Physical activity promotion in Saudi Arabia: A critical role for clinicians and the health care system

Zahra Alahmed, Ministry of Health, Primary Health Centers, Eastern Province, Saudi Arabia
Felipe Lobelo, Emory University

Journal Title: Journal of Epidemiology and Global Health
Volume: Volume 7
Publisher: Atlantis Press | 2018-03-01, Pages S7-S15
Type of Work: Article | Final Publisher PDF
Publisher DOI: 10.1016/j.jegh.2017.10.005
Permalink URL: https://pid.emory.edu/ark:/25593/vp85r

Final published version: http://dx.doi.org/10.1016/j.jegh.2017.10.005

Copyright information:
© 2017 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd.

This is an Open Access work distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (https://creativecommons.org/licenses/by-nc-nd/4.0/).

Accessed November 12, 2022 2:22 AM EST
Physical activity promotion in Saudi Arabia: A critical role for clinicians and the health care system

Zahra Alahmed, Felipe Lobelo

To cite this article: Zahra Alahmed, Felipe Lobelo (2018) Physical activity promotion in Saudi Arabia: A critical role for clinicians and the health care system, Journal of Epidemiology and Global Health 7:Suppl. 1, S7–S15, DOI: https://doi.org/10.1016/j.jegh.2017.10.005

To link to this article: https://doi.org/10.1016/j.jegh.2017.10.005

Published online: 16 April 2019
Physical activity promotion in Saudi Arabia: A critical role for clinicians and the health care system

Zahra Alahmed a,⇑, Felipe Lobelo b,c

a Ministry of Health, Primary Health Centers, Eastern Province, Saudi Arabia
b Hubert Department of Global Health, Rollins School of Public Health Emory University, Atlanta, Georgia
c Exercise Is Medicine Global Research and Collaboration Center, Rollins School of Public Health Emory University, Atlanta, Georgia

A R T I C L E   I N F O

Article history:
Received 14 June 2017
Received in revised form 29 September 2017
Accepted 18 October 2017
Available online 24 October 2017

A B S T R A C T

This work aimed to summarize the benefits of physical activity and the importance of counseling by a physician to promote physical activity in a primary health care setting in Saudi Arabia. Despite established evidence that physical activity is effective for reducing the risk of non-communicable diseases, as well as the importance and cost-effectiveness of physical activity counseling in the primary care setting, few studies have been conducted regarding physical activity counseling in Saudi Arabia.

© 2017 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Contents

1. Introduction ........................................................................................................... S7
2. PA and inactivity in Saudi Arabia ........................................................................ S9
3. PA promotion intervention .................................................................................... S10
  3.1. PA counseling ................................................................................................ S10
  3.2. PA counseling effectiveness ............................................................................ S11
4. PA counseling in primary care in Saudi Arabia ......................................................... S14
  4.1. Role of PHC centers ....................................................................................... S14
  4.2. Studies in PA counseling ............................................................................... S14
5. Conclusions ...................................................................................................... S14

References ............................................................................................................ S14

1. Introduction

Physical activity (PA) is defined as any bodily movement produced by the contraction of skeletal muscles that results in a substantial increase in caloric requirements over resting energy expenditure [1]. According to the World Health Organization (WHO), physical inactivity is considered the fourth leading risk factor for global mortality [2] and is estimated to account for 6% of the global mortality rate [3]. In Saudi Arabia, 58.5% of the Saudi adult population was considered physically inactive [4]. In Saudi Arabia, the WHO estimated that 57% of children and 71% of youths were physically inactive [5]. According to a national survey, 60% of the entire Saudi Arabian population is physically inactive [6]. Furthermore, 90% sit consecutively for more than 2 h daily [6]. To counter this phenomenon, health education counseling should be provided in primary health care (PHC) centers to encourage PA.

Studies have suggested that physician-recommended PA is one of the most powerful health-promoting practices [7]. PA reduces the risk of diabetes, stroke, ischemic heart diseases, and breast and colon cancers. It is also important for weight control and the prevention of obesity [3]. Furthermore, evidence has shown that PA improves mental health by reducing anxiety, depression, and stress [8]. In addition, the health-related outcomes of PA are inversely associated with the amount of PA (Fig. 1). The health-related benefits of PA are summarized in Table 1 [9–12]. Fig. 2

Worldwide, physical inactivity has been estimated to be the leading cause of most non-communicable diseases (NCD), 6% of coronary heart disease cases, 7% of type 2 diabetes cases, 10% of breast cancers, and 10% of colon cancers [10]. In 2008, physical

Peer review under responsibility of Ministry of Health, Saudi Arabia.

