AVICENNA
Healthcare development and innovation in the Arabian Gulf

OPEN ACCESS

Review article

Barriers and facilitators influencing the physical activity of Arabic adults: A literature review

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ABSTRACT

Physical inactivity is a global health concern. Evidence suggests low levels of physical activity among Arabic adults living in Middle Eastern countries. To help ensure the success of strategies to promote physical activity, a better understanding of the barriers and facilitators to physical activity is needed. The objective of this article is to present a review of the literature that focuses on the barriers and facilitators to physical activity among Arabic adults. A socio-ecological framework was used to guide this review. Following a database search (2002 – 2013), a total of 15 studies were included in this review. The findings revealed that barriers (i.e., factors that impede physical activity), occurred at the individual level (e.g., lack of time, health status), social/cultural/policy level (e.g., traditional roles for women, lack of social support, use of housemaids), and the environmental level (e.g., hot weather, lack of exercise facilities). Some of the facilitators (i.e., factors that enable/promote physical activity) were: Muslim religion, desire to have slimmer bodies, and having good social support systems.
Future intervention studies aimed at promoting physical activity among Arabic adults need to address these multiple influencing factors.

Keywords: physical activity, Middle East, Arab, UAE, barrier, facilitator

http://dx.doi.org/10.5339/avi.2013.8

Submitted: 18 May 2013
Accepted: 14 June 2013

QSCIENCE.com
Member of Qatar Foundation

Cite this article as: Benjamin K, Donnelly TT. Barriers and facilitators influencing the physical activity of Arabic adults: A literature review, *Avicenna* 2013:8 http://dx.doi.org/10.5339/avi.2013.8

BACKGROUND

Physical activity guidelines from the World Health Organization (WHO) suggest that healthy adults 18–64 years of age should accumulate at least 150 min of moderate intensity[a] aerobic activity per week.[1,2] According to the most recent statistics from WHO, in 2008, 31% of people 15 years of age and older worldwide had insufficient levels of physical activity.[3] A study conducted in the Gulf Cooperation Council (GCC) countries revealed that only 40% of men and 27% of women reported that they were physically active for at least 150 min per week.[4] Similarly, in the State of Qatar, nearly 50% of young adults 18–19 years of age had insufficient levels of physical activity and this rate increased substantially with age.[5] For example, among people 60–69 years of age, 75% had insufficient levels of physical activity.[5] High rates of physical inactivity suggest the existence of underlying barriers to physical activity.[6]

Changes in activity patterns (e.g., less physical activity and sedentary life style) and diet (e.g., high fat and sugar diets) in the Middle East are important risk factors for conditions such as cardiovascular diseases, type 2 diabetes, breast and colon cancer, and obesity.[7] There is a high incidence of cardiovascular diseases, diabetes, colon and breast cancer and obesity among Arabic people living in the Middle East and GCC countries.[5,8–10] For example, cardiovascular diseases are the leading causes of mortality and morbidity in the State of Qatar.[5,10] Diabetes is a recognized risk factor for heart diseases such as myocardial infarction.[11] In 2006, about 4% of the population worldwide had diabetes.[5] Among GCC countries, Qatar has the highest prevalence of diabetes (16.7%).[5,12] Globally, the incidence of obesity is rising rapidly.[13] For example, results of a 2006 WHO report indicated that 24% of the people surveyed in Qatar were of normal weight, 39% were overweight, and nearly 29% were obese.[5] Contributing factors for obesity in the Middle East and United Arab Emirates (UAE) include diets high in carbohydrates and fats and the lack of social support for exercise, especially among women.[14] In the Middle East region, the incidence of breast cancer has increased substantially in the last 24 years.[8] For example, in 2006, breast cancer was the leading cancer diagnosis for Qatari women with the incidence, increasing significantly with age.[5] Studies support an association between breast cancer and physical inactivity and high fat diets.[15–19]

For seniors, physical inactivity can lead to muscle and balance disturbances which, in turn, place seniors at greater risk of experiencing a fall event.[20] Globally, it is estimated that one-in-three seniors, aged 65 years and older, experience one or more falls each year.[20–22] Considering population aging and the high incidence of falls among seniors, the promotion of physical activity is an important component of fall prevention programs. Lastly, there is growing evidence to support the hypothesis that exercise may be an effective alternative to traditional mental health interventions in cardiac patients who have a high incidence of depression.[23–26] Results of a recent Cochrane review suggest that among people with depression, exercise may reduce the symptoms of depression.[23] In addition, given the high incidence of cardiovascular diseases in the Middle East and GCC countries, and the link between cardiovascular disease and depression, the promotion of physical activity should be an important component of mental health interventions in people with cardiovascular diseases.

