakes, milk consumption, intake of energy drinks, and waist to height ratio were independently associated with total duration spent in PA per week.[51] In addition, Collison et al. reported that PA was positively correlated with fruit, vegetable, and cereal intake among adolescent from Riyadh.[60]

**Discussion**

This systematic review is considered as the first comprehensive review on PA in Saudi Arabia, covering inactivity prevalence, reasons for exercise, correlates, and barriers to PA. Based on the number of published papers in this systematic review, it is clearly apparent that PA research in Saudi Arabia has grown substantially over the past decade. Nevertheless, our ability to relate PA to health indicators depends on accurate, precise, and dependable measures of activity levels. PA is commonly measured through mechanical/electronic, physiological measurements, or validated self-reported questionnaires.[73]
Table 2: Major reasons for being active and correlates or barriers to engaging in physical activity among Saudi population

| Category               | Region or city | Gender       | Number of subjects | Age     | Reason for exercise             | Correlates or barriers                                                                 | Reference number |
|------------------------|----------------|--------------|--------------------|---------|----------------------------------|----------------------------------------------------------------------------------------|------------------|
| **Children**           |                |              |                    |         |                                  |                                                                                        |                  |
| Preschoolers (2007)    | Jeddah         | Male         | 109                | 5.2±0.8 |                                  | High screen time                                                                        | [14]             |
|                        |                | Female       | 115                | 5.2±0.9 |                                  | Gender                                                                                 |                  |
| Preadolescent (2007)   | Riyadh         | Male         | 296                | 10.3±1.3|                                  | Obesity                                                                                | [16]             |
|                        |                | Female       |                    |         |                                  | Age                                                                                    |                  |
| **Adolescents**        |                |              |                    |         |                                  |                                                                                        |                  |
| Adolescent (2003)      | Riyadh         | Male         | 894                | 15.7±1.8|                                  | Obesity                                                                                | [18]             |
|                        |                | Female       |                    |         |                                  | Inadequate school PE program                                                            |                  |
| Adolescents (2008)     | Al-Khobar      | Male         | 1240               | 16.3±1.7|                                  | Being female                                                                           | [19]             |
|                        |                | Female       | 1331               |         |                                  | Age (older is less active) Knowledge about obesity prevention                             |                  |
| Adolescents (2014)     | Riyadh, Jeddah | Male         | 1384               | 15–19   | Health                          | Lack of time                                                                            | [53]             |
|                        | and Al-Khobar  | Female       | 1482               |         | Lose weight                      | No suitable place                                                                        |                  |
|                        |                |              |                    |         | Recreation                       | Age (older adolescents)                                                                 |                  |
|                        |                |              |                    |         | Socializing with other           | Sex (being female)                                                                      |                  |
| Adolescents (2015)     | Riyadh         | Male         | 453                | 15–18   | Enhancing muscle and strength    | Lack of sports facilities                                                               | [23]             |
|                        |                | Female       |                    |         | Enjoyment                        | Lack of time                                                                            |                  |
|                        |                |              |                    |         | Improving body appearance        | Lack of friends’ support                                                                |                  |
| Adolescents (2015)     | Riyadh, Jeddah | Male         | 1388               | 16.7±1.1| Age                             | Age                                                                                    | [68]             |
|                        | and Al-Khobar  | Female       | 1500               | 16.5±1.0| Gender (being female)            | Gender                                                                                 |                  |
|                        |                |              |                    |         | WC                              | WC                                                                                    |                  |
|                        |                |              |                    |         | Sleeping hours                   | Sleeping hours                                                                          |                  |
|                        |                |              |                    |         | Eating habits                    | Eating habits                                                                          |                  |
| **Adults**             |                |              |                    |         |                                  |                                                                                        |                  |
| College students (1990)| Riyadh         | Male         | 362                | 21.9±2.1| Health                          | Lack of time                                                                            | [26]             |
|                        |                | Female       |                    |         | Recreation                       | No suitable place                                                                        |                  |
| College students (2008)| Riyadh         | Male         | 150                | 21.4±1.8|                                | Lack of time                                                                            | [28]             |
|                        |                | Female       | 152                |         |                                | Lack of resources                                                                        |                  |
| College students (2013)| Abha           | Female       | 663                | 20.4±1.5| Health                          | Lack of time                                                                            | [29]             |
|                        |                |              |                    |         | Losing weight                    | Lack of time                                                                            |                  |
|                        |                |              |                    |         | Have fun                         | No one to exercise with                                                                 |                  |
| College students (2014)| Abha           | Male         | 426                | 17–25   |                  | Lack of time                                                                            | [30]             |
|                        |                | Female       | 831                |         |                                | Lack of time                                                                            |                  |
|                        |                |              |                    |         |                                | Lack of suitable place                                                                  |                  |
|                        |                |              |                    |         |                                | Lack of social support                                                                  |                  |
| College students (2015)| Dammam         | Female       | 215                | 19.3±0.9| Health                          | Lack of time                                                                            | [31]             |
|                        |                |              |                    |         | Lose/maintain weight             | No time                                                                                |                  |
|                        |                |              |                    |         | Enjoyment                        | No access to sport facilities                                                           |                  |
| College students (2015)| Riyadh         | Female       | 94                 | 18–22   | Health                          | Lack of facilities                                                                      | [32]             |
|                        |                |              |                    |         | Losing weight                    | Low self-efficacy                                                                       |                  |
|                        |                |              |                    |         | Recreation                       |                                                                                       |                  |
| Primary care patients  | Riyadh         | Male         | 144                | 33.3±13.3|                                | Lack of resources                                                                        | [38]             |
|                        |                | Female       | 306                |         |                                | Lack of will-power                                                                      |                  |
|                        |                |              |                    |         |                                | Lack of sports skills                                                                   |                  |
|                        |                |              |                    |         |                                | Lack of energy                                                                          |                  |
| Primary care patients  | Al-Hassa region| Males        | 2176               | 37.0    |                                | Being female                                                                            | [40]             |
|                        |                | Female       |                    |         |                                | High educational level                                                                  |                  |
|                        |                |              |                    |         |                                | High occupational status                                                                 |                  |
|                        |                |              |                    |         |                                | Lack of time                                                                            |                  |
|                        |                |              |                    |         |                                | Lack of facilities                                                                       |                  |
|                        |                |              |                    |         |                                | Bad weather                                                                             |                  |
|                        |                |              |                    |         |                                | Culture and tradition                                                                    |                  |