⇑ Corresponding author at: 7233 Al Tanaem-Al Urubah, Safwa 32833-3211, Saudi Arabia.
E-mail address: Zahraa.alahmed@gmail.com (Z. Alahmed).

https://doi.org/10.1016/j.jegh.2017.10.005
2210-6006/© 2017 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
Fig. 1. Adapted ecological model of the determinants of physical activity. Used with permission from Lancet [30].

Table 1

| Health Outcome          | Evidence of Inverse Dose–Response Relationship | Effect Size                                      | Strength of Evidence*       |
|-------------------------|-----------------------------------------------|-------------------------------------------------|-----------------------------|
| All-cause mortality     | Yes                                           | 30% risk reduction                              | Strong                      |
| Cardiorespiratory health| ____                                          | 20%–35% lower risk of cardiovascular disease, coronary heart disease, and stroke | Strong                      |
|                         |                                               | Lower risk of high blood pressure               | Strong                      |
|                         |                                               | Aerobic activity decreases blood pressure by 6.9/4.9 mmHg | Strong                      |
| Metabolic health        | Yes                                           | Increased cardiorespiratory and muscular fitness | Strong                      |
|                         | ____                                          | 30%–40% lower risk of metabolic syndrome and type 2 diabetes in at least moderately active people compared to those who are sedentary | Moderate to strong          |
|                         |                                               | Healthier body mass and composition             | Strong                      |
| Energy balance          | Yes                                           | Weight loss                                     | Strong                      |
|                         | Yes                                           | Weight maintenance following weight loss        | Moderate                    |
|                         | Yes                                           | Abdominal obesity                               | Moderate                    |
| Musculoskeletal health  | Yes                                           | **Bone**: Reduced risk of hip fracture is 36%–68% at the highest level of physical activity. The magnitude of the effect of physical activity on bone mineral density is 1% to 2% | Moderate (weak for vertebral fracture) |
|                         | Yes                                           | **Muscular**: Increases in exercise training enhance skeletal muscle mass, strength, power, and intrinsic neuromuscular activation | Strong                      |
| Functional health       | Yes                                           | Approximately 30% risk reduction in terms of the prevention or delay in function and/or role limitations with physical activity | Moderate to strong          |
|                         | ____                                          | Older adults who participate in regular physical activity have an approximately 30% lower risk of falls | Strong                      |
|                         |                                               | Improved cognitive function                      | Strong                      |
| Cancer                  | Yes                                           | 30% lower risk of colon cancer and approximately 20% lower risk of breast cancer for adults participating in daily physical activity | Strong                      |
|                         | ____                                          | Lower risk of lung cancer and endometrial cancer | Moderate                    |
| Mental health           | Yes                                           | There is an approximately 20%–30% lower risk of depression and dementia for adults participating in daily physical activity | Strong                      |
|                         | ____                                          | There is an approximately 20%–30% lower risk of distress for adults participating in daily physical activity | Weak                        |
|                         |                                               | Improved sleep quality                           | Moderate                    |

Adapted from [9–12].

Strong: strong, consistent across studies and populations. Moderate: moderate or reasonable, reasonably consistent. Weak: weak or limited, inconsistent across studies and populations.

Evidence presented here is the result of clinical intervention as well as large-scale, population-based, observational studies. Evidence was summarized from ACSM-AHA recommendations for physical activity and the Physical Activity Guideline Advisory Committee.

Note: The Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, or weak. To do so, the Committee considered the type, number, and quality of studies available, as well as the consistency of findings across studies that addressed each outcome. The Committee also considered evidence for causality and dose-response when assigning the strength-of-evidence rating.
Women) [18]. However, it was found that 16.8% of the population overall Saudi Arabia population (60.1% for men and 72.9% for prevalence of physical inactivity was found to be 66.6% for the (52.1% of men and 67.7% of women) [4]. In another study, the nationwide study showed that the prevalence of PA is very low ties [5, 17]. This can be seen especially in Saudi Arabia, where a physical inactivity is a major public health burden in Saudi Arabia.

