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Knowledge and Attitudes Regarding Adapted Physical Activity and Physical Activity Practices Among Medical Students in Morocco: A Cross-Sectional Survey

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Abstract

Introduction

Adapted physical activity (APA) is a non-pharmacological therapy whose prescription requires the training of future physicians. To our knowledge, no study has described the knowledge, attitudes, and practices (KAP) of Moroccan medical students regarding APA. This study aimed to describe the self-reported KAP regarding APA among medical students at the Faculty of Medicine and Pharmacy of Rabat (FMPR) and to compare first-year students with second- to fifth-year students.

Methods

A descriptive cross-sectional online survey was conducted among a convenience sample of first- to fifth-year medical students at the FMPR between September 17, 2026, and October 17, 2026. A 20-item questionnaire hosted on Google Forms was distributed via student groups on social media. All respondents were included, and percentages were calculated with the total sample as the denominator for all items. First-year students (n = 68) were compared with second- to fifth-year students (n = 372) using the chi-square or Fisher's exact test, with percentages calculated on the size of each group.

Results

Among the 440 participants (mean age 20.7 ± 1.6 years; male-to-female ratio, 0.58), 164 (37.3%) reported familiarity with the concept of APA, and 366 (83.2%) selected the expected response regarding its possible use in chronic diseases. Familiarity with the World Health Organization recommendations was reported by 129 (29.3%) respondents. Overall, 405 (92.0%) respondents considered that APA could improve the care pathway, and 364 (82.7%) expressed support for its integration into the curriculum. Regular physical activity was reported by 303 (68.9%) respondents, whereas 322 (73.2%) reported difficulties integrating it into daily life; lack of time was the most frequently cited barrier, reported by 294 (66.8%) respondents. Compared with second- to fifth-year students, first-year students less frequently reported familiarity with the concept of APA (23.5% vs 39.8%; $p = 0.011$) and with the WHO recommendations (11.8% vs 32.5%; $p < 0.001$), whereas attitudes toward APA did not differ significantly between the two groups.

Conclusions

These findings, based on self-reported data from a convenience sample, suggest a potential need for structured teaching of APA and physical activity in medical training at the FMPR. Declared familiarity remained limited beyond the first year. Further assessment of students' objective knowledge and of current curricular content is needed to guide this teaching.

Categories: Sports Medicine, Medical Education, Epidemiology/Public Health
Keywords: attitudes, cross-sectional studies, exercise, exercise therapy, health knowledge, medical students, morocco, practice

Introduction

Physical inactivity is a major public health issue: in 2022, 31.3% of adults worldwide did not reach the recommended levels of activity, compared with 23.4% in 2000 [1]. Yet regular physical activity helps prevent noncommunicable diseases, and the World Health Organization (WHO) recommends that adults perform 150 to 300 minutes of moderate-intensity or 75 to 150 minutes of vigorous-intensity physical activity per week, or an equivalent combination, together with muscle strengthening and reduced sitting time [2].

Adapted physical activity (APA), which takes into account the patient's diseases, abilities, and limitations [3], is also a recognized non-pharmacological therapy in many chronic diseases [4].

Training health professionals to promote physical activity is one of the actions recommended in the WHO global action plan [5]. However, this teaching often remains absent or optional in medical curricula [6,7], and surveys of medical students repeatedly report insufficient knowledge of the recommendations [8,9]. The measurement of this knowledge is itself uncertain: in Scotland, 52% of final-year students reported knowing the national recommendations, but only 27% identified them correctly [8]. These gaps have clinical consequences, as insufficient training and physicians' personal physical activity habits are among the determinants of the counseling provided to patients [10].

These studies, however, address physical activity in general. The knowledge, attitudes, and practices (KAP) approach has been applied to healthcare students [11], but understanding APA, which involves adapting activity to a disease or limitation, is a distinct dimension. Beyond general physical activity counseling, prescribing APA requires specific clinical competencies, including the assessment of disease-related limitations, individualized prescription, safety considerations, and referral to appropriate supervised programs or facilities [3]. The scarce data on APA concern physicians: in France, only 21% of 230 physicians involved in digestive oncology reported having been trained in it [12].