A socio-ecological model was used to guide the organization and presentation of the barriers and facilitators in this review.[27–31] This is a useful model because it considers the barriers and facilitators to physical activity and their interconnections at multiple levels of the system (e.g., individual, policy, community, environmental).[27–31] Based on a socio-ecological model, three categories used in past research are: (1) individual level, (2) organizational, social/cultural, policy level, and (3) environmental level. Other authors have used a similar typology to guide their physical activity studies.[6,31–33] A fourth category called 'intersecting barriers' was used in this review. Intersecting barriers refers to barriers that intersect or converge at more than one level of the ecological system.[6,32] The convergence or intersection of barriers creates additional challenges on the ecological system. For example, in a qualitative study conducted in nursing homes in Ontario, Canada, less than optimal conditions for physical activity for residents were created when an organizational barrier (i.e., inadequate staffing) converged with a barrier at the environmental level (i.e., inadequate number of elevators to transport residents in wheelchairs to their activity programs).[32] An understanding of the influencing factors and

[a]According to the WHO, the intensity of different types of physical activity varies between people and is dependent on a person's level of fitness and past exercise history. Typically, moderate-intensity activity requires moderate effort which noticeably accelerates the heart rate. Examples of moderate intensity activities are: brisk walking, dancing, housework, gardening, and general building tasks such as painting.[1]

their interconnections is critical to the development of effective interventions to address the problem of sedentary behaviors.[6,32]

The main objective of this paper is to present an overview of the literature related to the barriers and facilitators to physical activity for Arabic adults. A better understanding of the barriers and facilitators to physical activity is critical to the successful promotion and implementation of physical activity interventions. No previous reviews of the literature related to the barriers and facilitators to physical activity for Arabic adults were found.

METHODS

Search for articles focusing on 'barriers' and 'facilitators'

An English-language search of MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), SPORTdiscus, and Middle Eastern and Central Asian Studies was conducted to identify journal articles published from 2002 to 2013. The following keywords were used: physical activity, exercise, Middle East, Arab*, Emirates, Bahrain, Qatar, Kuwait, Gulf Co-Operative Council, GCC, UAE, barriers, challenges, facilitators, enablers, singly and in combination. This search yielded 47 articles. The abstracts of these articles were reviewed using the following inclusion criteria: (1) study focused on the barriers and/or facilitators to physical activity or exercise, (2) study included Arabic adults 18 years of age and older, and (3) qualitative, quantitative or mixed methods study design. Thirty-two articles were eliminated because they did not meet the inclusion criteria (i.e., 11 did not include Arabic adults and 21 did not focus on the barriers/ facilitators to physical activity). Hence, 14 studies that focused on the barriers/facilitators to physical activity were retained for review.[34–48]

Search for RCTs

We anticipated that some of the intervention studies may have included a description of the barriers/facilitators encountered during intervention implementation.[6] Thus, we also searched for RCTs that contained an exercise or physical activity component. To identify these studies, we conducted a separate English-language MEDLINE database search for articles published from January 2002 to January 2013. Keywords were: physical activity, exercise, Middle East, Arab*, Emirates, Bahrain, Qatar, Kuwait, Gulf Co-Operative Council, GCC, UAE, randomized control trial, singly and in combination. This search yielded 11 articles. The abstracts of these articles were screened using the following inclusion criteria: (1) RCT that included an exercise or physical activity intervention(s), and (2) sample included Arabic adults aged 18 years and older, living in the community. Ten articles were eliminated because they did not meet our inclusion criteria (i.e. six articles did not focus on an exercise or physical activity intervention (e.g., drug study) and four articles did not include Arabic adults. One intervention study was retained.[49] Hence a total of 15 studies were included in this review.[34–49] Fourteen studies focused on the barriers/facilitators to physical activity and one study was a lifestyle intervention study that contained an exercise intervention. Figure 1 provides a flow diagram of the literature search.

Assessing the quality of the retrieved articles

The Mixed Methods Appraisal Tool (MMAT) was used to assess the methodological quality of our retained studies.[50] This multi-faceted tool allows researchers to use only one appraisal tool when assessing the methodological quality of different study designs for a literature review (i.e., qualitative, quantitative descriptive, quantitative randomized controlled trials, quantitative, non-randomized, and mixed methods studies). Reliability and efficiency testing of the pilot MMAT in 2010 found that the inter-rater reliability scores ranged from moderate to perfect agreement.[50–52] This tool uses two main steps for assessing studies. First, regardless of the study design, all studies are screened by two criteria which are: (1) are there clear objectives? and (2) does the collected data address the research objectives? Three possible response options are provided: (1) yes, (2) no, and (3) can't tell. Next, each study is assessed using specific criteria related to type of study design. For instance, one of the criteria used to assess RCTs relates to withdrawal and dropout rates (i.e., Is there a low withdrawal/dropout rate? – below 20%). The tool and scoring metrics are available online.[50] The first author (KB) assessed the quality of the studies. All of the studies met the first two criteria in step one. In step two, four studies met 100% of the criteria, six studies met 75% of the criteria, and five studies met 50% of the criteria. Hence, the overall methodological quality of the studies was good.