2. PA and inactivity in Saudi Arabia

NCD have become more prevalent in the oil-producing countries of the Arabian Peninsula (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) and account for a large portion of mortality and morbidity there [17]. Most NCD mortality is due to cardiovascular diseases, including hypertension, diabetes, dyslipidemia, and overweight/obesity. The increase in NCD mortality and morbidity in the Arabian Peninsula is partly caused by the rapid changes in lifestyle due to urbanization and motorization, which increase the level of physical inactivity in these communities [5, 17]. This can be seen especially in Saudi Arabia, where a nationwide study showed that the prevalence of PA is very low (men, 6.1%; women, 1.9%) [17].

According to the WHO’s 2016 diabetes country profile, 58.5% of the adult Saudi population were found to be physically inactive (52.1% of men and 67.7% of women) [4]. In another study, the prevalence of physical inactivity was found to be 66.6% for the overall Saudi Arabia population (60.1% for men and 72.9% for women) [18]. However, it was found that 16.8% of the population engaged in a moderate level of PA and 16.6% engaged in a high level of PA [18]. The estimated population-attributable fractions (PAF) in Saudi Arabia were calculated using adjusted relative risks and were reported to be 11.4% for coronary heart disease, 14.1% for type 2 diabetes, 19.9% for breast cancer, 20.4% for colon cancer, and 18.4% for all-cause mortality associated with physical inactivity [10]. The estimated gains in life expectancy by eliminating physical inactivity are 1.51 years [10].

In addition to health-related problems, physical inactivity creates an economic burden in every country. In Saudi Arabia, using the PAF approach, the direct health care costs attributable to physical inactivity have been estimated to total $869,019, representing 1.71% of the total health care costs [19]. Indirect productivity costs ($169,442), which represent the financial value of lost productivity due to premature mortality using a friction cost approach, take into account replacements within the labor market (3-month friction period). Therefore, the total costs (direct and indirect costs) are estimated to be $1,038,461 in Saudi Arabia [19]. In 2013, the amounts of direct health care costs attributable to physical inactivity were $557,910 (64.2% of total direct costs) paid by the public sector, $172,066 (19.8% of total direct costs) paid by households, and $139,043 (16.0% of total direct costs) paid by the private sector [19].

To assess the health-related and economic-related burdens of physical inactivity as well as the effectiveness of PA interventions, a behavioral epidemiology framework has been developed to understand the patterns of PA and sedentary behavior to build evidence for public health action. This framework organized the research into six phases to help identify the research gaps and guide public health policy and practice [17]. These phases are as follows:

**Phase 1.** Identify relationships of PA and sedentary behavior with health outcomes (see Table 2)

**Phase 2.** Measure PA and sedentary behavior

**Phase 3.** Characterize the prevalence and variations of PA and sedentary behavior in populations (see Table 3)

**Phase 4.** Identify the determinants of PA and sedentary behavior (see Table 4)

**Phase 5.** Develop and test interventions that influence PA and sedentary behavior (see Table 5)

**Phase 6.** Use evidence to inform public health guidelines and policy [17]

At the policy level, some of the studies conducted in the Arabian Peninsula have identified an inverse association between PA and the following: ineffective health communication, limited resources (general) allocated for PA promotion, and ineffective PA policies in colleges—all at the population-based policy level. However, at the individual-based policy level, studies have identified an inverse
association between PA and the following: lack of time for counseling, health personnel’s limited knowledge/awareness of the benefits of PA, limited material resources in health centers (teaching materials, guidelines), lack of specialty clinics at the PHC level, and limited availability of human resources (i.e., dietitians) [17].

3. PA promotion intervention

Strategies to promote PA can be implemented using an ecological model to determine the factors that play a role in promoting PA and behavioral change. PA counseling is one of these strategies, and it can affect different levels in the ecological model of the determinants of PA (Figure 3).