In Morocco, the 2017 national survey based on the WHO STEPwise approach to noncommunicable disease risk factor surveillance (STEPS) estimated the prevalence of physical inactivity at 26.0% among women and 16.1% among men [13], and approximately one-quarter of the students surveyed at Mohammed V University in Rabat were physically inactive [14]. To our knowledge, based on a literature search combining the terms "adapted physical activity" or "physical activity prescription" with "knowledge" and "students," no study has yet assessed the KAP of medical students regarding APA, and no Moroccan data are available, although such data could inform the content of future teaching.

The primary objective of this study was to describe the self-reported knowledge, attitudes, and practices related to APA among medical students at the Faculty of Medicine and Pharmacy of Rabat (FMPR). The secondary objectives, which addressed three distinct domains, were to describe (i) their support for integrating APA teaching into the curriculum, (ii) their own physical activity, and (iii) the barriers they reported to this activity. An additional exploratory objective was to compare these responses between first-year students, who were at the beginning of their medical studies, and second- to fifth-year students.

Materials And Methods

Study design, setting and period

This was a descriptive cross-sectional survey conducted online among medical students at the Faculty of Medicine and Pharmacy of Rabat (FMPR), Mohammed V University in Rabat, Morocco. At the time of the study, no module dedicated to APA was included in the curriculum of any year of medical studies at the FMPR. The main objective was descriptive; an exploratory comparison between years of study was also performed, and no hypothesis of causality was tested. This report follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations for cross-sectional studies [15] and the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) for online surveys [16]; the completed checklists are available from the authors upon request. Responses were collected between September 17, 2026, and October 17, 2026.

Participants and recruitment

The target population comprised medical students enrolled in the first to fifth years at the FMPR. First-year students were included in order to describe knowledge and attitudes at the very beginning of medical training. However, as data collection took place at the start of the academic year, they had only just begun their medical studies and had not yet acquired basic medical notions, unlike students in the following years, who had completed at least one year of medical training; their responses were therefore also analyzed separately from those of second- to fifth-year students (see Statistical analysis). All students who declared their consent to participate online were included; no exclusion criteria were applied. All respondents who submitted the questionnaire during the data collection period were included. Sampling was non-probabilistic (convenience sampling); no sample size was calculated a priori. The questionnaire link was posted in the faculty's student Facebook groups for each year of study, followed by two reminders. The survey was open to anyone with the link, and participation was voluntary. To limit multiple responses, the form required respondents to sign in with a Google account and accepted a single response per account, without collecting names or email addresses. No incentive was offered, and multiple responses from the same person using several accounts could not be excluded.

Questionnaire

The self-administered questionnaire was developed specifically for this study in French, which all medical students at the FMPR master, and was administered without translation on Google Forms (Google LLC, Mountain View, CA, USA). Its content was reviewed by a committee of four professors of rheumatology, who

assessed the relevance and clarity of the items; no formal psychometric validation was performed. It was then pretested with 15 medical students before distribution to check the comprehension of the items and the completion time. Students who participated in the pretest were not included in the final sample. After a consent question, the questionnaire comprised a sociodemographic and anthropometric section, followed by 20 KAP items divided into three sections: knowledge (items 1 to 7), attitudes (items 8 to 13), and practices and intentions (items 14 to 20). Single-answer items offered the options "Yes," "No," and "I don't know / I'm not sure"; item 15 offered four weekly frequency categories and this last option. The term "regular physical activity" (item 14) was not defined and was left to the respondents' own judgment. As item 15 did not include a "no practice" option, respondents who did not engage in physical activity could select "Less than once a week" or "I don't know / I'm not sure." Items 3, 7, and 20 were multiple-choice. An answer to each of the 20 KAP items was mandatory, and each item offered an "I don't know / I'm not sure" option to limit random answers. The items are presented here in thematic order within each section, and all 20 KAP items. The full original questionnaire (in French) is provided in the Appendices. Self-selection and reporting biases are discussed below.

