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Physical activity and Healthy Diet the Opportunities and Barriers, among for King Saud University Working Women in Riyadh city.

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Abstract: Background: Understanding community perceptions, experiences, and the surrounding environment regarding opportunities and barriers to physical activity (PA) and a healthy diet is a prerequisite for designing effective interventions aimed at preventing related non-communicable diseases (NCDs). This study aimed to explore these factors among women working in office-based jobs.
Methods: A cross-sectional study was conducted with 132 Saudi women, aged 26–60, working in office-based jobs at King Saud University in Riyadh, the Kingdom of Saudi Arabia. Barriers were assessed using the Arabic version of the Capability Assessment for Diet and Activity (CADA) questionnaire, which is a validated, self-administered questionnaire.
Results: The mean age of the participants was 40 ± 6.7 years. According to the body mass index, most participants were overweight or obese (44.7%). The study revealed that the most important opportunity for PA was the availability of nearby places. For a healthy diet, the availability of fresh foods was one of the most important opportunities, while the availability of time was 3.68±1.023, the most important barrier.
Conclusion: This study identified opportunities and barriers to PA and a healthy diet in Saudi working women as a high-risk group for obesity and physical inactivity. The findings of this study may support healthy, environmental, and social initiatives and strategies to achieve healthy aspects for working women.

Key Words: physical activity; Healthy Diet; Saudi women, obesity

الفرص والمعوقات لممارسة النشاط البدني والنظام الغذائي الصحي لدى النساء العاملات في جامعة الملك سعود بمدينة الرياض.

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الملخص
الخلفية: فهم تصورات المجتمع، والخبرات، والبيئة المحيطة فيما يتعلق بالفرص والعوائق التي تحول دون النشاط البدني (PA) والنظام الغذائي الصحي هو شرط مسبق لتصميم التدخلات الفعالة التي تهدف إلى الوقاية من الأمراض غير المعدية ذات الصلة .(NCDs) هدفت هذه الدراسة إلى استكشاف هذه العوامل بين النساء العاملات في الوظائف المكتبية.
الطريقة: أجريت دراسة مقطعية على 132 امرأة سعودية تتراوح أعمارهن بين 26-60 سنة، يعملن في وظائف مكتبية في جامعة الملك سعود بالرياض ، المملكة العربية السعودية. تم تقييم العوائق باستخدام النسخة العربية من استبيان تقييم القدرة على النظام الغذائي والنشاط(CADA) ، وهو استبيان تم التحقق منه ذاتيًا.
النتائج: كان متوسط عمر المشاركين 40 ± 6.7 سنة. وفقًا لمؤشر كتلة الجسم، كان معظم المشاركين يعانون من زيادة الوزن أو السمنة (44.7٪). وكشفت الدراسة أن أهم فرصة للسلطة الفلسطينية كانت توفر الأماكن المجاورة. بالنسبة لنظام غذائي صحي، كان توافر الأطعمة الطازجة من أهم الفرص ، في حين كان توفر الوقت 3.68 ± 1.023 ، وهو أهم عائق.
الخلاصة: حددت هذه الدراسة الفرص والعوائق التي تحول دون PA واتباع نظام غذائي صحي لدى النساء العاملات السعوديات كمجموعة عالية الخطورة للإصابة بالسمنة وقلة النشاط البدني. قد تدعم نتائج هذه الدراسة المبادرات والاستراتيجيات الصحية والبيئية والاجتماعية لتحقيق الجوانب الصحية للمرأة العاملة.

الكلمات المفتاحية: النشاط البدني PA؛ حمية غذائية صحية؛ النساء السعوديات العاملات، السمنة.

1- Introduction:

There is a higher increase in obesity in the KSA compared to other countries. In accordance with the World Health Organization (WHO) data, the overall spread of obesity in the KSA was estimated to be 35.4%, in comparison with that of neighboring countries such as the United Arab Emirates, Iraq, Oman, Syria, and Sudan, where it falls between 8.6–31.7%[1]. There are some sex differences in the risk of (NCDs) with body mass index (BMI)[2], as obesity is more severe among women[3]. For example, one study reported twice the rate of obesity in women in contrast to that in men[4]. Socio-economic development is dependent on the occupational population. Hence, the health of this group is of important value in economic development and social stability. Obesity and overweight are usually caused by a higher calorie intake than the energy expended, as many previous studies have confirmed that both were associated with lower levels of physical activity (PA)[5,6].

