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RESEARCH ARTICLE

ASSESSMENT OF PHYSICAL ACTIVITY OF RESIDENT PHYSICIANS IN SAUDI ARABIA

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ABSTRACT

Background: physical activity improves quality of life, helps to improve daily activities and have a good impact on health. Physician's health matter and studies showed that doctors' own physical activity practices may influence their clinical attitudes towards physical activity. **Methods:** A Cross-sectional study was conducted among resident physicians in Saudi Arabia from October 2015 to January 2016. We used an online survey, which *INCLUDES* demographic data, residency program and counseling their patients, and the short form of international physical activity questionnaire (IPAQ). **Results:** 296 responses were received. Most of the residents (65.5%) have sedentary life and only 14.9 % have high physical activity. The most active were ER residents followed by internal medicine residents (28.6%, 24.4%) respectively, while pediatric residents and family medicine residents were the most sedentary groups (73.7%, 70%) respectively. Residents who perceived their residency program as being stressful were found to be the least active. The opposite was true for residents with low levels of perceived stress. Majority of residents (43%), frequently give advice of physical activity to their patients. At the same time, (52%) think that their physical activity level is affecting their counseling of physical activity to patients. **Conclusion:** most of residents are not physically active. They are also suffering from overweight and obesity. There should be more attention from health institutions and government to provide supportive exercise environment for the population including residents.

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INTRODUCTION

Physical activity is defined as "any bodily movement produced by skeletal muscles that requires energy expenditure" (http://www.who.int/topics/physical_activity/en/.(Accessed 30th February 2015). It improves quality of life, helps to improve daily activities and have a good impact on health such as reducing the risk of Hypertension, coronary heart disease, breast and colon cancer (http://www.who.int/topics/physical_activity/en/.(Accessed 30th February 2015]; http://www.cdc.gov/physicalactivity/everyone/guidelines/adult_s.html. (accessed 28th February 2015]; Berlin *et al.*, 1990; Lee, 2000; Warburton, 2006) Insufficient physical activity is one of the ten leading risk factors for global mortality. It is on the rise in many countries, increasing the burden of non-communicable diseases, and is affecting general health worldwide.

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People who are insufficiently active have a 20 to 30% increased risk of death compared to people who are sufficiently active (http://www.who.int/topics/physical_activity/en/.(Accessed 30th February 2015). Physical inactivity is the fourth leading risk factor for global mortality with an estimated 2.3 million deaths. Lack of physical activity is a modifiable risk factor for cardiovascular disease and other chronic diseases including diabetes, obesity, hypertension, cancers (breast and colon), bone and joint diseases (osteoarthritis & osteoporosis) and depression (Berlin, 1990; Lee, 2000; Warburton *et al.*, 2006). The intensity of different forms of physical activity varies between people. In order to be beneficial for cardiorespiratory health, all activity should be performed in bouts of at least 10 minutes duration (http://www.who.int/topics/physical_activity/en/.(Accessed 30th February 2015) Regular physical activity of moderate intensity has significant benefits for health, and people can easily achieve the recommended activity levels (http://www.who.int/topics/physical_activity/en/.(Accessed 30th February 2015);

<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>. (accessed 28th February 2015). Physical activity is classified into three main categories: Light daily activities such as shopping and cooking, Moderate-intensity aerobic activity such as walking fast and Doing water aerobics, and Vigorous-intensity aerobic activity such as Jogging and running (<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>. (accessed 28th February 2015). For Adults, the WHO recommended that they should do at least 150 minutes of moderate-intensity physical activity, or 75 minutes of vigorous-intensity physical activity throughout the week, or combination of both (<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>. (accessed 28th February 2015). In 2010, around 23% of adults aged 18 and over were not active enough (20% men and 27% women). In high-income countries, 26% of men and 35% of women were insufficiently physically active, as compared to 12% of men and 24% of women in low-income countries (<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>. (accessed 28th February 2015). Several international studies that assessed physical activity among physicians found that most of internal medicine resident physicians may not be adequate role models for promoting exercise, and that only 41% of physicians met the recommended physical activity guidelines. Furthermore, medical students were better to achieve the recommended exercise than medical residents. Many residents find it difficult to maintain healthy life style during residency training program (Rogers *et al.*, 2006; Rye *et al.*, 2012).