Variables

The knowledge section comprised three distinct components, which were analyzed separately and were not combined into an overall knowledge score: declared knowledge, i.e., self-reported familiarity with the concept of APA (item 1) and with the WHO recommendations for adults (item 6); recognition of the characteristics of APA, assessed by three single-answer items (items 2, 4, and 5) and one multiple-choice item (item 3); and identification of the components of the WHO recommendations, assessed by one multiple-choice item (item 7). For items 2, 4, and 5, the expected answer was established according to the reference definitions of APA [3,17]: "No" for items 2 and 4 and "Yes" for item 5. The four options of item 3 other than "I don't know" corresponded to characteristics of APA according to the same definitions [3,17]. The five options of item 7 other than "I don't know" corresponded to the 2020 WHO recommendations for adults [2]. As items 3 and 7 contained no incorrect options, responses to these items were interpreted as endorsement of the listed statements rather than as tested knowledge. Attitudes concerned the place of APA in patient care and in initial and continuing training (items 8 to 13). Practices included declared regular physical activity and its frequency (items 14 and 15), schedule-related constraints (item 16), previous participation in APA programs or supervised sessions (item 17), difficulties integrating physical activity into daily life (item 19), and declared barriers (item 20); item 18 concerned the intention to adopt an active lifestyle in future medical practice.

Participant characteristics were self-reported: age, sex, year of study, type of housing, household socioeconomic level, weight and height. For the comparison, year of study was grouped into two categories: first year and second to fifth year. Household socioeconomic level, used as a proxy for students' socioeconomic status, was defined according to monthly household income, using the method of the High Commission for Planning (Haut-Commissariat au Plan, HCP), which places the middle class between 0.75 and 2.5 times the national median income [18]. This median was 5,133 Moroccan dirhams (MAD) per household per month [19]. The resulting thresholds, rounded to the nearest hundred, defined three levels: low (less than MAD 3,800 per month), middle (MAD 3,800 to 12,800), and high (more than MAD 12,800) [18,19]. Body mass index (BMI) was calculated from self-reported weight and height, as these could not be measured in this anonymous online survey, and categorized according to the WHO classification: underweight (<18.5 kg/m^2), normal weight (18.5 to 24.9 kg/m^2), overweight (25.0 to 29.9 kg/m^2) and obesity (≥30.0 kg/m^2) [20]. Characteristics that were not reported were classified as "not specified."

Statistical analysis

The analysis was mainly descriptive, in accordance with the objectives of the study. Qualitative variables were expressed as numbers (n) and percentages (%), and quantitative variables as mean ± standard deviation (SD). Percentages for participant characteristics were calculated on the total sample (N = 440). For all KAP items, the denominator was also 440 participants, corresponding to the submitted questionnaires rather than to the eligible student population; no imputation was performed. For the multiple-choice items (items 3, 7, and 20), each option was reported relative to this total; the sum of percentages therefore exceeds 100%. An exploratory bivariate analysis then compared first-year students (n = 68) with second- to fifth-year students (n = 372); in each group, percentages were calculated on the group size. For single-answer items, the distribution of all response options was first compared between the two groups, and each response option was then compared separately (option selected vs not selected). For multiple-choice items, each option was compared separately (option selected vs not selected). Pearson's chi-square test was used, or Fisher's exact test when an expected count was less than 5. The significance threshold was set at $p < 0.05$. Given the number of comparisons and the absence of correction for multiple testing, these comparisons were considered exploratory. No weighting or correction for the non-representativeness of the sample was applied. All submitted questionnaires were analyzed. Descriptive analyses were performed using jamovi version 2.7.29.0 (The jamovi project; www.jamovi.org); p-values were computed using Python (SciPy library, version 1.18).

Ethical considerations

This study was approved by the Biomedical Research Ethics Committee of Rabat (Comité d'Éthique pour la

Recherche Biomédicale de Rabat, CERB) (approval number 118/26, dated September 7, 2026) before the start of data collection. Consent was obtained online: a consent question preceded the questionnaire, and all 440 respondents agreed to participate; no written consent was collected. Participation was voluntary, and participants could withdraw at any time by closing the form without submitting it, as unsubmitted questionnaires were not recorded. The response file contained no names or email addresses.

Results

Participants

In total, 440 questionnaires were submitted between September 17, 2026, and October 17, 2026; all 440 respondents agreed to participate and were included in the analysis (Figure *1*). View and participation rates could not be calculated because the platform recorded neither form views nor unsubmitted questionnaires, and the number of enrolled students by year of study was not available. The denominator was 440 participants for each of the 20 KAP items, and 68 first-year and 372 second- to fifth-year students for the comparison.