3.1. PA counseling

PA counseling in the PHC system can help achieve the main objectives of the WHO’s Global Strategy for Diet, Physical Activity, and Health. These objectives include the following: reducing risk factors for chronic diseases; increasing the awareness and understanding of the influences of diet and PA on health and the positive impact of preventive interventions; developing, strengthening, and implementing global, regional, and national policies and action

Table 2

| Lead Author          | Study Design                                      | Health Outcomes                                                                 | Association with Physical Activity (Type)                   |
|----------------------|---------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------|
| Prospective Studies  |                                                   |                                                                                 |                                                             |
| Al Saif (2015)       | Aerobic and anaerobic intervention (3 months)      | BMI                                                                             | Inverse association (aerobic intervention)                  |
| Al-Eisa (2014)       | Exercise intervention (3 wk)                      | BP, Insomnia, Depression, Attention span                                        | Inverse association (exercise intervention) Positive association (exercise intervention) |
| Alghadir (2016)      | Exercise intervention (12 wk)                     | BMI, WHR, Serum levels of copper, zinc, and bone-specific alkaline phosphatase  | Inverse association (exercise intervention) Positive association (exercise intervention) |
|                      | 100 adults aged 30–60 y                           | Osteoporosis t-score, Bone mineral density, Serum levels of calcium and manganese|                                                             |
|                      | Serum levels of calcium and manganese             |                                                                                 |                                                             |
| Rouzi (2011)         | Prospective cohort (6 y)                          | All fragility-related fractures                                                  | Inverse association (total PA)                              |
| Salman (2009)        | Exercise intervention (11 y)                      | Hypertension                                                                     | Inverse association (leisure PA)                            |
| Tomar (2013)         | Exercise intervention (12 wk)                     | Glycemic control                                                                  | Positive association (exercise intervention)                |
| Cross-Sectional: Adults |                                               |                                                                                 |                                                             |
| Al-Hamdan (2012)     | Cross-sectional                                   | Hypertension                                                                     | Inverse association (work, transport, and leisure PA)       |
| Almajwal (2015)      | Cross-sectional 362 non-Saudi hospital nurses     | BMI                                                                             | Inverse association (total PA)                              |
| Al-Nozha (2007)      | Cross-sectional                                   | BMI                                                                             | Inverse association (leisure PA)                            |
| Basalaiman (2014)    | Cross-sectional 10,735 patients aged 15 y or older| Hypercholesterolemia, Borderline hypercholesterolemia, Hypertension              | Non-significant (total PA)                                  |
| El Bcheraoui (2013)  | Cross-sectional 10,735 patients aged 15 y or older| Borderline hypertension                                                         | Non-significant (total PA)                                  |
| Hegazy (2015)        | Cross-sectional study 174 women, half with lower back pain for ≥ 3 mo aged 20–45 y | Lower back pain                                                                  | Inverse association (total PA)                              |
| Memish (2014)        | Cross-sectional 10,735 adults aged 15 y or older   | BMI                                                                             | Inverse association (total PA, men only)                    |
| Tuffaha (2015)       | Cross-sectional 10,735 adults aged 15 y or older   | Vitamin D deficiency                                                            | Non-significant (total PA)                                  |
| Cross-Sectional: Children and Adolescents |                                          |                                                                                 |                                                             |
| Al-Hazzaa (2012)     | Cross-sectional 2906 school students aged 14–19 y  | BMI                                                                             | Inverse association (vigorous PA)Non-significant (total PA) |
| Al-Hazzaa (2013)     | Cross-sectional 2868 secondary-school students aged 15–19 y | WHHR, Sleep duration                                                            | Positive association (total PA)                             |
| Al-Nakeeb (2012)     | Cross-sectional 1138 school students aged 15–17 y  | BMI                                                                             | Inverse association (total PA and walking)                  |
| Al-Nuaim (2012)      | Cross-sectional 1270 school students aged 15–19 y  | BMI                                                                             | Inverse association (total PA)                              |
| Alqahtani (2015)     | Cross-sectional 370 school children aged 14–19 y   | BMI                                                                             | Inverse association (total PA, boys only)                   |

BMI: body mass index; PA: physical activity; WC: waist circumference; WHR: waist-to-hip-ratio.
plans to improve diets and increase PA that are sustainable and that comprehensively and actively engage all sectors; and monitoring science and promoting research on diet and PA [20]. Table 6 presents different organizations and evidence-gathering agencies and their recommendations for PA counseling within PHC centers.