Women family physicians in Estonia who were physically active were promoting health more and encouraging physical activity among patients as part of their everyday work.(8)Nevertheless, the rates of exercise counseling by doctors remain low as only 34% of US adults report exercise counseling at their last medical visit. It was suggested that health of the physician matter and that doctors' own physical activity practices may influence their clinical attitudes towards physical activity (Lobelo *et al.*, 2009). In USA, a study found that residents meet 73.2% of physical activity guidelines while the medical students were 84%, attending physicians 84.8% and fellow physicians 67.9%. They also found that physicians and medical students engage in more physical activity and tend to have a lower BMI than the general population (Stanford *et al.*, 2012). In Bahrain, Borgan estimated that 4 % of primary health care physician had met the CDC recommendation (Borgan *et al.*, 2015). While in Saudi Arabia, the prevalence of physical inactivity among children and adults was (43.3%–99.5%). Abo Zaid and his colleges found that physical activity among patients attending family medicine clinic in western region of Saudi Arabia was 54%. Furthermore, most of the men and women did not reach the recommendations necessary for prompting health and preventing diseases. Approximately 81% of the Saudi male age 19 years and older do not exercise on a regular basis (53% were totally inactive and 27.5% irregularly active). One study evaluated the physical activity among primary health care professionals as part of healthy life status and found that their level of physical activity was 21.1 % (Al Hazzaa *et al.*, 2004; AboZaid, 2013; Al-Nozha *et al.*, 2007; Al-Rafae *et al.*, 2001; AlAteeq *et al.*, 2014). We found no study evaluating physical activity of residents particularly in Saudi Arabia.

The aim of the study is to assess the level of physical activity of resident physicians in Saudi Arabia.

Objectives

- To assess the level of physical activity among resident physicians in Saudi Arabia.
- To explore the effect of residency programs and perceived stress level on residents physical activity.
- To compare physical activities of residents in different specialties
- To explore the relationship between physical activity and residents demographics.

Secondary objective: To explore the effect of the level of physical activities of residents on their counseling of their patients for physical activities.

METHODS

Study design: A Cross-sectional study was conducted among resident physicians in Saudi Arabia from October 2015 to January 2016.

Study Subjects

Inclusion criteria: All resident Physicians currently involved in Saudi residency training programs all over the kingdom at different level of training.

Exclusion criteria: Pregnant resident and Residents with physical disability

Sample size & technique: Based on a study done in USA by Fatima *et al* we assumed a percent of being physically active among physicians to be 78%. Using Open-Epi online sample size calculator (<http://www.openepi.com/SampleSize/SSPropor.htm>) we calculated a sample size of 264 with confidence interval of 95 % and 5% margin of error. The sample size was adjusted to 270.

Sampling period: The Survey Monkey® questionnaire was available online between October 2015 and January 2016.

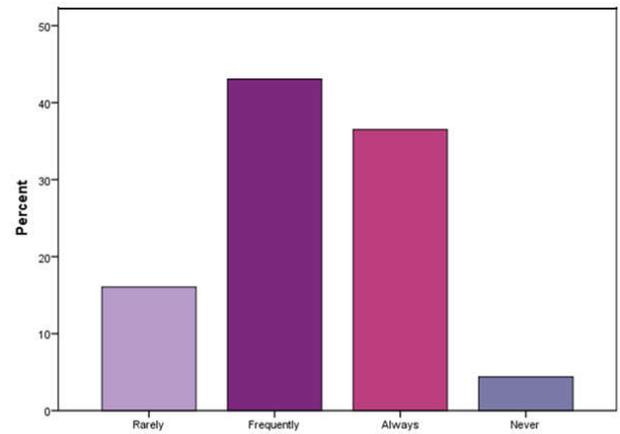
Data instruments:

A questionnaire was developed for this study. The questionnaire was in English language. It was divided into 3 sections: The first section contains the demographic data of the resident (age, sex, marital status, and number of children, region of residency program, residency level, specialty, height, and weight). The second section enquires about their residency program and counseling their patients. The third section is the short form of international physical activity questionnaire (IPAQ) which is validated internationally (17). IPAQ questionnaire is surveillance of PA of adult (15-69) years, and consist mainly of 7 questions to assess physical activity in the last 7 days . Every question have a score and after calculating these scores through specific calculations (MET-min per week: MET level x minutes of activity/day x days per week) we can categorized the participants PA either low, moderate or vigorous active.

- Low activity or sedentary (not active or not meeting the criteria of moderate or vigorous activity).

Table 1. participants socio- demographics

| Characteristics | Number | Percentage |
|-------------------------|----------------------|------------|
| Age (mean ±SD) | 28.19 ± 3.069 | |
| Gender | | |
| • Male | 138 | 46.8 |
| • Female | 157 | 53.2 |
| Marital Status | | |
| • Married | 141 | 47.8 |
| • Unmarried | 154 | 52.2 |
| Have children | | |
| • Yes | 91 | 30.8 |
| • No | 204 | 69.2 |
| Live in : | | |
| • Apartment | 185 | 62.7 |
| • Villa | 110 | 37.3 |
| Live: | | |
| • Alone | 51 | 17.3 |
| • With others | 244 | 82.7 |
| BMI | | |
| • Under weight | 8 | 2.8 |
| • Normal weight | 119 | 41.3 |
| • Over weight and obese | 93 | 55.9 |



Graph 1. Do you give physical activity advice to the patient ?

Graph3: PA STATUS

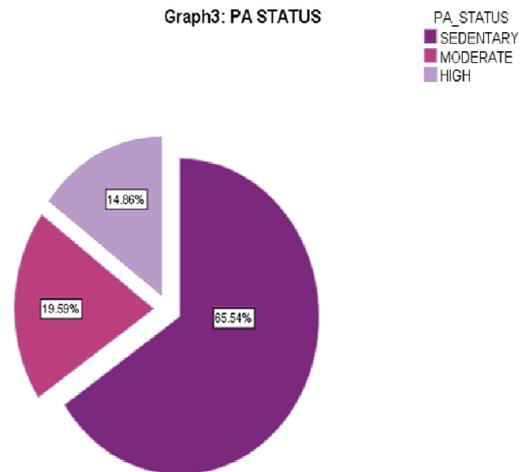
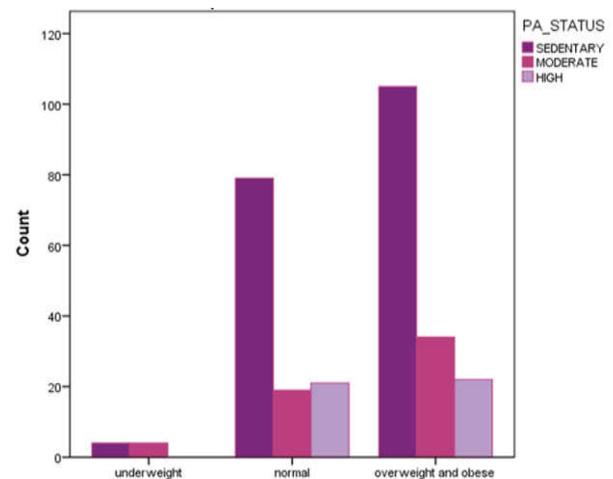