Figure 1. Flow diagram of literature search.

Design and characteristics of the 'barriers' and 'facilitators' studies

The characteristics of the 14 included barriers/facilitator studies are presented in Table 1. Seven studies were quantitative in design, six were qualitative, and one study was mixed methods. Sample sizes for the quantitative studies ranged from 334 to 2176 participants. Sample sizes for the qualitative studies ranged from 21 to 110 participants. Three studies were conducted in the UAE, three in the USA, two in Saudi Arabia, two in Israel, and one in each of the following countries/states: Qatar, Kuwait, Turkey, and Australia. Participants' age varied across studies (young, middle aged adults). Only one study focused on seniors[44] and six studies included women only.[35,38–41,46,47]

FINDINGS

Barriers: Individual level

Except for one study,[45] the remaining studies reported on barriers at the individual level. The two most common barriers reported in the quantitative studies were: 'lack of time' and the 'presence of health conditions' (e.g., heart disease, osteoarthritis, asthma). 'Lack of time' was related to factors such as competing family demands (e.g., household chores, child care), extra office work for men, frequent

Table 1. Studies focusing on the barriers and facilitators to physical activity and exercise.

Author(s) Country Focus	Sample	Research Approach	Levels- Barriers and Facilitators Individual	 Organizational, social/cultural, policy	 Physical Environment
1. Al-Kaabi et al.[34] **UAE** Focus on barriers to physical activity	390 diabetic patients (mean age 52 ± 9.9 yrs) Outpatients from AL- Ain District UAE 62% females	Quantitative Face-to-face interview	*Barriers* Presence of diseases 32.1% Lack of time 29.7% Family responsibilities 20.8% Exercise is boring 20.3% Fear of injury 4.9% Laziness 1.0% Embarrassed to wear exercise clothes 0.5% Belief that exercise makes control of diabetes difficult 0.5%	*Barriers* Cultural reasons 29.2%, especially for women, difficulty of joining gym – only few centers for women only Lack of family support 4.1% Cost of joining gym 2.8%	*Barriers* Weather 7.9% Parks unavailable 1.5% Lack of safe places to walk 0.8%
2. Ali et al.[35] **UAE** Focus on the barriers and facilitators to weight management (only barriers to exercise reported in this table)	75 Emirita women with pre-diabetic with abdominal obesity Al Ain medical district- rural and urban Age: 20–60 yrs. (mean age = 39 ± 12.1 yrs)	Qualitative, Descriptive, Grounded theory Constant comparative analyses Purposive sampling Eight focus groups	*Barriers* Competing demands- No time for exercise- housework and excessive computer/internet use Chronic health conditions (e.g., asthma) *Facilitators* Presence of health condition acted as a motivator to exercise	*Barriers* Cultural norms- walking in public without a male escort not culturally acceptable for women Low family support for exercise-e.g. discouraged purchase of treadmill for home use- no space) Frequent social gatherings with food limited physical activity opportunities Use of housemaids limited physical activity *Facilitators* Having other women to walk with (walking buddy)	*Barriers* Lack of indoor space to do exercise Lack of culturally appropriate exercise facilities Hot weather- difficult to walk outdoors Street safety-women felt unsafe to walk alone in the city *Facilitators* Living on a farm increased walking opportunities. Cooler weather promoted outdoor walking
3. AlQuaiz and Tayel[36] **Saudi Arabia** Focus- barriers to healthy lifestyle (Physical activity and healthy eating) Only barrier to	452 patients (15–80 years (mean age = 33.3 years ±13.3yrs) 50% = 15–29 yrs 32% males, 68% female, 29.4% housewives	Quantitative Cross-sectional Self- administered survey Tool adapted from Centre for Disease	*Barriers* Lack of energy −73.2%- higher among females versus males Lack of willpower-2nd most common Lack of skills 43.5%	*Barriers* Lack of resources −80.5% Higher in females and in lower versus higher income) Limited funding for Saudi women to join sports clubs.	*Barriers* *None reported*