### 3.2. PA counseling effectiveness

The American Heart Association has emphasized that “the advice from healthcare professionals significantly influences adoption of healthy lifestyle behaviors, including regular PA, and can...
| Organizations | Recommendation | Description |
|---------------|----------------|-------------|
| Royal Australian College of General Practitioners (Royal Australian College of General Practice, 2012) | Grade A III evidence All adults should be advised to participate in 30 min of moderate activity on most (preferably all) days of the week | Interventions that have shown short-term benefits of changing physical activity include: a) patient screening to identify current levels of activity (including use of a pedometer) and readiness to be more active; b) provision of brief advice or counseling regarding exercise; c) supporting written materials and/or written prescription for exercise; d) pedometer step target of 10,000 steps per day or 2000 more than at baseline |
| U.S. Preventive Services Task Force (Moyer and U.S. Preventive Services Task Force, 2012) | Grade C evidence There is sparse evidence indicating that the health benefits of initiating behavioral counseling in the primary care setting promote physical activity. Clinicians may choose to selectively counsel patients instead of incorporating counseling into the care of all adults in the general population | Studies of medium-intensity and high-intensity behavioral counseling interventions have shown beneficial effects on behavioral and intermediate health outcomes. Medium-intensity interventions involved a range of 3–24 phone sessions or 1–8 in-person sessions. High-intensity interventions involved a range of 4–20 in-person group sessions and were the only interventions to report sustained benefits beyond 12 months. No high-intensity interventions and few medium-intensity interventions have involved primary care clinicians as the providers of the intervention. Tailor advice to: a) motivations and goals; b) current level of activity and ability; c) circumstances, preferences, and barriers to being physically active; and d) health status. Provide information about local opportunities to be physically active for people with a range of abilities, preferences, and needs. Consider giving a written outline of the advice and goals that have been discussed. Follow-up when there is another appointment or opportunity. Intensive behavioral counseling interventions are effective for creating small but important changes in health behavior outcomes (dietary intake and physical activity) and selected intermediate clinical outcomes (lipid levels, blood pressure, fasting glucose levels, diabetes incidence, and weight) after 12–24 mo. Many types of intensive counseling interventions are effective. Such interventions focus on behavior change, include didactic education plus other components, such as audits and feedback, problem-solving skills, and individualized care plans, and are typically delivered by specially trained health professionals. |
| NICE (National Institute for Health and Care Excellence, 2013) | Grade B evidence Adults who have been assessed as being inactive should be advised to perform more physical activity | |
| Authors (Year)     | Study Objective                                                                 | Study Type/Tool                                                                 | Population/Sample Size                                                                 | Key Finding                                                                 |
|-------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Al Shammari (2016) [24] | Determine the amount of physical activity to which family medicine residents adhere, and determine whether family medicine residents practice what they counsel to their patients regarding physical activity | Cross-sectional Physical Activity Questionnaire (IPAQ) | Residents of the family medicine joint program, Eastern Province (n = 80 family medicine residents) | • The majority (>70%) of physicians had a low level of physical activity  
• The majority (96%) did counsel their patients about physical activity, especially when the patient had diabetes  
• Most of them consider that lack of time, lack of training, and shortages of health educational materials are the most common barrier to conducting effective counseling in their practices |
| Al Jaberi (2014) [25] | Assess physical activity counseling provided by PHC physicians in the Aseer region, Saudi Arabia | Self-administered questionnaire; Physician-Based Assessment and Counseling for Exercise (PACE) Program | PHC physicians in the Aseer region (n = 232) | • More than half of primary health care physicians in the Aseer region are physically inactive  
• They show support for physical activity counseling to their clients  
• Most of them consider that lack of time, lack of training, and shortages of health educational materials are the most common barrier to conducting effective counseling in their practices |
| Al-nahdi (2006) [27] | Assess physician knowledge of the current physical activity guidelines and the current practice of physical activity counseling in PHC; identify the barriers related to the promotion of physical activity | Cross-sectional descriptive analytic study | Jeddah City, Saudi Arabia (n = 7) | • Physicians believe it is important to talk to all patients regarding physical activity, especially patients with risk factors for chronic disease, such as being overweight and having diabetes  
• Most physicians assess at least those patients with a pre-existing condition or a risk factor for chronic diseases  
• Most of the physicians were not aware of the current physical activity guidelines. It was observed that lack of time was one of the main barriers to physical activity counseling |
| AlRashdi (2015) [26] | Determine the attitude of primary care physicians toward promoting regular physical activity; determine the barriers to promoting physical activity | Cross-sectional | Prince Sultan Military Medical City Riyadh Kingdom of Saudi Arabia (n = 80 physicians) | The physicians’ attitudes were good, but consideration should be given to overcome the barriers to achieve health goals related to promoting regular physical activity |
increase satisfaction with medical care” [21]. According to numerous studies, cardiovascular risk factors, mortality, and morbidity from stroke and heart disease can be reduced by lifestyle modifications (utilizing a number of clinician counseling strategies), including PA [21].