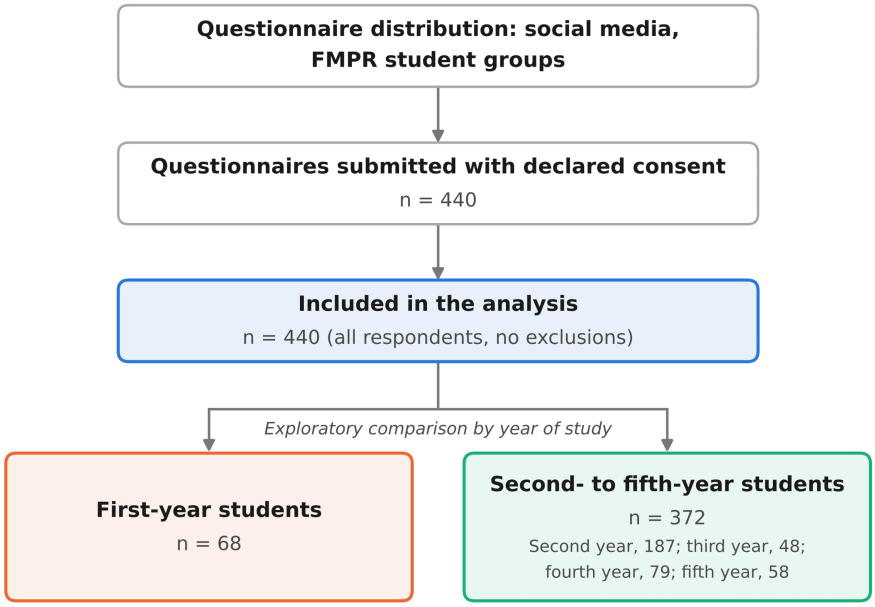


FIGURE 1: Flow diagram of participants

Data were collected between September 17, 2026, and October 17, 2026. For the exploratory comparison, participants were divided into first-year students (n = 68) and second- to fifth-year students (n = 372). FMPR: Faculty of Medicine and Pharmacy of Rabat

Participant characteristics

The mean age was 20.7 ± 1.6 years; 279 (63.4%) participants were female and 161 (36.6%) were male (male-to-female ratio, 0.58; Table *1*). Second-year students accounted for 187 (42.5%) participants, and first-year students for 68 (15.5%). Most participants lived in their family home (264, 60.0%) and reported a middle household socioeconomic level (354, 80.5%). The mean BMI, calculated from self-reported weight and height, was 22.9 ± 2.7 kg/m^2; 281 (63.9%) participants had normal weight, and BMI was not specified for 44 (10.0%) participants.

Characteristic	n (%)
Sociodemographic characteristics	
Age (years), mean ± SD	20.7 ± 1.6
Sex	
Female	279 (63.4)
Male	161 (36.6)
Year of study	
First year	68 (15.5)
Second year	187 (42.5)
Third year	48 (10.9)
Fourth year	79 (18.0)
Fifth year	58 (13.2)
Type of housing	
Family home	264 (60.0)
University residence	62 (14.1)
Shared rental	76 (17.3)
Individual rental	38 (8.6)
Household socioeconomic level	
Low	21 (4.8)
Middle	354 (80.5)
High	41 (9.3)
Not specified	24 (5.5)
Anthropometric characteristics	
BMI (kg/m²), mean ± SD	22.9 ± 2.7
BMI categories	
Underweight	55 (12.5)
Normal weight	281 (63.9)
Overweight	49 (11.1)
Obesity	11 (2.5)
Not specified	44 (10.0)

TABLE 1: General characteristics of the students (N = 440)

Categorical variables are expressed as n (%); percentages were calculated on N = 440 and rounded to one decimal place. Quantitative variables are expressed as mean ± SD. BMI was calculated from self-reported weight and height; the mean BMI is based on the 396 participants whose BMI could be calculated. BMI: body mass index; SD: standard deviation

Knowledge

The concept of APA was reported as known by 164 (37.3%) respondents, and 150 (34.1%) were unsure (Table *2*, Figure *2*). The expected answer was given by 291 (66.1%) respondents for item 2, 396 (90.0%) for item 4, and 366 (83.2%) for item 5. For item 3, the most frequently selected options were the adaptation of exercises to individual abilities (287, 65.2%), prescription for therapeutic purposes (280, 63.6%), and the aim of health and well-being (279, 63.4%). Knowledge of the WHO recommendations for adults was reported by 129

(29.3%) respondents. For item 7, reducing time spent sitting (216, 49.1%) and the threshold of 150 minutes of moderate activity per week (185, 42.0%) were the most frequently selected options, whereas muscle strengthening at least two days per week was selected by 132 (30.0%) participants and the "I don't know" option by 107 (24.3%).