Table 2. Residency program region ,residents level,and speciality

| Characteristics | Number | Percentage |
|--|--------|------------|
| Region of residency program | | |
| • Central | 167 | 56.4 |
| • Western | 83 | 28.0 |
| • Eastern | 22 | 7.4 |
| • Other | 24 | 8.1 |
| Residency level | | |
| • First part residency (junior residents) | 138 | 46.6 |
| • Second part residency (Senior residents) | 158 | 53.4 |
| Residents specialty | | |
| • Family medicine | 130 | 44.1 |
| • Internal medicine | 41 | 13.9 |
| • Surgery | 26 | 8.8 |
| • Pediatric | 19 | 6.4 |
| • ER | 14 | 4.7 |
| • Oby/gyne | 6 | 2.0 |
| • Other | 59 | 20 |



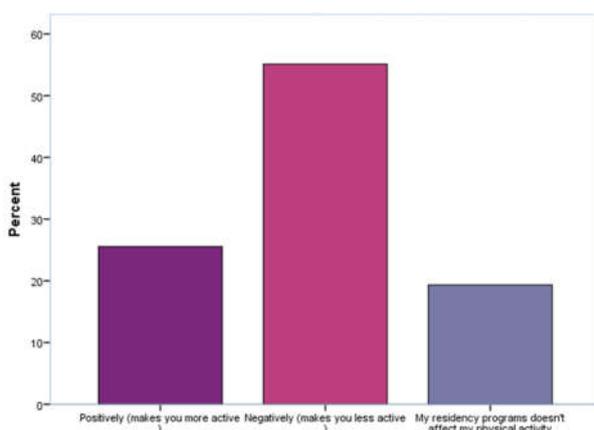
Graph 4. Relation between PA and BMI

- Moderate activity (get at least 600 MET-minutes/week.).
- Vigorous activity or high (get at least 1500 MET-minutes/week).(17-19)

The questionnaire was built online using SurveyMonkey® website. Participants were assured that no person identifying data will be collected and participation is voluntary. The average time required to fill the questionnaire was between 3 to 5 minutes. It was distributed online through social media (Twitter & Facebook). To increase the sample size we contacted the training centers at the hospitals in Saudi Arabia.

Table 3. Satisfaction of residency program

| Satisfaction | Frequency | Percentage % |
|---------------------|-----------|--------------|
| Not satisfied | 53 | 17.9% |
| Partially satisfied | 165 | 55.8% |
| Satisfied | 68 | 19% |



Graph 1. Does the residency training affect your physical activity?

Also, we acquired permission from the Saudi commission for health specialties to distribute the questionnaire to all residents in SA. We asked those who received the survey to forward it to their colleagues.

Data analysis: Data set was downloaded from Survey Monkey® site and imported into SPSS. Data were then cleaned and coded by a trained Data entry clerk. Data was analyzed using statistical package for the social sciences version 20 software (SPSS, 20). Descriptive statistics performed in the form of frequencies and percentage for categorical variables while mean and standard deviation (SD) used for description of continuous variables. Analytic statistics was done using chi-square test (χ^2) to assess differences between categorical variables. Statistical significance is set to 0.05 or less.

Ethical clearance: For the study was obtained from King Abdullah International Medical Research Center (KAIMRC) Institutional Review Board IRB in, Riyadh and Ethics committee permission (please see appendix for approval letter) and participation in the research was considered as consent.

RESULTS

We received around 296 responses to the online survey (109.6% of the required sample size).

Survey-respondent demographics: The age of the participants was between 25 to 35 years with the mean age of 28 years and standard deviation \pm 3.069 years.

Most of the respondents were females (53.2%), unmarried (52.2%), have no children (69.2%), live in an apartment (62.7%), and living with other people (82.7%). 55.9% were overweight or obese. Table 1 summarizes participant's socio-demographic characteristic

Residency program region, resident's level and specialty: Resident came from different regions in Saudi Arabia. Most of them were from central region 56.4%. Senior residents (R3, R4 and R5) constitute (53.4%) of the sample compare to junior (R1, R2) level residents. Residents' respondents were from different medical subspecialties. The highest number were family medicine residents, followed by internal medicine (44.1% & 13.9%) respectively.