Trials and studies have been conducted to examine the effectiveness of brief counseling during PHC visits. In the Activity and Counseling Trial, primary care physicians were trained to deliver a brief, 3- to 4-min counseling session during routine office visits. This intervention was associated with increased levels of PA over the course of 2-year follow up. In the PREMIER trial, a brief lifestyle and PA counseling session was presented to adult patients with prehypertension or stage 1 hypertension. Strong evidence was found that counseling was effective; the intervention resulted in a risk reduction of 12%–14% over an 18-month period (based on the 10-year Framingham Coronary Heart Disease Risk Score) [21]. Moreover, a cohort study conducted in the United Kingdom found that brief PA counseling during primary care was a cost-effective way to promote and improve PA among adults [22].

PA counseling in a primary care setting can be delivered using the “SA” approach: assess, advise, agree, assist, and arrange. The SA approach involves a sequence of counseling behaviors that are designed to engage the patient in developing a specific and realistic action plan for behavior change [23]. Figure 4 demonstrates how to use the SA approach in PA counseling.

4. PA counseling in primary care in Saudi Arabia

4.1. Role of PHC centers

PHC centers serve as the frontline in health care systems because they are the first place where patients go for health services regarding prevention, promotion, management, and health education to improve their quality of life. The range of services provided at PHC centers is required to meet people’s health care needs for prevention and primary treatment. Of these, the promotion of PA is one of the most important services that physicians provide to their patients. Therefore, PA counseling interventions offered in PHC settings have emerged as a viable strategy to promote PA [14,15].

Because physical inactivity is a major public health burden in Saudi Arabia, assessing the knowledge, attitudes, and practices of PHC providers in Saudi Arabia with regard to PA is an essential step in implementing effective interventions and policies that encourage PA. This is especially true considering that in 2015, there were 49,615,932 visits to 2282 PHC centers in Saudi Arabia. Each center served an average of approximately 13,813 persons [16]. With regard to the work force in PHC centers, there were 9647 physicians and 18,745 nurses [16].

4.2. Studies in PA counseling

Despite the established evidence of the effectiveness of PA regarding NCD risk reduction, despite the high prevalence of physical inactivity, obesity, and NCD, and despite the importance and cost-effectiveness of PA counseling in the primary care setting, few studies have been conducted regarding PA counseling in Saudi Arabia. The available literature regarding PA is limited to certain regions, family physicians, and patients with chronic diseases. Furthermore, all studies that have assessed PA have done so in a general manner without specific and detailed data about PA counseling.

Only a few studies have been conducted on this topic in Saudi Arabia: two published articles and two unpublished research studies. These studies are discussed and summarized in Table 7.

Al Shammary (2016) studied the PA counseling practice of family medicine residents. This study was limited to only family medicine residents who had joined the residency program and did not assess the physicians who worked in PHC centers, regardless of their specialties. The study was also limited to the assessment of counseling provided regarding specific diseases and did not include detailed information about the assessment process [24]. In 2014, Al Jaberi assessed PA counseling at primary care centers in the Aseer region. Data collected was related to PA counseling practice, opinions regarding PA behavior, main sources of information regarding PA, and perceived barriers to PA counseling [25].