Table 1 – *continued*

Author(s) Country Focus	Sample	Research Approach	Levels- Barriers and Facilitators: Individual	Organizational, social/cultural, policy	Physical Environment
physical activity included in table.	82.4% from primary health care clinics King Khalid University Hospital in Riyad	Control (CDC) website		High cost of gym memberships Lack of social support (higher in females than males)	
4. Amin et al.[37] **Saudi Arabia** Focus- barriers toward leisure related physical activity All barriers listed by author under personal category	2176 adult Saudi nationals (men = 55.6%, women-44.4%) Age: 18–64 (mean 32.7 ± 9.8 yrs) From primary health centers urban = 61% rural = 39.0% 10.8% of sample had chronic disease	Quantitative Cross sectional Descriptive Survey Global physical activity questionnaire	*Barriers* Lack of time (44.7%) (domestic chores for women, extra office work for men) Lack of money (28.2%) esp. among men Lack of interest (22%) esp. among younger age group Fear of injury (20%) Dislike exercising (13.8%) Internet/TV use (13.8%) Chronic illness (13.5%) Old age (7.7%)	*Barriers* Traditions 2nd most common barrier (60.1%) Lack of places to exercise (55.4 %) Lack of company (29.1%), esp. among women-could not go outdoors to exercise alone–must be escorted by father, brother or husband. Approval of family, husband were important	*Barriers* Weather leading barrier (65.9%)
5. Berger and Peerson[38] Fujairah **UAE** Focus: identify social and cultural barriers to physical activity	20 Emirati female unmarried college students 18–27 yrs of age. Islamic, Arabic first language.	Qualitative Participatory Action Research Interviews & focus groups Content analyses	*Barriers* Age & female gender Grooming: efforts might be ruined by exercise, Did not like to wear sports clothes under abayas Lack of motivation Dislike for exercise Tiredness Prefer to watch rather than engage Excessive body weight Lack of time Lack of information on the benefits of physical activity Lack of transport to exercise facility	*Barriers* Exercise not considered a social activity Non- participation of friends Lack of role models among peers and family Putting on makeup at school not allowed – makeup applied in a.m. at participants' home	*Barriers* Intense heat June to August Some informants did not like to sweat, while other did (i.e. belief that it would increase weight loss).

6. Caperchione et al.[39] **Australia** Focus on physical activity behaviours NB – multi-cultural sample- included common themes across all ethnic groups and ethnic specific themes. Only Arabic- speaking themes will be reported	110 women in Australia 55.7% Fillipino 26.8% Sudanese 63.0 % Bosian 39.1% Arabic speaking Mean age (39.1 ± 10.4 yrs)	Qualitative 12 focus groups	*Barriers* Ethnic specific – Finding time to be active – partly due to larger than normal family size and cultural norms that required house work to be done by women regardless of external employment Not ethnic specific – Family commitments prevented them from being active/ Women were responsible for most of the domestic chores – Could exercise alone in home but not motivated without group support – Health concerns (seen as both a barrier/enabler)- Health "scares" was a motivating factor/Belief that too much exercise associated with tiredness, soreness, and injury.	*Barriers* Ethnic specific – Need for public modesty for women barrier to outdoor activities Different perceptions of what constitutes health compared (e.g. in Africa – bigger body mass is better- denotes richness, happiness and healthy Not ethnic specific – Do not know where to access information about programs	*Barriers* Not ethnic specific – Safety concerns – high crime areas-would only engage in outdoor walks in daylight
7. Donnelly et al.[40,41] **Doha, Qatar** Focus – challenges and opportunities to engage in healthy lifestyle (Physical activity, diet and smoking) Author mentioned ecological model	50 Arabic Muslim women with heart disease in Doha Qatar ≥ 30 years (range 32–85 yrs). 36% of sample between 50–59yrs, 28% between 60–69 years Four women worked outside of home and three did not have children	Qualitative Individual Interviews Semi-structured questionnaire	*Barriers* Health conditions (these women had heart disease and some had fatigue and SOB) (2012, 2011) *Facilitators* Religion- Quran supportive of exercise (2012) Feeling healthy and looking younger were motivators – all participants expressed desire for slimmer bodies (2012)	*Barriers* Traditional cultural values and practices Taboo for females to go out in public places unless accompanied by male family member (2012) Priority on caring for family-not exercise (2012, 2011) Family responsibilities (e.g., caring for children and grandchildren) took precedence over their own health care (2012) Having more servants than one needs which reduces opportunities for women to be active when doing domestic chores (2012)	*Barriers* Hot desert climate- people walk for only two months per yr. due to heat *Facilitators* Low cost and accessible facilities (2012,2011)