Lack of PA in the workplace is an important factor in people becoming overweight and suffering from obesity[7]. The fact that most women are engaged in occupations that require only light PA makes them more likely to become obese. Therefore, it is not surprising that the prevalence of lifestyle-related obesity has increased among Saudi women[8]. This illustrates the growing need to understand how social restraints imposed on Saudi women affect their health and their response to current improvement methods[9].

A healthy diet includes a balanced diet of natural and fresh foods, many fruits and vegetables, and foods containing minerals and vitamins[10]. Eating healthy is one of the most substantial means of enhancing health, but it also involves consistently practicing certain behaviors and eating habits that are beneficial for supporting and maintaining both physical and psychological health[11]. Maintaining a healthy diet is influenced by various individual and collective (social and environmental) factors[12]. Over the past few decades, eating patterns in the KSA have significantly changed because of the country's rapidly growing socio-economic status. This has resulted in a marked change in lifestyle, which has affected the health of different age groups within the population.

Regarding women, the health benefits of PA are clear. Women are less likely to engage in the recommended levels of PA [13]. Several factors, such as increased urbanization, dense traffic, extreme weather, cultural barriers, lack of social support, absence of female school PA programs, and lack of time and resources, make it difficult for Saudi women to choose to be involved in PA[14]. In addition, further barriers to PA include a lack of time, an anticipated lack of enjoyment, self-consciousness about body size, shape, and PA ability, and urinary incontinence, among other things[15].

Physical inactivity is a major global health problem [16]. As a result of the immense health and social ramifications of obesity, the government of the KSA has implemented a wide range of policies in its "Vision 2030" plan for a healthier population [3,4]. NCDs can be associated with unhealthy lifestyles and behaviors, and the removal of barriers to a healthy lifestyle can have great benefits[17]. To identify opportunities and challenges to following a lifestyle of a healthy diet and PA in Arab countries, the Capability Assessment for Diet and Activity (CADA) scale has been translated into Arabic. The measure is an important guide for improving women's quality of life, according to researchers[18]. Therefore, the aim of this study was to assess the status of opportunities for and barriers to a healthy diet and activity among Saudi women working at King Saud University.

2- Methods:

2-1 Data Collection:

For this cross-sectional study, the target participants were women aged 25–60, living and working at the College of Applied Studies and Community Service at King Saud University in Riyadh, the capital city of the KSA. College of Applied Studies and Community Service is a link between the university and all local community groups and sectors, including ministries, public and private institutions, and individuals. Courses and programs are provided to meet the needs of the community.

One hundred and thirty-two women working in the college's offices agreed to participate in the research by responding to the questionnaires. Data was collected through interviews between January and March 2022. The average time required to complete the questionnaire was 20 minutes. The ethics committee of King Saud University approved the study (reference number: KSU-HE-19-208). Permission to collect data was obtained from the worksite, and informed consent was obtained from all participants.

2-2 Instrumentation:

The practical opportunities and barriers for diet and physical activity were measured using the Arabic version of the CADA questionnaire [18,19], which included two additional items: (1) taking care of the family prevents me from spending time on physical activity; (2) my daily schedule allows me to spend time on physical activity. This was done because women who work and take care of household duties are further limited in their time for diet and PA[15]. The final instrument comprised 27 items that were scored on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always); for factor analysis, there were eight scales: diet opportunity, diet barriers, diet knowledge, diet time, PA convenience, neighborhood, PA barriers, and PA time. The survey was translated to Arabic, then back to English, and test-retest reliability was conducted for 15 participants who were fluent in both English and Arabic. The survey yielded a 95.8% agreement. The

stability of the questionnaire was calculated using Cronbach's alpha coefficient (CAC), and the internal validity of the questionnaire was calculated **Table (2)** using Spearman's rank correlation coefficient with internal consistency between the expressions (0.305–0.622), which indicated statistical significance at (P≤ 0.01).

2-3 Demographic Characteristics:

The demographic characteristics included in the analysis were the respondents' ages, heights, weights, health status, chronic diseases, marital status, level of education, monthly family income, and job category. BMI was used as a continuous variable and was calculated as (kg/m). The participants were categorized as underweight, normal weight, overweight, or obese based on the WHO criteria, according to the international classification[20] .

2-4 Data Analysis:

In this cross-sectional study, statistical analyses were performed using the IBM SPSS software (version 20.0; IBM Corp., Version 20.0, Armonk, NY, USA). To assess the internal consistency of the instrument, a p-value of 0.05 was considered statistically significant. The participants' demographic characteristics were used to figure out the frequency and percentage of the participants, and associations were made using Spearman rank correlation of CADA scores, which were calculated as means and standard deviations (SD). This was calculated using Cronbach's alpha for each subscale and score. An acceptable level of Cronbach's alpha was between 0.5 and 0.8.

