In general, 58.4% of adults showed a low level of PA, 23.2% fell within
the moderate level of PA and 17.5% of people showed a high level of PA. Both men
and women aged 40 – 64 years, have a high level of sedentary behavior: the higher
percentages of a low and moderate physical activity correspond to diabetics aged 40–
64, are respectively 16.84%, 31.58% (for male); and 16.24%, 41.03% (for women).
There is no link between gender and the practice or not of physical activity ($\chi^2 = 0.428$
$p=0.482 > 0$ and $V \text{Cramer}=0.044$).

Results: In general, 58.4% of adults showed a low level of PA. 23.2% fell within
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Conclusion: Those diabetics present a low level of physical activity and a high level
of sedentary behavior, which may lead to a lot of long-term complications. So to make
sure of this hypothesis another research is necessary to study the impact of this lack of
PA on the glycemic control of those diabetics.

Keywords: physical activity, sedentary behavior, diabetes, complications

Abbreviations: GPAQ, general physical activity questionnaire; MET, metabolic equivalents; PA, physical activity; RCD, referral
center of diabetes; WHO, world health organization

Introduction

In general, physical activity is associated with health outcomes and can reduce rates of all-cause mortality and a number of non-
communicable diseases such as coronary heart disease, high blood
pressure, type 2 diabetes and other.1 Diabetes is a major public
health problem and can promote a lot of severe complications,2
Physical activity can be an essential part to avoid those long-
term complications; therefore the benefits of physical activity for
individuals with diabetes are undisputed, a regular physical activity
enhances insulin sensitivity, increases cardiorespiratory fitness,
improves glycemic control, reduces the risk of cardiovascular
mortality, and enhances psychosocial well-being.3 Physical inactivity
called also sedentary behavior has a lot of health inconveniences. It is
now identified as the fourth-leading risk factor for global mortality,4
their levels are rising in many countries with major implications for
increases in the prevalence of non-communicable diseases and the
general health of the population worldwide.4 Thus, the promotion of
physical activity (PA) has become a key factor in preventing many
chronic diseases in public health strategies. Fighting weight gain and
obesity should be a primary element of the strategy.5 Morocco is also
undergoing an important epidemiological and nutritional transition.
6 Diabetes affects 6.6% of the population.7 However, there are not
many studies that aimed to evaluate the level of physical activity of
adults in general, and especially diabetics. Therefore, the aim of the
study was to describe the level of physical activity and sedentary
behavior according to age and gender among diabetics’ adults using
the (General physical activity questionnaire (GPAQ), in the province
of Kenitra, Morocco.

Methods

Participants and data collection

This study was carried out from January 2015 to April 2016, the
target population was diabetics presenting different types of diabetes
(type 1, type 2 and gestational diabetes). The research sample
consisted of 329 diabetics aged 18–86 years (28.6% of men and 70.5%
of women) living in Kenitra, Morocco. 12.7% were aged 18-39 years,
65.5% were aged 40-64 years and 20.8% were aged 65-86 years.
Physical activity and sedentary behavior among diabetic from the provincial referral center of diabetes, Kenitra, Morocco.

The response rate was 75%. The most frequent reason for non-response was the lack of time (40% of respondents). Participation in the study was voluntary. The study was carried out in the only provincial reference center of diabetes (RCD) located in the Urban Health Center - Moulay El Hassan in the Kenitra city, Morocco. Data was collected by the Global physical activity questionnaire (GPAQ). All participants reported having already attended a nutritional education and education sessions to physical activity, organized by the health center dietician.

Assessment of physical activity (PA) and sedentary behavior

The level of physical activity was determined using the version of GPAQ translated to Arabic.

The GPAQ was developed by the WHO for physical activity surveillance in developing countries. It collects information on physical activity participation in three settings; PA at work, travel to and from places and recreational activities as well as sedentary behavior. The questionnaire consists of 16 questions covering both vigorous and moderate intensity physical activity. The participants were, for example, asked how much time they spent doing vigorous-intensity activities at work on a typical day or week, on how many days they walk or cycle for at least 10 minutes continuously to get to and from places. The level of physical activity was measured by the GPAQ Analysis Guide, and by MET-minutes per week according to age categories. The duration of vigorous PA was multiplied by an energy equivalent coefficient of MET-8, the duration of moderate PA was multiplied by a coefficient of MET-4. The level of PA was assessed according to the following criteria:

- **a. High:**
  - I. Vigorous-intensity activity for at least three days with a minimum of 1500 MET-minutes per week of any combination of walking.
  - II. Moderate- or vigorous-intensity activities achieving a minimum of 3000 MET-minutes per week.
- **b. Moderate:** 1500 MET-minutes > moderate activities > 600 MET-minutes per week of any combination of walking.
- **c. Low:** A person not meeting any of the above-mentioned criteria falls in this category (MET<600).
- **d. Sedentary behavior:** Classified according to minutes per day of sitting at a desk, sitting with friends, travelling by car, bus, train, reading, and playing cards or watching television, excluding the time spent for sleeping.