Table 1 – *continued*

Author(s) Country Focus	Sample	Research Approach	Levels- Barriers and Facilitators		
			Individual	Organizational, social/cultural, policy	Physical Environment
				Facilitators Having a good informal (family friends) and formal (health care provider) support system (2012,2011)	
8. Serour et al.[42] **Kuwait** Barriers to adherence to lifestyle management (diet and physical activity)	334 adults – with hypertension, and/or type 2 diabetes from family practice health centers Mean age 53.5 ± 10.3 range (27–74) Female = 62.6%	Quantitative International Physical Activity Questionnaire used	*Barriers* Lack of time (39%) Coexisting disease (35.6%) (e.g., osteoarthritis, asthma, and musculoskeletal disease	*Barriers* Use of house maids (54.1%) Lack of exercise partner (3.7%)	*Barriers* Weather (27.8%) Intense hot summers Excessive use of private cars reduced opportunities for physical activity (e.g., walking to bus stop, or walking to work) (83.8%)
9. Kahan[43] **USA** Focus on sociocultutal factors that influence physical activity, body composition and nutrition Used ecological model – levels were- intrapersonal, interpersonal, & community/organ-izational/policy	21 Arab American college students Selected for extreme manifestations of religiosity or acculturation 9 males 12 females (9-Muslim & 12 non- Muslim) Age not reported 13 lived off campus without parents, 5 with parents and 3 in college dorms.	Qualitative Focus groups Individual interviews Thematic analyses	*Barriers* Most common barrier -time management (school work and family commitments left little time for physical activity) *Facilitators* Most common facilitator – health and wellness outcomes– Improved mental, physical and function)	*Barriers* Overall, lack of parental support, modeling or encouragement, esp. for daughters –Mixed messages from parents Women's traditional role (domestic) More religious -less likely to be acculturated and more likely to confirm to Middle Eastern beliefs about physical activity. *Facilitators* Friends exerted a positive influence	*Facilitators* More active- friendly physical environments in US. (Bicycles) Clerics likely to offer some type of PA program
10. Shemesh et al.[44] **Israel** Multiethnic (Hebrew, Arabic, Russian) Focus- factors influencing health behaviours	Seniors ± 60 years 70% of sample-female, 89% between 60–79 yrs. Most participated in activity at least twice per week	Quantitative Convenience sample Self administered questionnaire	*Barriers* Low motivation (47%) Poor health or disability (32%)	*Barriers* Access barriers – high cost of exercise facilities	*Barriers* Lack of places to exercise-10%

11. Shuval et al.[45] **Israel** Focus of the role of culture, environment and religion in the promotion of physical activity	45 Arab Israeli physical education students –Ohalo College Age: 18–31 (mean = 21.9yrs) Slightly more than 50% were female Most were not physically active on a regular basis.	Qualitative 8-Focus groups Purposeful sampling Slightly more than 50% were female Most Muslim or Bedouin and lived in rural villages	*Barriers* Not reported *Facilitators* Religion- Quran supportive of physical activity	*Barriers* Although participants recognized value of activity – they were not active- lived in extended families that deemphasized the value of physical activity Women not permitted to exercise in public Villages receive less funding for sports than urban centers. *Facilitators* Living in an urban center (sidewalks, gyms, accessible) Living away from extended family structure	*Barriers* Not reported *Facilitators* Access to exercise facilities
12. Tami et al.[46] **USA- Texas** Focus on the effect of acculturation on dietary and physical activity NB- only factors related to physical activity included in this table	22 Arab mothers < 45 years of age, married, well educated From 7- Middle Eastern countries Majority did moderate exercise, e.g., brisk walking, vacuuming 1–2 days per wk. 10 did vigorous activity (e.g. running) 1–2 days per week	Mixed methods Focus groups Interviews 15 open ended question using Social Cognitive Theory Male Arab- American Acculturation Scale used	*Barriers* Lack of time *Facilitators* After exercise the mothers stated they felt "good" and had more energy	*Barriers* Not reported *Facilitators* Low cost (fees) Social support from husband Availability of fitness classes at Islamic center Motivator- seeing people walking in the mall.	*Barriers* Not reported
13. Qahoush et al.[47] **USA** Focus on physical activity	180 Arabic women mean-age 37.6 ± 12.9 46.2 % were sedentary	Quantitative Cross sectional	*Barriers* Not enough time (56%) Too stressed (27.8%) Pain when exercising (12.2%) Exercise is boring (8.3%) Not enough money (6.1%) Too old (3.3%)	*Barriers* Takes time away from family (15%) Lack of support- family & friends (3.9%) *Facilitators* Walking & cycling club- (29.4%) Recreational facilities (31.1%)	*Barriers* Not reported *Facilitators* Safe places to jog or walk (73.3%)
14. Koçak[48] **Turkey** (university Middle East Technical – Ankara) Focus on barriers to exercise	314 male /female students - mean = 20.6 ± 1.93 yrs) 60 male/female faculty (mean = 43.3 yrs ±11.3, 71 male/female staff (mean = 36.1 ± 8.73 years	Quantitative 12 item questionnaire	*Barriers* Lack of time most common barriers (44.4%) Laziness (6.9%) Dislike for exercise (7.3%) Not interested (6.9%) Illness or handicap (4.0%) No past habit (4.9%) Cost (2.5%) Work pressure (1.6%)	*Barriers* Heavy class schedule 2nd most common barrier (25.2% among students) No partner- 1.7% Family pressure/obligations 1.2%	*Barriers* Lack of facilities 0.89%

social gatherings, and time management challenges related to heavy school workloads. Some participants did not exercise because they believed that exercise would be painful or that it would make diabetic control more difficult.[34,47] Fatigue and tiredness was a barrier reported in studies, especially among women.[36,38] Other reported barriers were: lack of interest, motivation, and information about the benefits of exercise, fear of injury, stress, excessive internet and computer usage, and no past 'habit' of exercise.