3- Results:

3-1 Reliability:

The stability of the questionnaire was determined using Cronbach's alpha, as shown in **Table 1**. The scales for the eight factors showed a value of Cronbach's alpha ranging between 0.55–0.83 and an overall score of 0.81, which reflects a high value in stability for application in human scientific research.

Table (1). Cronbach's Alpha for factors of the questionnaire .

No	Factors	items	Cronbach Alpha
1	Diet opportunity	5	0.695
2	Diet barriers	3	0.529
3	Diet knowledge	3	0.813
4	Diet time	3	0.708
	Diet	14	0.707
5	Physical activity convenience	3	0.555
6	Neighborhood	5	0.833
7	Physical activity barriers	3	0.707
8	Physical activity time	2	0.727
	Physical activity	13	0.777
	Total	27	0.817

Table 2 shows that the correlations between the items and the factors of the overall score were statistically significant, with the lowest correlation being 0.305 (item 1: easy to shop for food) and the highest being 0.622 (item 23: illness gets in the way of being active), indicating the possibility of obtaining reliable results using this instrument.

Table (2). Correlations between Items and Factors.

Factor	No.	Item	CORRELATIONS
Diet opportunity	1	Easy to shop for food	.305**
	2	Can afford fresh fruit and vegetables	.435**
	3	Can afford lean meat or fish	.309**
	4	High-quality fruit and vegetables	.354**
	5	Too expensive to buy groceries over the entire month	.374**
Diet barriers	6	Illness gets in the way of cooking meals	.524**
	7	Too tired to cook my own meals	.480**
	8	Feeling depressed keeps me from food shopping	.426**
Diet knowledge	9	Know how to eat healthy foods	.463**
	10	Know how to choose healthy meals at restaurants	.471**
	11	Know where to shop for healthy food.	.492**
Diet time	12	Taking care of family leaves little time for cooking	.563**
	13	Schedule leaves little time for food shopping	.489**
	14	Schedule gives me little time for cooking	.598**
Physical activity convenience	15	Places nearby for outdoor physical activity	.590**
	16	Places are open when I want indoor activity	.582**
	17	Can afford to join a gym	.412**
Neighborhood	18	Easy to walk to places in my neighborhood.	.478**
	19	Places where I can be active without needing to pay	.385**
	20	Often see people walking in my neighborhood.	.475**
	21	People generally feel safe in my neighborhood.	.401**
	22	Neighborhood is well-lit for evening activities	.457**
Physical activity barriers	23	Illness gets into the way of being active	.622**
	24	Health limits my activities.	.611**
	25	Feeling depressed keeps me from being physically active	.534**
Physical Activity time	26	Taking care of the family prevents me from spending time on physical activity	.561**
	27	My daily schedule allows me to spend less time in physical activity	.537**

****** Indicates statistical significance P≤ 0.01

3-2 Characteristics of the participants:

The participants comprised 132 women working in offices; their demographic characteristics are shown in **Table 3**. The sample included 82.9% married women, 10% single, and 6% divorced. In addition, a majority of the respondents (75.8%) were not supervisors but performed various office tasks. There were, 62% of participants between the ages of 36 and 45, with a mean age of 40±6.7. Their mean BMI was 27.29±4.35, where 44.7% of the participants were in the "overweight" category. Regarding the women's health status, 67% of them had no chronic diseases, and of the remaining 32.6%, who had chronic diseases, 35%, 21%, and 19% suffered from thyroid disorders, blood pressure, and diabetes, respectively.

Table (3). Socio-demographic Characteristics of the Participants (n=132).

Variable	(n)	(%)
Age groups (years)		
25-< 35	24	18.2
35-< 45	82	62.1
45-< 60	26	19.7
Mean ± SD[a]	40±6.7	
BMI (kg/m^2)[b]		
<18.50	2	1.5
18.50-24.99	31	23.5
25.00-29.99	59	44.7
≥30.00	40	30.3
Mean ± SD	27.29±4.35	
Weight9(kg)		
43-75	82	62
75-130	50	38
Mean ± SD	70±37.19	
Hight(cm)		
144-160	68	52
160-173	64	48
Mean ± SD	158±76.79	
Health status Chronic disease		
No	89	67.4
Yes	43	32.6
The type of disease		
Diabetes	8	19
Hypertension	9	21
Thyroid disorders	15	35
Cholesterol	1	2
colon diseases	1	2
Asthma	2	5
Migraine	7	16
Marital Status		
Single	14	10.6
Married	109	82.9
Divorced	8	6.1
Widowed	1	0.8
Educational Level		
Primary or less	0	0
Middle school	3	2.3
High school	10	7.6
College diploma	10	7.6
Bachelor	95	72
Postgraduate degree	14	10.6
Monthly family income (SR)[c]		
5000 or less	3	2.3
-5001-7000	11	8.3
10000-7001-10000	37	28
-10001-15000	37	28
15001--20000	21	15.9
Over 20000	23	17.4
Job category		
Supervisor	32	24.2
NON-SUPERVISOR	100	75.8