In addition, family medicine residents in Saudi Arabia conducted two unpublished studies during their residency program. One of these studies assessed physicians’ attitudes toward PA counseling and the barriers perceived by physicians in promoting PA counseling [26]. The other assessed physicians’ knowledge of current PA guidelines and current practices of PA counseling in PHC and identified the barriers preventing the promotion of PA [27].

5. Conclusions

PA is a health behavior that helps prevent all causes of mortality, and different international agencies recommended PA counseling to patients within the primary health care context due to its effectiveness. However, currently, there are limited data available about PA counseling practice in PHC centers in Saudi Arabia, despite the high prevalence of obesity and physical inactivity and the high number of patient visits to PHC centers. Studies should be conducted to assess the PA knowledge and attitudes of all health care providers to put forth strategies for all health care providers regarding the promotion of PA. An assessment of PHC providers is needed to help shed light on the barriers that exist regarding PA counseling. Assessment can also help to improve continuous health education strategies. Providing the Ministry of Health with an assessment that defines the structure of PA counseling in PHC centers could help improve behavioral counseling, therefore potentially increasing PA levels among patients. In turn, this could possibly decrease NCD mortality.

References

[1] Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep 1985;100:126–31.
[2] World Health Organization. Physical activity, http://www.who.int/topics/physical_activity/en/ [accessed 2016].
[3] World Health Organization. Global recommendations on physical activity for health. Geneva, Switzerland: World Health Organization; 2010.
[4] World Health Organization. Saudi Arabia Diabetes country profiles 2016. Geneva, Switzerland: World Health Organization; 2016.
[5] Al-Hazzaz HM. The public health burden of physical inactivity in Saudi Arabia. J Fam Commun Med 2004;11:45–51.
[6] Ministry of Health. Survey of Health Information in Kingdom of Saudi Arabia 2013.
[7] Kraus WE, et al.: American Heart Association Physical Activity Committee of the Council on Lifestyle and Metabolic Health, Council on Clinical Cardiology, Council on Hypertension, and Council on Cardiovascular and Stroke Nursing. The National Physical Activity Plan: A call to action from the American Heart Association. Circulation 2015;131:1932–40.
[8] Blake H, Mo P, Malik S, Thomas S. How effective are physical activity interventions for alleviating depressive symptoms in older people? A systematic review. Clin Rehabil 2009;23:873–87.
[9] Pescatello LS. ACSM’s guidelines for exercise testing and prescription. American College of Sports Medicine, tenth edition. Lippincott Williams & Wilkins; 2017.
[10] Lee I-M, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet 2012;380:219–29.
[11] Department of Health and Human Services. Physical Activity Guidelines Advisory Committee Report, 2008. To the Secretary of Health and Human
McKinney J et al. The health benefits of physical activity and cardiorespiratory fitness. Br Columbia Med J 2016;58:131–7.

Rahim HFA, Sibai A, Khader Y, et al. Non-communicable diseases in the Arab world. Lancet 2014;383:356–67.

Eakin EG, Smith BJ, Bauman AE. Evaluating the population health impact of physical activity interventions in primary care—Are we asking the right questions? J Phys Activ Health 2005;2:197–215.

Elley R, Kerse N, Arroll B, Swinburn B, Ashton T, Robinson E. Cost-effectiveness of physical activity counselling in general practice. N Z Med J 2004;117:U1216.

Ministry of Health. Statistical Yearbook 1436H. Ministry of Health; 2015.

Mabry R, Koohsari MJ, Bull F, Owen N. A systematic review of physical activity and sedentary behaviour research in the oil-producing countries of the Arabian Peninsula. BMC Public Health 2016;16:1003.

Al-Zalabani A, Al-Hamdan N, Saeed A. The prevalence of physical activity and its socioeconomic correlates in Kingdom of Saudi Arabia: a cross-sectional population-based national survey. J Taibah Univ Med Sci 2015;10:208–15.

Ding D et al. Lancet Physical Activity Series 2 Executive Committee. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet 2016;388:1311–24.

World Health Organization. Global Strategy on Diet, Physical Activity and Health. Geneva, Switzerland: World Health Organization; 2004.

Berra K, Rippe J, Manson J. Making physical activity counseling a priority in clinical practice: the time for action is now. JAMA 2015;314:24.