Similar findings were found in the qualitative studies. For instance, in a study among 21 Arab college students in the US, family commitments and school work left little time for exercise.[43] In a study among 20 female Emirati college students, barriers related to grooming and traditional dress for women were reported.[38] The female students in the study did not like to wear sports clothes under their abayas[b] and some did not like to exercise because they felt that exercising would ruin their makeup. They explained that they were not allowed to apply makeup at school.[38]

Barriers: organizational, cultural/social, policy level

Most of the qualitative and quantitative studies reported on barriers related to 'cultural and social norms'.[34–41,43,45,47] Traditionally, women in many Islamic countries need to be accompanied by a male family member (e.g., husband, father, or brother) when going outdoors which reduces opportunities for physical activities. To preserve public modesty, many Arabic women wear traditional dress (e.g., abayas) in public which may make it difficult for them to participate in certain types of physical activities.[53]

Cultural norms and expectations regarding women's roles were also viewed as barriers to physical activity. Similar to many other cultures and societies, women were expected to care for the family and household and their exercise needs were afforded low priority. In an Australian study, Arabic women reported that they had less time for physical activity because they do all of the household tasks (e.g., cooking, cleaning) even if they are employed outside of the home.[39] Another barrier reported across the studies was a general lack of social support for exercise, especially for women.[34–37,43,45,47] For women, family obligations (e.g., caring for children and husband) took precedence over engagement in physical activity. Another barrier was a general lack of parental support and peer role modelling.[43] In a US study, participants reported that parents did not support physical activity, partly due to the fact that education was afforded higher priority than physical activity.[43] They also reported receiving mixed messages. For example, mothers expressed their concerns to their daughters regarding weight gain, but provided only conditional support for physical activity.[43] Barriers reported in two Middle Eastern studies were difficulties in finding an exercise 'partner' and a belief that exercise was not considered a social activity.[38,48] Another reported barrier was the use of housemaids.[35,40,42] For example, in a study conducted in Qatar, female participants recommended that women should do more housework with less dependency on housemaids as a mean of doing more physical activity at home.[40]

At the policy level, barriers were related to the allocation of funding for sports, especially for women. In a study conducted in Saudi Arabia, participants reported that there was limited funding for Saudi women to join sports clubs and, typically, gym memberships were expensive.[36] In an Israeli study, participants indicated that compared to urban centres, villages received less funding for sport programs.[45]

Barriers: environmental level

Several studies cited barriers at the environmental level.[34,35,37,41–44] The two most common barriers at the environmental level were the 'weather' and 'lack of exercise facilities'. The Middle East is noted for it hot summer climate (30–50 degree Celsius), which restricts outdoor activities like walking, cycling and jogging. Overall, there was a lack of culturally appropriate and affordable exercise facilities or outdoor spaces for activities (e.g., parks), especially for women. A barrier reported in a US study was the lack of places to jog because of high crime rates.[39] In a UAE study, the women reported that they felt unsafe to walk on the street alone in the city.[35] Lastly, in a study conducted in Kuwait, most of the participants (83.8%) agreed that the excessive daily use of private driver/cars interfered with their physical activities.[42] The excessive use of private drivers/cars is likely due to factors such as: a hot desert climate which makes outdoor walking difficulty; a lack of adequate public transport systems, and a lack

[b]An 'abaya' is a traditional loose fitting outer garment that is worn by some women in parts of the Islamic world. It is typically black in color.

of 'walkable' neighbourhoods. Typically, private cars transport clients from door to door which reduces the need to walk outdoors in intense hot temperature.

Intersecting barriers

None of the studies included an explicit reference to the presence of intersecting barriers. As mentioned previously, intersecting barriers are barriers that converge or intersect at more than one ecological level. However, some of the studies implicitly described instances where barriers intersected or converged. For instance, in a qualitative study, a woman explained that her 'family' discouraged her from buying a treadmill for home use (barrier – social level) because there was not enough 'space' for it in the home (barrier – environmental level).[35]