WC: Waist circumference

(Contd...)
Unfortunately, many of the studies reporting PA prevalence among Saudi population used questionnaires that were not validated.\[18,19,21,23,24,27,28,31,34,35,37,38,43,45,51]\] However, nine studies in this review adopted validated and commonly used international PA questionnaires (IPAQs),\[20,33,39,40,42,44,46,47,50]\ and several studies used the validated ATLS PA questionnaire.\[26,29,32,74,75]\ The prevalence of physical inactivity in Saudi Arabia

The current review confirmed the presence of high inactivity prevalence among the Saudi population. In many of the examined studies in this review, inactivity prevalence among Saudi adults was defined as <600 METs-minutes per week or the equivalent of 150 min per week of moderate-intensity PA.\[31,41,45,47,48]\ Such level of activity represents the minimal health-enhancing PA that was previously recommended for health benefits.\[2-4]\ As for children and adolescents’ health, the recommendations from major consensus statements call for the accumulation of at least 60 min of daily moderate to vigorous intensity PA plus adding muscle-strengthening activities.\[2,4,74]\ However, not many studies\[18,19,21,23]\ observed in the current review used stringent criteria for adolescent’s physical inactivity as formerly defined by international recommendations.\[76]\ The remarkable economic prosperity, rapid developments in the standards of living, increased mechanization, and massive urbanization during the past few decades have significantly influenced the lifestyle habits of all the Saudi people. As a result, PA has undoubtedly been systematically reduced, while sedentary living becomes increasingly prevalent in all segments of the society.\[80]\ It is well established that physical inactivity is considered an important contributor to NCDs in countries with high income and is increasingly becoming so in those countries with low and middle income.\[3,77]\ In Saudi Arabia, it was estimated that over 18% of the burden of disease, which is due to all-cause mortality, can be eliminated if all inactive persons in the country become active.\[81]\ No other medical intervention can positively influence the overall well-being as PA can do.