[a] SD: standard deviation; [b] BMI= Body Mass Index**.** Underweight: <18.5; normal: 18.50–24.99; overweight: 25.00–29.99; obese: ≥30.0, [c] SR: Saudi Riyals.

3-3 The Opportunities and Barriers to PA and Healthy Diet:

In terms of educational level, 72% of the participants had at least a bachelor's degree, while only 10.6% had a postgraduate degree. The rest were divided equally between high school graduates and those with a diploma (15.2%). The monthly family income for 17.4% of the women was >20,000 Saudi Riyals (SAR), while the monthly family incomes for 28% of the participants who belonged to both categories were 7001–10000 and 10001–15000 SAR per month.

Table (4). Descriptive items and scale characteristics (n=132).

Scales/ Items	Mean /SD
Diet	**3.53 ±0.541**
1-Diet opportunity	**3.97± 0.675**
Easy to shop for food	4.18± 0.971
Can afford fresh fruit and vegetables	4.25± 0.841
Can afford lean meat or fish	3.81± 0.966
Fruit and vegetables high quality	3.64± 1.099
Too expensive to buy groceries over entire month	3.95± 1.125
2-Diet barriers	**3.330±0.845**
Illness gets in way of cooking meals	3.78± 1.058
Too tired to cook my own meals	3.2± 1.244
Feeling depressed keeps me from food shopping	3.02± 1.223
3-Diet knowledge	**3.694**±0.929
Know how to eat healthy foods	3.86± 1.010
Know how to choose healthy meal at restaurant	3.61± 1.123
Know where to shop for healthy food	3.61± 1.131
4-Diet time	**3.64±0.875**
Taking care of family leaves little time to cook	3.65± 1.179
Schedule leaves little time for food shopping	3.62± 1.045
Schedule gives me little time to cook	3.66± 1.076

Scales/ Items	Mean /SD
physical activity	**2.72 ±1.167**
1-Physical activity convenience	**3.41±0.921**
Nearby places for outdoor physical activity	3.52± 1.201
Places open when I want indoor activity	3.48± 1.214
Can afford to join a gym	3.23± 1.379
2-Neighborhood	**3.79±0.924**
Easy to walk places in neighborhood	3.42± 1.404
Places I can be active w/o needing to pay	3.71±1.501
Often see people walking in my neighborhood	3.80± 1.108
People generally feel safe in my neighborhood	4.11± 1.016
Neighborhood well lighted for evening activities	3.89± 1.237
3-Physical activity barriers	**2.724**±1.167
Illness gets in way of being active	2.60± 1.408
Health limits my activities	2.51± 1.328
Feeling depressed keeps me from being physically active	3.07± 1.300
4-Physical activity time	**3.68±1.023**
Taking care of family leaves little time for Physical activity	3.57±1.173
Schedule gives me little time to Physical activity	3.80± 1.135

Table 4 shows a descriptive analysis of the items and scale characteristics. The means and SDs of the diet and PA scales were 3.53, 0.54, 2.72, and 1.16, respectively. Between 2.72 and 1.16 (PA barriers) and 3.97 and 0.67 (diet opportunity), the questionnaire subscale scores ranged from 2.51 to 1.328 (item 24: Health limits my activities) to 4.25 to 0.84 (item 1: Easy to shop for food). The mean and SD of the opportunity for the diet were greatest at 4.25± 0.841 and 4.18± 0.971 for item 1 (Easy to shop for food) and item 2 (Can afford fresh fruit and vegetables). **Table 5** shows that diet and PA opportunities were significantly higher ($p \leq .01$) among supervisory and regular office respondents.

Table (5). Independent sample t-test for deference according to type of work .