Items and response options	First year (n = 68), n (%)	Second to fifth year (n = 372), n (%)	Total (N = 440), n (%)	p
1. Do you know the concept of adapted physical activity (APA)?			N = 440	**0.029**
Yes	16 (23.5)	148 (39.8)	164 (37.3)	**0.011**
No	26 (38.2)	100 (26.9)	126 (28.6)	0.057
I don't know / I'm not sure	26 (38.2)	124 (33.3)	150 (34.1)	0.433
2. Does APA necessarily mean doing sport?			N = 440	0.064
Yes	2 (2.9)	33 (8.9)	35 (8.0)	0.097
No[a]	42 (61.8)	249 (66.9)	291 (66.1)	0.407
I don't know / I'm not sure	24 (35.3)	90 (24.2)	114 (25.9)	0.055
3. Why does APA not necessarily mean "sport"?[b]			N = 440	—
APA is adapted to specific needs, whereas sport is a competitive or recreational activity	18 (26.5)	130 (34.9)	148 (33.6)	0.174
APA can include simple exercises adapted to each person's abilities, even without intense effort	44 (64.7)	243 (65.3)	287 (65.2)	0.922
APA aims to improve health and well-being, not necessarily sports performance	40 (58.8)	239 (64.2)	279 (63.4)	0.393
APA can be prescribed for therapeutic purposes for people with chronic diseases or disabilities	43 (63.2)	237 (63.7)	280 (63.6)	0.940
I don't know / I'm not sure	9 (13.2)	33 (8.9)	42 (9.5)	0.260
4. Is APA intended only for elite athletes?			N = 440	0.706[c]
Yes	0 (0.0)	5 (1.3)	5 (1.1)	1.000[c]
No[a]	61 (89.7)	335 (90.1)	396 (90.0)	0.930
I don't know / I'm not sure	7 (10.3)	32 (8.6)	39 (8.9)	0.652
5. Can APA be used for people with chronic diseases?			N = 440	0.743[c]
Yes[a]	57 (83.8)	309 (83.1)	366 (83.2)	0.878
No	0 (0.0)	7 (1.9)	7 (1.6)	0.602[c]
I don't know / I'm not sure	11 (16.2)	56 (15.1)	67 (15.2)	0.813
6. Do you know the WHO recommendations for physical activity in adults?			N = 440	**0.002**
Yes	8 (11.8)	121 (32.5)	129 (29.3)	**<0.001**
No	44 (64.7)	170 (45.7)	214 (48.6)	**0.004**
I don't know / I'm not sure	16 (23.5)	81 (21.8)	97 (22.0)	0.748
7. What are the WHO recommendations for physical activity?[b]			N = 440	—
At least 150 minutes of moderate activity per week (such as brisk walking)	34 (50.0)	151 (40.6)	185 (42.0)	0.148
At least 75 minutes of vigorous activity per week (such as jogging)	11 (16.2)	52 (14.0)	63 (14.3)	0.634
A combination of moderate and vigorous activities to reach the	12 (17.6)	96 (25.8)	108 (24.5)	0.151

equivalent of 150 minutes of weekly physical activity				
Including muscle-strengthening exercises at least 2 days per week	15 (22.1)	117 (31.5)	132 (30.0)	0.120
Reducing time spent sitting and increasing time spent moving	40 (58.8)	176 (47.3)	216 (49.1)	0.081
I don't know / I'm not sure	15 (22.1)	92 (24.7)	107 (24.3)	0.637

TABLE 2: Students' knowledge of adapted physical activity and WHO recommendations (overall and by year of study)

N: denominator for percentages, i.e., 440 participants for all items in the Total column; in the first-year and second- to fifth-year columns, percentages were calculated on 68 and 372 participants, respectively; percentages are rounded to one decimal place. [a] Expected answer (see Materials & Methods). [b] Multiple answers possible; the sum of percentages exceeds 100%; each option was compared separately (selected vs not selected). P-values on the item rows compare the distribution of all response options between first-year and second- to fifth-year students; p-values on the response option rows compare each option (selected vs not selected). Pearson's chi-square test unless otherwise indicated; [c] Fisher's exact test (expected count < 5). P-values < 0.05 are shown in bold. APA: adapted physical activity; WHO: World Health Organization. Items are presented in English; the original questionnaire was in French (see Appendices).