The present review has also revealed that females are much more inactive than males. This finding is similar to what was previously reported elsewhere.\[78,79]\ The reduced female’s PA in Saudi Arabia could be attributed mainly to social and cultural reasons, as females have generally limited opportunities when compared with males, to engage in PA, especially outdoor leisure-type activity. Furthermore, there are much fewer and more expensive fitness centers available to females compared to those of males.\[66]\ Another factor that may contribute to the reduction of PA includes more reliance on cars rather than walking for short-distance travels, including trips to and from work or school.\[8,80]\ Elsewhere, research indicated that actively commuting to school can significantly enhance children’s PA levels and increase their energy expenditure.\[81]\ It is well understood that a comparison between PA studies should be made with caution since wide variations among studies can exist in the age range, gender, representation, PA assessment, and inactivity criteria. However, it is important to put the inactivity prevalence findings from this review in

| Table 2: (Continued) |
| --- |
| Category | Region or city | Gender | Number of subjects | Age | Reason for exercise | Correlates or barriers | Reference number |
| --- |
| Primary health patients (2013) | Al-Ahsa region | Male | 118 | 20–56 | Lack of energy | Lack of motivation | [65] |
| | | Female | 124 | | Lack of self-confidence | Lack of time | |
| Adult population (2001) | Riyadh | Male | 1333 | 41.1±9.7 | Health Losing weight Recreation | Lack of time | [43] |
| | | | | | | Being married | |
| | | | | | | Work in private section | |
| Adult population (2007) | National sample | Male | 17395 | 30–70 | | Age | [45] |
| | Female | | | | | Low educational level | |
| | | | | | | Increased BMI and WC | |
| Adults (working women) (2016) | Riyadh | Female | 420 | 31.7±8.3 | Health Weight maintenance | Working in private sector Working 7 or more h | [49] |
| | | | | | | | |
| Lowlanders and highlanders (1995) | Aseer province | Male | 905 | 16–60 | | Obesity (in men) | [41] |
| | Female | | 16–60 | | | |
| Adults (physicians) (2016) | Riyadh | Male | 1733 | 24–65 | | | [50] |
| | Female | 222 | | | | |

WC: Waist circumference
perspectives and compare them with that of international prevalence data. A recent study used pooled analysis of three multi-center studies, which were conducted between 2002 and 2004, and investigated the prevalence of physical inactivity in 76 countries with almost 300,000 participants aged 15 years or older.\(^{[82]}\) The IPAQ or the global PA Questionnaire (GPAQ) were used in these studies to assess physical inactivity. The findings indicated that the crude worldwide prevalence of physical inactivity was 21.4% (95% confidence interval [CI] 18.4–24.3) and that inactivity was higher among women (23.7%; 95% CI 20.4–27.1) than men (18.9%; 95% CI 16.2–21.7).\(^{[82]}\) Furthermore, a recent worldwide survey using data for participants 15 years and older from 122 countries, indicated that physical inactivity was the highest among people in the Americas and the Eastern Mediterranean regions, and that inactivity rises with age, higher in women as compared with men, and increase in high-income as compared with low-income countries.\(^{[77]}\) In another study conducted on university students in 23 countries, using the IPAQ, the prevalence of physical inactivity was 41.4%, ranging from 21.9% in Kyrgyzstan to 80.6% in Pakistan.\(^{[83]}\)