The residency program and counselling patient: 50% of the residents described their residency program as being moderately stressful. However, 55.8% of them were partially satisfied about their residency program as shown in Table 3 & 4. Furthermore, more than half of the respondents (55.1%) think that the residency program have a negative effect on their physical activity as shown in Graph1.

43% of residents frequently give advice of physical activity to their patients. At the same time, (52%) of them think that their physical activity is affecting their counselling of physical activity to patient.

Physical activity status: Most of the residents 65.5% (194) have sedentary life and only 14.9 % (44) have high physical activity as shown in Graph 3.

Table 4. Relationships between demographic character & PA

| Demographic | | Physical activity status | | | Chi-square | p-value |
|--|--------------------|--------------------------|----------|-------|------------|---------|
| | | Sedentary | Moderate | High | | |
| Gender | Female | 72% | 14.6% | 13.4% | 7.02 | 0.03 |
| | Male | 58% | 25.4% | 16.7% | | |
| Region of respondent residency program | Central | 62.3% | 21% | 16.8% | 3.410 | 0.756 |
| | Western | 66.3% | 20.5% | 13.3% | | |
| | Eastern | 77.3% | 13.6% | 9.1% | | |
| | Other | 75% | 12.5% | 12.5% | | |
| Live in | Apartment | 69.7% | 16.8% | 13.5% | 4.188 | 0.123 |
| | Villa | 58.2% | 24.5% | 17.3% | | |
| BMI | Underweight | 50% | 50% | 0% | 6.975 | 0.137 |
| | Normal weight | 66.4% | 16% | 17.6% | | |
| | Overweight & obese | 65.2% | 21.1% | 13.7% | | |

Table 5. Residents, Residency programs and PA

| Residents and residency program | | Physical activity status | | | Chi-square | p-value |
|---------------------------------|--------------------|--------------------------|----------|-------|------------|---------|
| | | Sedentary | Moderate | High | | |
| | | | | | 2.875 | 0.238 |
| Residents level | Juniors | 64.5% | 23.2% | 12.3% | 11.654 | 0.474 |
| | Seniors | 66.5% | 16.5% | 17.1% | | |
| | Internal medicine | 58.5% | 17.1% | 24.4% | | |
| | Family medicine | 70% | 20.8% | 9.2% | | |
| | Surgery | 61.5% | 15.4% | 23.1% | | |
| | Oby/gyne | 66.7% | 16.7% | 16.7% | | |
| Residents specialty | Pediatric | 73.7% | 10.5% | 15.8% | 11.654 | 0.474 |
| | Emergency medicine | 50% | 21.4% | 28.6% | | |
| | Other | 62.7% | 23.7% | 13.6% | | |
| | Mild | 53.8% | 23.1% | 23.1% | | |
| Stress of residency program | Moderate | 62.8% | 23% | 14.2% | 1.698 | 0.791 |
| | Sever | 63.7% | 18.6% | 17.7% | | |

Relationship between demographic and physical activity:

There was statistically significant difference between genders ($\chi^2=7$, p value 0.03). Female residents were having more sedentary life comparing to male residents. The resident who had their residency program in Western and Eastern regions were more sedentary (77.3%, 66.3%) respectively while residents in central regions shows more active life style 16.8%. Residents who lived in a villa were more active and less sedentary than residents who lived in apartment. Residents who were overweight and obese were having sedentary life as shown in Graph 4.

Residents level, specialty, residency programs and PA:

Senior residents were more sedentary than juniors but this finding was not statistically significant ($\chi^2=2.875$, p value 0.238). Different specialty of residents shows difference in activity level, ER residents were the most active followed by internal medicine residents (28.6%, 24.4%) respectively, while pediatric residents and family medicine residents were the least active PA (73.7%, 70%) respectively, none of these differences were statistically significant ($\chi^2=11.654$, p value 0.474). Residents who perceived their residency program as being stressful were found to be the least active. The opposite was true for those who perceived their program to be less stressful as they reported higher levels of physical activity. This difference was not statistically significant ($\chi^2=1.698$, p value 0.791).