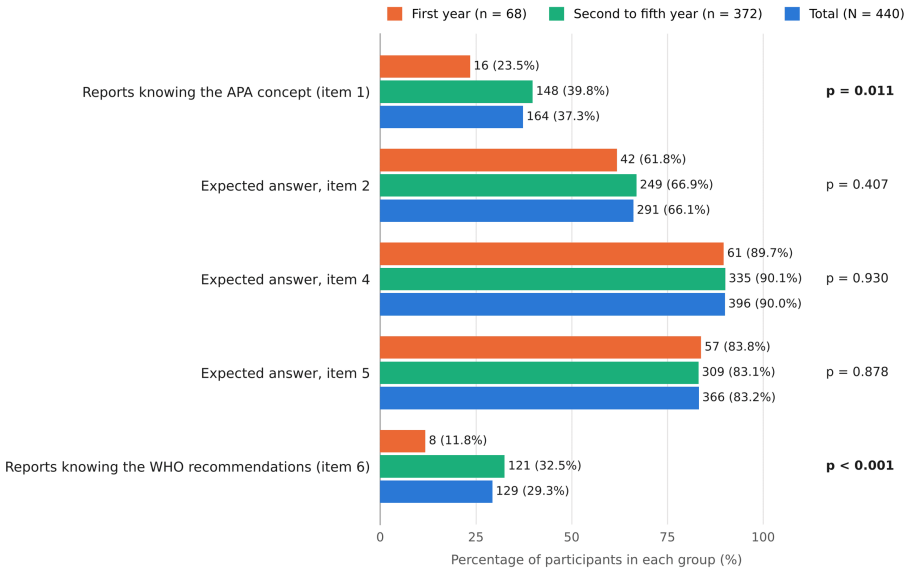


FIGURE 2: Declared knowledge of the APA concept and WHO recommendations, and expected answers to the items on the characteristics of APA, overall and by year of study

Items 1, 2, 4, 5, and 6. Values are n (%); percentages were calculated on N = 440 for the total and on 68 first-year and 372 second- to fifth-year students for each group. P-values compare the response shown between first-year and second- to fifth-year students (Pearson's chi-square test; see Table 2); p-values < 0.05 are shown in bold. APA: adapted physical activity; WHO: World Health Organization

Attitudes

Overall, 405 (92.0%) respondents considered that APA could improve patients' care pathways, and 385 (87.5%) believed that future health professionals should be trained to prescribe it (Table *3*, Figure *3*). The integration of APA into the medical curriculum at the FMPR was supported by 364 (82.7%) respondents, and 343 (78.0%) wished to take an APA module during their studies. Continuing education after graduation interested 324 (73.6%) respondents; participation in conferences or continuing education sessions received 265 (60.2%) positive answers and 96 (21.8%) negative answers.