Statistical analysis

- **A.** The data was analyzed using SPSS V.18. Percentage and mean are described in Table 1 & Figure 1.
- **B.** The prevalence of PA and sedentary behavior in age (18-39 years, 40-64 years and 65 years or above) and gender groups were described and the proportion of ‘highly active’, ‘moderately active’ and ‘low active’ adult females and males in different age categories were described.
- **C.** The relationship between gender and the practice of physical activity was determined by the chi-square test and the strength of this relationship was determined by the V Cramer.

### Table 1 Relationship between gender and practice or not of physical activity by X² test and V Cramer

<table>
<thead>
<tr>
<th>Items</th>
<th>Practice PA</th>
<th>Does not practice PA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>68(20,6%)</td>
<td>27(8,2%)</td>
<td>95</td>
</tr>
<tr>
<td>Woman</td>
<td>157(47,7%)</td>
<td>77(23,4%)</td>
<td>234</td>
</tr>
<tr>
<td>X² Test</td>
<td>0,428</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V Cramer</td>
<td>0,044</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*X²: chi-square test, *PA, physical activity

**Results**

I. 87,5% of women and 21,5% of men are illiterate.

II. 94,9% of women have no jobs.

**Level of PA**

- **a.** Irrespective of age and gender 58,4% of adults showed a low level of PA, 23.2% fell within the moderate level of PA and 17.5% of people showed a high level of PA (according to the GPAQ Analysis Guide)
- **b.** According to the Figure 1, for male, the higher percentages of a low and moderate physical activity correspond to diabetics aged 40 - 64 are respectively 16,84%, 31,58%. For the three groups of ages, the percentage of participants who practice a high physical activity remain low (3,16% for diabetics aged 18-39, 11,58% for diabetics aged 40 -64 and 3,16% for diabetics aged 65 and more).
- **c.** According to Figure 2, for the women, the higher percentages correspond to diabetics with a low and moderate physical activity, aged 40 -64 years, are respectively 16,24%, 41,03%. And also for the three groups of ages, the percentage of participants who practice a high physical activity remain low (2,56% of diabetics aged 18-39, 11,45% of diabetics aged 40-64 and 3,42% of diabetics aged 65 and more).
- **d.** The prevalence of low PA was more important in women compared to men (61,1% vs. 53,7% respectively; p<0.001).

**Figure 1 Distribution of the physical activity level among diabetics by age range.**

**Figure 2 Distribution of the physical activity level among diabetics by age range.**

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Physical activity and sedentary behavior among diabetic from the provincial referral center of diabetes, Kenitra, Morocco

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Discussion

The aim of this study was to describe the prevalence of physical activity and sedentary behavior as well as age and gender differences of diabetics adults using the GPAQ. Irrespective of age and gender, more than the half of the population showed a ‘low level’ of physical activity (58.4%). 23.2% fell within the moderate level of PA and 17.5% showed a high level of physical activity. These results indicate that this population doesn’t meet the recommendation of PA delivered by the world health organization. These results are different from those shown in some studies using the same test (GPAQ), such as the research conducted by ZDENEK HAMRIK and coll, in 2014, on Czech Adults, which found that the general population present a high PA (46.4%), and 32.3% for low PA, but for the moderate PA we found almost the same result 23.2% in our study for 21.3% in their study. 81.6% of our population have a low to moderate PA, this results are different from those found by a study analyzing PA in Moroccan adults using a short-self administrative version of IPAQ, where they indicate that 83.5% of the adults have moderate to high levels of PA. As shown in the Figure 1 and 2, for women as for men, the age range (40-64) represent the high prevalence of low PA, this result is also different from the one found by ZDENEK HAMRIK and coll, the difference between these two results can be explain by the sampling mode, which the age range (40-64) in our sample represent 65.5% of the population. In relation to our objective, we described and compared the proportion of sedentary females and males. Significant associations of age and sedentary behavior has been shown in women, the older the age group, the more sedentary behavior was reported. In opposition in men, increased age has been shown to be inversely associated with PA in previous studies, the younger age range (18-39) present the most sedentary behavior with 296.67 minutes/day. This result is alarming, because that lack of physical activity at this age may induce a dangerous long-term complication related to diabetes. Lower PA within women was correlated to housewives status. In fact, most women participating in this study were housewives (74%). It can’t be excluded that housewives consistently underestimated the effort during their homework, which actually still effort is demanding. The time spent for the three types of PA, (PA at work, travel from places and recreational PA) remain low for men as for women, and there is no significant difference between the age ranges. According to the KHI-square test (p=0.482), and V of Cramer (V=0.044) there is no relationship between gender and the practice or not of physical activity.

Conclusion

Those diabetics present a low level of physical activity and a high level of sedentary behavior for men as for women, which may lead to a lot of long-term complications. So to make sure of this hypothesis another research is necessary to study the impact of this lack of PA on the anthropometric status and the glycemic control of those diabetics.

Acknowledgements

None.

Conflict of interest

The author declares that they have no conflicts of interest in relation to Article.
References