DISCUSSION

The majority of residents (55.9%) in our study were overweight and obese which was consistent with the general population (Al-Nozha *et al.*, 2005) but was lower when compared to other residents in Pakistan (59.8%) (Mahmood *et al.*, 2010). The major finding in our study is that most of the residents (66.5%) were leading a sedentary life. This figure is similar to the general Saudi population (43.3%-99.5%) (Al Hazzaa, 2014), and especially to the PA in adult males in Riyadh city (53%) (Al-Rafae, 2001). However, it is showing higher activity when compared with an evaluation of primary health care professional life style. (16) Multiple factors could contribute to this sedentary life, as residents work hard, long hours, with no much time for leisure activity, using cars for transportation and with the hot weather in the kingdom that does not allow walking outside. Our study was consistent with another United States study where senior residents were less active than juniors (Rye *et al.*, 2012). Resident came from different regions in Saudi Arabia; most of them were from central region. Central region is preferable due to high quality training and availability of many training programs as compare to different regions. What is important is that although they are less active, majority of residents (43%) were frequently giving advice of physical activity to their patients. This is less when compared with Estonian Family doctors (94%) but higher than US physicians (34%) (Suija *et al.*, 2010; Lobelo *et al.*, 2009). Half of the residents thought their physical activity level was affecting their counseling of patients about physical activity. Studies in Canada and US suggested that physicians who did more exercise, were more likely to counsel patients to be more active (Lobelo *et al.*, 2009; Frank *et al.*, 2010). It was not surprising that 55.1% of residents believed that residency-training program have a negative effect on their PA. This might be explained by having a heavy workload, on call duties, lack of time, sleep disturbance, and using any extra time to study for exams and career planning. Residents, who label

their residency-training program as stressful, were more likely to have sedentary life. That mirror a study which showed the negative effect of stress on physical activity (Stults-Kolehmainen, 2014). ER residents as expected were the most highly active. This could be because of their line of work, where they need to move quickly between patients, also because extra days off between works shifts that allow them the freedom to do leisure activities. On the other hand, pediatric and family medicine residents were among the top sedentary PA residents, as major part of their work is in a clinic and doesn't require much movement.

Acknowledgment

Before all I must thank ALLAH, the great almighty, the most merciful, for giving me the capability to finish the study. I would like to express my sincere gratitude and appreciation to my supervisor Dr. Muneera Baraja for her valuable guidance and expert advice, enthusiasm & encouragement during this study. I am grateful to Dr. Imad Abdulmajeed for all his effort, help and Assistance. Also, I would like to thank Mrs. Hind Al-Shatry Research Coordinator for her Technical and administrative support. Finally, special thanks to my lovely parents who pray for me a lot, to my siblings and my friends for their continued support and help.

Conclusion

Our study showed that residents are not physically active. They are also overweight and obese which is not acceptable from physicians who are role models for their patients and society. Further studies on barriers preventing residents from being physically active should be evaluated in order to plan how to improve it. There should be more attention from institutions and government to provide the supportive exercise environment for the population including residents.

Recommendation

- Provide a good facility for PA in work environment that include a gym, a walking path, and a sport instructor.
- Ask sport medicine and health education to give advice and education on how to increase physical activity during work.
- Encourage residents to utilize their available time to do exercise (before work, during work, at break time, or after work)
- Make competitions on different sport activities among residents
- Establish a stress relief program for residents and include PA as part of stress reliever.
- Advise residents of regular monitoring of their PA.
- The Institutions may consider an annual PA monitor as a part of annual health monitoring for residents physicians.