It is well recognized that there are substantial health benefits from regular PA for children and adolescents.\(^{[54]}\) They need regular PA for normal growth and development and maintenance of good health and fitness. The findings of this review showed that the majority of Saudi children and youth were not active enough to meet the minimal weekly requirements of MVPA levels. Elsewhere, a recent study on the global PA prevalence among adolescents has combined the two most comprehensive data sets on adolescents’ PA levels; the Global School-based Student Health Survey (GSHS)\(^{[84]}\) and the health behavior in school-aged children’s survey.\(^{[85]}\) The findings of the above-mentioned study showed that the proportion of adolescents aged 13–15 years engaging in <60 min of moderate to vigorous intensity PA per day was 80.3% and that girls were less active than boys.\(^{[77]}\) In addition, the GSHS, which reported PA data for school children in 34 countries, showed that nearly 24% of boys and over 15% of girls across the countries met the PA recommendations.\(^{[86]}\)

The current review observed that in some studies which used the short version of IPAQ, inactivity among Saudi women was surprisingly somewhat lower than that of men.\(^{[40,44]}\) This could have been due to the fact that the IPAQ includes household PA, in which females in Saudi Arabia may engage in, and thus, report plenty of such household activities (such as carrying babies, scrubbing floors, sweeping, and vacuuming, which are classified as moderate-type of PA in IPAQ). Other studies, which utilized IPAQ, have also found no significant differences in inactivity prevalence between Saudi males and females.\(^{[30,33,39]}\) This may be due to the fact that, previous studies have shown that there was the possibility of over-reporting moderate levels of PA when using IPAQ.\(^{[44,87,88]}\) Therefore, the real overall prevalence of physical inactivity among Saudi females in those studies using IPAQ may be much higher than what have been previously reported.

The present report revealed some inconsistencies between studies regarding PA levels among students attending public versus private schools.\(^{[19,52,53]}\) It appears that the location, from which the study sample was selected, may have influenced such inactivity levels among female students, as physical education classes are not compulsory in all females’ private schools. However, the majority of private schools do offer physical education classes on elective bases. In contrast, no physical education classes are offered as yet in girls’ public schools. Such differences between the two types of schools were mirrored in the findings of a recent subnational study conducted on adolescent girls, which revealed that females in private schools spent more time per week in leisure-time PA as compared to females in public schools.\(^{[40]}\)

### Factors influencing PA in Saudi Arabia

Understanding the reasons behind PA or inactivity is very important for implementing effective intervention strategies for the promotion of active living in Saudi society. Research into PA correlates and determinants has proliferated in the past few decades. Factors such as age, sex, health status, self-efficacy, and motivation are known to associate with PA.\(^{[89]}\) Variables that are found to positively associate with adult’s PA include high education level, high income, enjoyment of PA, self-efficacy, social support, and safe environment.\(^{[6]}\) On the other hand, the factors that are believed to be negatively associated with adult PA include advancing age, low income, lack of time, low motivation, obesity, and poor health.\(^{[60]}\) Among children and adolescents, the following factors have been found to positively associate with PA: Gender (boys), self-efficacy, parental support, parental education, physical education, or sports at school and support from friends and family.\(^{[90]}\)

The present study indicates that physical inactivity increased with advancing age in children and adolescents as well as in adults. Age-related decline in PA has been well documented in the literature. For instance, data from the Behavioral Risk Factors Surveillance System (BRFSS) study in the United States indicated that physical inactivity steadily increased in both sexes with advancing age from 18–29 years to 70+ years.\(^{[78]}\) Among adolescents, PA was also shown to decline during adolescence years.\(^{[91]}\)