Facilitators

Six studies reported on the facilitators to physical activity.[35,40,41,43,45–47] At the individual level, the most common facilitators were the presence of a 'health condition' and 'religion'. For some participants, the presence of a health condition or health 'scare', such as a cardiac event, acted as a 'motivator' for them to be more physically active. Similarly, in a study conducted among 50 Arabic women with heart disease in Qatar, 'feeling younger' and 'more healthy' acted as motivators for these women to engage in healthy lifestyles.[40,41] A few studies cited religion as a facilitator to physical activity.[40,45] In a qualitative study among Arab Israeli college students, religion was seen as a facilitator because the scriptures in the Quran[c] encourage physical activities, especially swimming and horseback riding.[45] However, although physical activity was viewed as extremely important, some students believed that it doesn't affect life expectancy because only God determines this.[45]

Although several studies reported a lack of social support as a barrier to physical activity, two American studies[43,46] and two Middle Eastern studies[35,40,41] reported that 'supportive social systems' acted as facilitators to physical activity. For instance, in a study conducted in Doha, Qatar, having 'good' informal (family members and friends) and formal support (government, health care professionals) systems acted as opportunities for Qatari women with heart disease to engage in healthy lifestyles. The findings indicated that daughters were often the most effective supporters because, in addition to offering simple encouragement, they took an active role in supporting their mothers. For instance, daughters would ask their mothers to accompany them to the gym.[41] Other informal supports reported included having supportive husbands and other women to walk with.[41] Formal supports reported in this study included government and physician support. The Qatari government encouraged healthy lifestyles by building accessible and affordable exercise facilities for women.[41] Physicians supported their female patients to maintain healthier lifestyles after their cardiac event by offering them advice on how to exercise and be more active.[41]

Although several studies reported a general lack of culturally appropriate and affordable exercise facilities, two US studies[43,46] and two Middle Eastern studies[40,41,45] reported that the availability of exercise facilities acted as a facilitator to physical activity. For example, Qatari women reported that there were several affordable facilities where women could go to be active, such as the Aspire Zone in Doha, capital of Qatar.[40] In an UAE study, participants explained that living on a farm provided opportunities for physical activity.[35] Participants in a US study reported that having active friendly physical environments (e.g. bicycles paths) encouraged them to be more active.[43]

Findings: RCTs

One RCT that met the inclusion criteria was included in this review.[49] Characteristics of this study are provided in Table 2. Two hundred and one Arab women (age 35–54 years) with one or more components of metabolic syndrome (see Table 2 for details of the sample health characteristics) were randomized to an intervention group and received 22 sessions of dietary counselling and 22 sessions of physical activity or to a control group and received five dietary sessions only. The dropout rate in the intervention group was 14% versus 6% in the control group. The average attendance rate in the intervention group was 40% for the activity sessions and 95% for the dietary sessions. The lower attendance rate in the activity sessions may have been due to frequent turnover of fitness instructors (i.e. three instructors in one year), and/or low motivation among participants. Although the authors

[c]The Quran is a book containing the sacred writings of Islam.

Table 2. Intervention study.

	Did authors discuss barriers related to implementation?
Kalter-Leibovici et al. (Israel)[49] Sample: women 35–54 years of age living in 2 Muslim Arab communities in the center of Israel with BMI of 30–40 and 1 or more component of the metabolic syndrome. Components of syndromes were: waist circumference greater than 88 cm, blood pressure of at least 130/85 mm Hg, fasting plasma glucose level of at least 110/mg/dL, triglycerides of at least 150 mg/dL, and high–density liproprotein cholesterol less than 50 mg/Dl. Focus: 12 month experimental lifestyle intervention study Group A- 22 dietary sessions per year – plus exercise Group B -5 dietary sessions, no exercise. Dietary sessions provided in both group and individual format. Sample: 110 obese, non diabetic Arabic women, 35–54 yrs of age	Yes: focus was to provide a culturally sensitive intervention. Participants face 'familial and societal barriers toward dietary modification, physical activity'. No further details provided Initial refusal during recruitment – 38% (81/209) Modest dropout rate group A (14%) –reasons-personal reasons (n = 9); lack of motivation (n = 5) Low dropout rate group B (7%)-lost to follow up (n = 1); lack of motivation (n = 6) High attendance rate to both individual and group dietary session

commented that in participants faced 'familial' and 'societal' barriers towards physical activity and dietary modification, they did not provide further details or explanations.

DISCUSSION

Although the presence of a health condition or disease was reported as a barrier to physical activity, some participants explained that the presence of a health condition/disease acted as a motivator for them to exercise because of the beneficial outcomes (e.g., feeling more healthy). Similar results have been reported in prior research.[32,33] For instance, it is well recognized that exercise can improve joint flexibility and may help to decrease the stiffness and pain associated with arthritis.[54–57] This type of information is valuable when considering the design of intervention strategies. It may be especially important that exercise programs for people with health conditions be tailored so that they are 'doable' which, in turn, may help to promote long-term adherence.[6,32]

The most commonly-reported barrier in the natural environment was the hot summer temperature, which impeded most outdoor activities. One potential solution would be to use existing air-conditioned buildings for exercise. For instance, shopping malls could offer walking programs for people. Mall-walking programs are popular in North America, especially for seniors because they provide accessible, safe and user friendly (benches, washrooms) options to outdoor walking.[58] Since the concept of 'family' plays an important role in Islamic Arabic speaking countries, mall-walking programs could provide walking programs for family units. Other facilities built specifically for family, women, and children would be needed as well.