Limitation of study:

- Due to administrative difficulties it was impossible to obtain the list of all residents in Saudi Arabia, so we opted to use social media for distribution of the questionnaire. Although social media and internet penetration is expected to be high among residents physicians community, the bias of internet accessibility cannot be eliminated.

- Although English is the main language for education and communication among Saudi medical work environment, English language is a second language for most if not all the residents. Language barrier may have had an impact on our results.
- Cross sectional study design is not the best design to conclude association between variables due to lack of temporality.
- The exact numbers of surveys delivered through different social media ports cannot be traced to accurately assess the response rate.
- We relied on self reporting of physical activity. Participants may over or underestimate their level of physical activity which may affect our results.

Abbreviation

| | |
|-------|---|
| NGHA | National Guard Hospital Affairs |
| MBBS | Bachelor of Medicine and Surgery |
| R3 | Resident level 3 |
| SES | Socio-Economic status. |
| KAMC | King Abdul-Aziz Medical City |
| NGCSC | National Guard Comprehensive Specialized Clinic |
| KSA | Kingdom of Saudi Arabia |
| PA | Physical Activity |
| CDC | Centers for Disease Control and prevention |
| ER | Emergency |
| US | United State of America |

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Appendix:

Questionnaire

Physical activity of resident physicians in Saudi Arabia using IPAQ: Dear colleague, I will appreciate your valuable Participation in my research titled physical activity of resident physicians in Saudi Arabia using IPAQ. This is study aims to explore the physical activity of resident physicians during residency program using international physical activity questionnaire-short form(IPAQ).Kindly fill this questionnaire, all the information will be kept confidential and will be used for the research purpose only.

Thank you for your help and for your valuable time.

Alhanoof Alotaibi

Family medicine R3

KAMC-Riyadh

Please if any concern contact me

Alhanoof1lotb@gmail.com

Part 1 Demographic:

1-Age:.....

2-Gender:

- Male
 Female

3-Marital status :

- Single
 Married
 Divorced
 Widowed

4-Number of children:

- 0
 1-3
 More than 3

5-Region residency programs

- Central
 Western
 Eastern
 Other

6-With whom do you live now ?

- Alone
 Spouse
 Extended family

7-Where do you live now :

- Apartment
 Villa

8-Residency level:

- R1
 R2
 R3
 R4

9-Specialty:

- Internal medicine
 Family medicine
 Surgery
 Oby/gyne
 Pediatric
 ER
 Other.....

10-Weight :.....

11-Height:.....

Part 2

12-on scale of 1-10 with 1 the least stressful and 10 the most stressful

how stressful is your residency program ?

.....

13- on scale of 1-10 with 1 the least satisfaction and 10 the most

satisfaction ,what is the level of your satisfaction with your residency program ?

.....

14-How does the residency training affect your physical activity?

- Positively (makes you more active)
 Negatively (makes you less active)
 My residency programs doesn't affect my physical activity.

15-Do you give physical activity advice to the patient ?

- Rarely
 Frequently
 Always
 Never

16-Do you think your physical activity is affecting your counseling patients regarding physical activity ?

- Yes
 No

Part 3**INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE**

The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

17. During the **last 7 days**, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

No vigorous physical activities Skip to **question 19**

18. How much time did you usually spend doing vigorous physical activities on one of those days?

_____ hours per day _____ minutes per day

Don't know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

19. During the **last 7 days**, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week

No moderate physical activities Skip to **question 21**

20. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day _____ minutes per day

Don't know/Not sure

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

21. During the **last 7 days**, on how many days did you walk for at least 10 minutes at a time?
_____ days per week No walking Skip to **question 23**

22. How much time did you usually spend walking on one of those days?
_____ hours per day _____ minutes per day
Don't know/Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

23. During the **last 7 days**, how much time did you spend sitting on a week day?
_____ hours per day _____ minutes per day
Don't know/Not sure

This is the end of the questionnaire, thank you for participating.