Factors	Kind of work		*t*	*P Value*
	Supervisor(n=32) **Mean**± SD	*Non-Supervisor(n=100)* **Mean**± SD		
Diet	3.80±0.58	3.61±0.49	1.84	0.068
Diet opportunity	4.25±0.65	3.878± 0.65	2.783	0.006*
Diet barriers	3.34±0.92	3.32±0.82	0.099	0.921
Diet knowledge	3.68±0.87	3.70±0.95	-.121	0.904
Diet time	3.94±1.11	3.55±0.78	2.213	0.029*
Physical activity	3.87±0.87	3.25±0.50	4.957	0**
Physical activity convenience	3.95±0.94	3.24±0.85	4.013	0**
Neighborhood	4.26±0.81	3.64±0.91	3.477	0.001**
Physical activity barriers	3.16±1.55	2.59±0.97	2.447	0.016*
Physical activity time	4.09±0.97	3.56±1.01	2.651	0.009*

4- Discussion:

This study was designed to explore the opportunities and barriers to PA and a healthy diet among a sample of Saudi women working in offices. The current study involved 132 women from the College of Applied Studies and Community Service at King Saud University in Riyadh. **Table 3** shows the study population, including the sample size and descriptive data. This sample had a 30% higher prevalence of obesity than the study by Albawardi et al., in which it was 26% among Saudi women working in office settings [21] . Despite the differences in the sample size, this finding is consistent with that of a previous study that found high BMI in women, with 31% being obese (BMI ≥ 30)[18]. However, this was higher than the 43% previously reported by the WHO [20]. 82 % of the participants had a college degree or higher in the present study, which was compatible with the findings from Albawardi et al., which reported that approximately 80% of Saudi women working in office settings had a college degree or higher[21]. In this case, the participants' educational level was a significant predictor of obesity [22].

The results of this study led the researchers to conclude that the practice of healthy food habits significantly outweighed that of PA among Saudi women working in offices. This seemed to be the case because opportunities for obtaining fish, meat, fresh vegetables, and fruits were readily available, as was the ease of purchasing them. This could be the result of the remarkable social and economic development that the KSA has undergone over the past few decades. Despite the country's extreme climatic conditions, it has initiated numerous agricultural schemes and programs with the primary goal of ensuring food security and an inclusive approach to societal development [23, 24]. Improvements in the food supply and the elimination of dietary deficiencies are often accompanied by economic development, which improves the country's overall nutritional condition[25]. FAO data show an overall increase in food supply (1961–2007) in the KSA, with an increase in the supply of sugar, meat, animal fat, offal (organ meats),

eggs, and milk, and a leveling-off trend in the vegetable and fruit supply[26]. The challenges faced by participants in the study appear to lie in their knowledge and nutritional awareness, which is in line with the findings of a previous study that examined these variables through a convenience sample (N = 151) of adult Saudi women living in the United States. The findings revealed a discrepancy between their perceived and actual knowledge ($p < .05$) and a desire to increase their intake of fruits, vegetables, and dairy products while decreasing their fat consumption [27]. In this study, knowledge of nutrition and attitudes toward dietary behaviors differed, depending mainly on the cultural, socio-economic, and educational levels of the participants [28].

Despite the knowledge about nutrition possessed by the participants, the traditional way in which women in the KSA cook includes two or more different kinds of foods rich in fat, sugar, and meat. The tradition of cooking healthy food in the KSA may therefore prevent women from cooking healthy food because they have to ensure that the meal conforms to the expectations of the whole family [29]. These findings suggest that there are incentives and barriers to PA. According to the responses of the participants, opportunities for PA lie mainly in neighborhood environmental factors. This is related to the availability of free places to practice PA, as well as the need for a sense of safety in the neighborhood. These findings contradict previous research, which found that women in the KSA were restricted from leaving their homes and had limited access to health care[30].

According to another Saudi study, the long working hours in office-based jobs would reduce the time women spent in PA, which was the highest reported barrier for PA22. Women often continue to perform most household tasks daily after work [31]. Leaving little time to achieve PA 15. Another reason for their inactivity is that women are responsible for childcare [32].

While this study makes it possible to determine some of the opportunities and barriers to PA and a healthy diet among women working in the office, it has some limitations. The limitations of this study include the use of a university sampling framework, which limits the generalizability of the results to other workplaces. Another limitation of the study is that the homogeneous sample was self-selected, and the study was conducted in an academic setting in the capital city of the KSA.

5- Conclusion:

Further investigations into the opportunities and barriers to PA and a healthy diet should include comparative studies of women with different functional capacities in other regions of the KSA and in different countries with similar cultures focusing on the impact of the type of job. Moreover, the tendency to study environmental opportunities for working women contributes to the practice of PA and the adoption of a healthy diet. This will also be important in clarifying the strategies to be employed and the policies to be developed to support PA and a healthy diet to provide good health to working Saudi women.

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