To address environmental barriers, an interdisciplinary approach will be needed. People such as city planners, architects, building inspectors, policy makers, and health care planners will need to work together to address the multiple levels of influence.[32] For instance, evidence suggests that the use of signage and spatial factors in the built environment (e.g., distance of stairwell from main building entrance) can increase stair use in public buildings.[59–63] Architects could incorporate this knowledge into the design of new buildings and building inspectors could ensure that stairs/stairwells in public buildings meet current safety recommendations (e.g., handrails, stair height/depth, adequate lighting).[64,65]

As mentioned previously, a 'lack of exercise facilities' was a barrier cited in this review. This lack may partly be related to the Islamic teaching about public modesty, which means that women must find exercise facilities that cater to women only, or facilities that offer specific hours for women.[66] Having separate facilities for men and women may not always be feasible. A potential solutions is having internally segregated facilities and programs in one building.[66]

Although not as common as in Western societies, there are independent fitness clubs in the Middle East, in addition to those established in major hotels.[67] Both types of fitness clubs may be

cost-prohibitive for some individuals. Less costly alternatives are needed. For instance, subsidized exercise programs can be provided in workplaces and local community centers. Wellness centres could be established in existing shopping malls. Another practical strategy that could help to offset the costs associated with formal exercise programs is the promotion of active living.[d] Active living can be done at home, as well as in formal exercise spaces. Given that public modesty is important in Islamic countries, the use of home gyms (e.g., treadmills, hand weights) could offer people exercise options in the privacy of their homes.

The Islamic faith plays an important role in the lives of Arabic people. Muslims are expected to care for their bodies and to engage in healthy lifestyles.[53,68] The Quran is supportive of Muslims engaging in physical activity provided it does not violate certain principles such as the Islamic dress code. This represents a potential opportunity to promote physical activity. Health promotion messages could be linked to religious teachings and religious leaders could play a supportive role in encouraging Muslims to adapt more active lifestyles.[40,41]

Physicians and other health care providers can also play a pivotal role in promoting and assisting their clients to be physically active.[6,40,41,69] For instance, the results of a Canadian study among seniors revealed that those who were advised to exercise by their physicians were 7.8 times more likely to be in the 'high' active group as opposed to the 'low' active group.[69] However, evidence suggests that the majority of physicians do not routinely advise their patients to exercise.[70–72] One study reported that the strongest predictor of patients receiving advice from their physicians to exercise and eat a less fat diet was high body mass index and having high cholesterol, respectively.[73] Similar to the West, in the Middle East, physicians' advice is typically valued and trusted. There is a critical need for physicians and other health care providers to take a proactive role in promoting physical activity in order to prevent and/or reduce the heavy burden of lifestyle related diseases.[40,41,69]

LIMITATIONS

First, this review was limited to an English-language search of published articles that focused on the barriers and facilitators to physical activity for Arabic adults living in the community. We did not do any hand searching for published articles or internet searching for unpublished work. Thus, important studies may have been missed. However, similar to another previous review,[6] we did attempt to augment this review by including RCTs that included a discussion of implementation barriers. Hence, we believe that this literature review gives insight on the barriers and facilitators to physical activities among Arabic adults.

CONCLUSION

Despite the paucity of research in the area, this literature review still provides insights as to the barriers/facilitators influencing the physical activity of Arabic adults. A socio-ecological model was used to frame this review. Barriers and facilitators occur at the individual, social/cultural/policy and environmental levels. Future physical activity intervention studies and health promotion strategies aimed at increasing physical activity will need to consider these multiple influences.[6] Because of their influence in the Arab world, health care professionals, religious leaders, and role models could play a pivotal role in promoting more active lifestyles. Separate exercise facilities for both sexes, and accessible and affordable community programs using existing physical spaces such as schools and shopping malls could be developed to promote physical activity among Arabic adults.

COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTIONS

KB contributed to the conception of this manuscript, revised it critically for content, and gave final approval of the manuscript version submitted for publication.
TD contributed to the conception of this manuscript, revised it critically for content, and gave final approval of the manuscript version submitted for publication.
All authors read and reviewed the final manuscript.

[d]Active living refers to a way of life that incorporates physical activity into daily life, for example, using the stairs rather than taking an elevator.

Acknowledgement

The authors wish to thank BC for helping us to format this article.

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