The present review revealed that reduced PA was associated with obesity and WC in adults, children, and adolescents.\(^{[15,16,45,58,75]}\) WC is considered a surrogate measure of abdominal obesity. In an international comparison survey involving youth 10–16 years from 34 countries, it was demonstrated that PA
levels were lower and screen viewing times were higher in overweight compared to normal weight youth.[95] Furthermore, a multicenter European study conducted on 9–10-year-old children reported a significant difference in body fatness measurement between children who engaged in more than 2 h of MVPA per day and those who participated in <1 h per day.[93] Other correlates of PA also include social and physical environment such as urban planning, transportation systems, and parks, and trails.[8,80,90] Evidently, there is a shortage of local researches in studying the environmental influences of PA in Saudi Arabia. Such information is extremely important for designing and implementing PA intervention programs. A recent findings from a study conducted on 9–12-year-old same-sex twin pairs (n = 234) showed that the shared environmental effects explained 73% of the variance in objectively-measured total PA (95% CI = 63–81%) with no significant genetic effect, whereas fidgetiness was largely under genetic control, with the genetic effects explaining 75% of the variance (95% CI: 62–84%).[94]

Before the recent economic growth surge that started four decades ago, traditional urban designs in Saudi cities, with narrow and shaded streets, supported pedestrian travel and is common daily activities within the community, thus, facilitating walking and cycling and resulting in increased daily living activity. Walking and cycling to and from nearby school were also common in the past. However, major Saudi Arabian cities are now modernized, with large street networks and separate zoning for residential and commercial areas. This kind of design requires, of course, the use of cars for all trips and, hence, totally discourages walking. Consequently, incongruous urban designs, as well as extreme weather and safety issues, discourage most students from walking to schools. In a study conducted on a representative sample of primary school children in Riyadh, it was found that the proportion of children walking to schools was only 28.7%.[80] The same study found that body fat percent was 15% lower among those students walking to schools, as compared to their peers who were not walking to school (17.9% vs. 20.6%).[80]

Therefore, there is a need to restructure our built environments to become safer and more PA promoting all season round. In addition, the population growth of major cities in Saudi Arabia has escalated over the past 40 years or so. For instance, the population of Riyadh city, the Capitol, has increased from 350 thousands in 1970 to an astonishing number of 6.15 billion in 2015.[95] Undeniably, major Saudi cities are becoming very crowded and densely populated with heavy traffic leading to long sitting hours in cars, thus simultaneously increasing sedentary behaviors and decreasing PA.

It is interesting to note that the recent national study on PA and other NCD risks reported that PA was low among more educated Saudis.[48] However, another community based national study conducted on Saudi adults between the ages of 30 and 70 years found that inactivity prevalence decreased with increasing education levels.[45] Elsewhere, PA was shown to increase with increasing education levels,[96,97] and inactivity was reported to be more prevalent among less educated American people.[98] It appears that the association between PA and education levels depends on the domain of PA assessed. PA is often categorized into four domains based on the location or purpose of the activity. These major domains are (1) leisure, (2) domestic or household, (3) occupational or work-related, and (4) transportation. Such an inverse association between activity and education level would very likely to be present when levels of education were associated with leisure-time PA.[98] However, the inclusion of work-related PA revealed that less educated individuals, who were involved in the manual occupation, were more active people.[99] In accordance with this finding, several previous reports have shown that leisure-time physical inactivity is inversely associated with socioeconomic status.[99,100] In addition, it appears that in developed countries, both income level and urban/rural status were significant predictors of adults’ likelihood of meeting PA guidelines.[7]

Some studies in the present review indicated that Saudi females had much energy and motivation to exercise than males and less internal barriers than males.[38,66] Females also reported more barriers than males with lack of time as the major external barrier along with the lack of social support, low self-efficacy, and lack of facility, and resources.[66,69] These, along with the cultural and traditional barriers, may partially explain the lower participation levels in PA among Saudi females as compared to males. Furthermore, a recent study focused on the barriers and facilitators to PA among Arabic adults concluded that the barriers included those happening at the individual level (e.g., lack of time and health status), at the social/cultural/policy level (e.g., traditional roles for women, lack of social support, and use of housemaids), and at the environmental level (e.g., hot weather and lack of exercise facilities), whereas activity facilitators included Muslim religion, desire to have slimmer bodies, and having good social support systems.[101]

Promoting physical inactivity in Saudi Arabia

This systematic review has clearly shown that Saudis need to be more physically active than the current estimates, to control the escalating prevalence of NCDs in this country, such as obesity, diabetes mellitus, cardiovascular diseases, and cancer.[3,10,11] At present, PA in Saudi Arabia appears to be an underserved public health issue.[102] Although the benefits of PA are well acknowledged, getting inactive people to start participating in PA and to keep exercising remains a great challenge. Therefore, Saudis need to create ways to make PA opportunities more available in schools, workplaces, and within the community settings.

Health-care providers have definitely an important role to play in promoting PA, by providing routine assessment and counseling on increasing PA, improving fitness and reducing sedentary behaviors for their patients. Health-care providers can encourage PA for patients and communities by making
PA a vital sign and designing innovative active health-care environments. Health-care institutions can promote active living and invest and advocate for community health through active transportation, public recreation space, and school health initiatives. They can also adopt a comprehensive curriculum that potentially closes the gap in medical schools, residency programs, graduate education, and nursing curricula on topics related to PA, and exercise prescription and lifestyle health. Physicians and other health professionals receive very limited formal training in the PA science and clinical applications of exercise, including obesity prevention, nutrition, lifestyle medicine, and PA prescription in health and disease. The incorporation of a well-tested PA module into the residency curriculum was shown to be feasible, efficacious, well received, and easily incorporated into the existing curriculum. In Saudi Arabia, a recent survey conducted on primary health-care centers in Eastern province of the country revealed that only one-third of the health-care professional believed that they were well prepared to treat obesity, and 83% of the respondents had negative attitudes toward the concept of overweight and obesity. This may not encourage them to prescribe PA for their obese patients.

It is interesting to know that findings from a study on Saudi population showed that preventable risk factors such as smoking, obesity, and physical inactivity were not associated with Saudis’ self-rated health. Such inadequate knowledge indicates a distorted perception of health and may represent a major challenge to PA promotional interventions in Saudi Arabia. Thus, requiring increased efforts to raise public awareness about unhealthy lifestyle habits such as physical inactivity and harmful sedentary behaviors. Furthermore, there are urgent needs for reliable and widely disseminated information for the public in nutrition, PA and health, obesity prevention, and live-long active living. The new social media, which is widely used by the Saudi people, can be fully utilized for PA promotion and obesity prevention.

### Strength and limitations

This is the first comprehensive review on the prevalence and correlates of PA/inactivity among Saudi population, a country that has been going into rapid economic development and dramatic lifestyle transition in the past few decades. However, this review is subjected to several limitations. Obviously, the review is limited by the quality of the reviewed studies reported in this paper. Some of the reviewed studies are lacking in one or more of the following limiting factors: The sample was not accurately represented, especially for some of the local studies, not reporting response rate, using less validated PA questionnaires and lack of statistical power calculation of the sample size. In addition, calculating usual PA prevalence for a population from different studies using varied PA instruments must be viewed with caution.

### Summary and Conclusion

It was clear from the available evidences that PA is increasingly becoming prevalent among the Saudi population of all ages and sexes. This may be largely due to the result of the recent dramatic changes in the people’s lifestyle. The proportion of Saudi children and adults who are at risk for inactivity is exceedingly much higher than those at risk of any of the other traditional coronary heart disease risk factors. The high prevalence of inactivity in Saudi Arabia, particularly among females, represents a major public health burden and a precursor for obesity prevalence. In addition, compared with men, Saudi women have less access to exercising facilities and limited opportunities to engage in PA. School children and university students appear to have fairly good knowledge about the benefits of PA. However, a large percentage of schools’ girls lacked proper information and skills on how to exercise or to be physically active. Although time constraint, lack of facilities and resources, low self-efficacy, and lack of social support (especially in the part of women) represent a major barriers to being physically active among Saudis, there remains a need to further understand the personal, social and environmental barriers to PA in Saudi population, particularly in relation to different domain of PA (leisure time, occupational, transports, and households PA). It is recommended that a national policy encouraging active living and discouraging inactivity be established. Health-care providers have an important role in promoting PA and encouraging and adopting healthy lifestyle habits among all Saudi people.

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