Items and response options	First year (n = 68), n (%)	Second to fifth year (n = 372), n (%)	Total (N = 440), n (%)	p
8. Do you think APA should be integrated into the medical curriculum at the FMPR?			N = 440	0.437[a]
Yes	53 (77.9)	311 (83.6)	364 (82.7)	0.256
No	5 (7.4)	24 (6.5)	29 (6.6)	0.790[a]
I don't know / I'm not sure	10 (14.7)	37 (9.9)	47 (10.7)	0.243
9. Would you like to take an APA module as part of your curriculum?			N = 440	0.353
Yes	57 (83.8)	286 (76.9)	343 (78.0)	0.204
No	4 (5.9)	42 (11.3)	46 (10.5)	0.180
I don't know / I'm not sure	7 (10.3)	44 (11.8)	51 (11.6)	0.716
10. Would you be interested in continuing education on APA after your studies?			N = 440	0.888
Yes	51 (75.0)	273 (73.4)	324 (73.6)	0.781
No	6 (8.8)	30 (8.1)	36 (8.2)	0.834
I don't know / I'm not sure	11 (16.2)	69 (18.5)	80 (18.2)	0.641
11. Would you attend conferences or continuing education sessions on APA?			N = 440	0.672
Yes	44 (64.7)	221 (59.4)	265 (60.2)	0.412
No	14 (20.6)	82 (22.0)	96 (21.8)	0.789
I don't know / I'm not sure	10 (14.7)	69 (18.5)	79 (18.0)	0.448
12. Do you think APA can improve patients' care pathways?			N = 440	0.747[a]
Yes	62 (91.2)	343 (92.2)	405 (92.0)	0.773
No	1 (1.5)	4 (1.1)	5 (1.1)	0.570[a]
I don't know / I'm not sure	5 (7.4)	25 (6.7)	30 (6.8)	0.796[a]
13. Do you believe that future health professionals should be trained to prescribe APA?			N = 440	0.885[a]
Yes	59 (86.8)	326 (87.6)	385 (87.5)	0.842
No	1 (1.5)	9 (2.4)	10 (2.3)	1.000[a]
I don't know / I'm not sure	8 (11.8)	37 (9.9)	45 (10.2)	0.649

TABLE 3: Students' attitudes toward adapted physical activity and its place in training (overall and by year of study)

N: denominator for percentages, i.e., 440 participants for all items in the Total column; in the first-year and second- to fifth-year columns, percentages were calculated on 68 and 372 participants, respectively; percentages are rounded to one decimal place. P-values on the item rows compare the distribution of all response options between first-year and second- to fifth-year students; p-values on the response option rows compare each option (selected vs not selected). Pearson's chi-square test unless otherwise indicated; [a] Fisher's exact test (expected count < 5). APA: adapted physical activity; FMPR: Faculty of Medicine and Pharmacy of Rabat. Items are presented in English; the original questionnaire was in French (see Appendices).

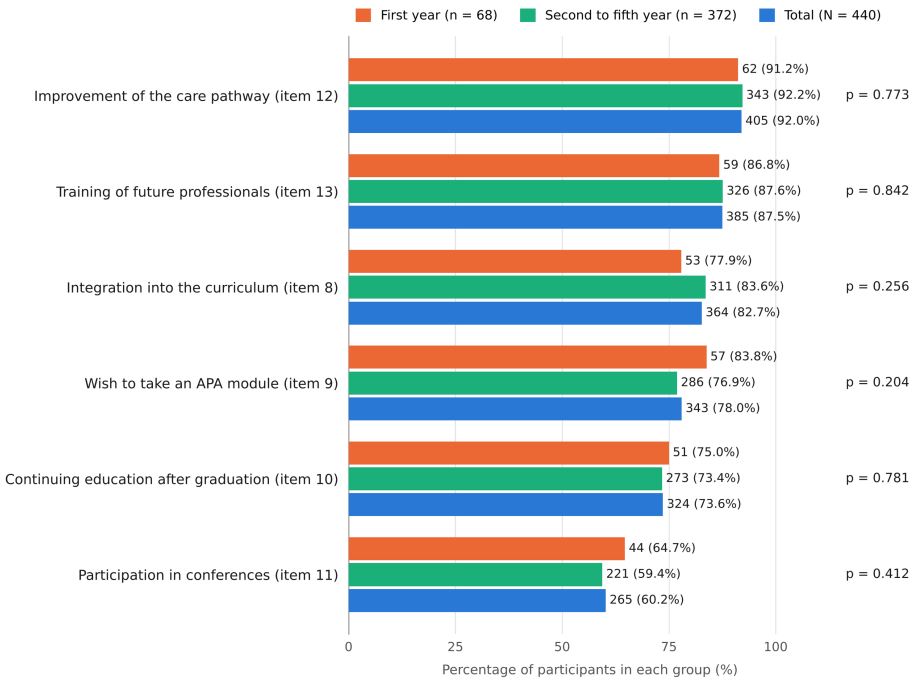


FIGURE 3: Attitudes toward APA and its place in medical training: proportion of "yes" answers, overall and by year of study

Items 8 to 13. Values are n (%); percentages were calculated on N = 440 for the total and on 68 first-year and 372 second- to fifth-year students for each group. P-values compare the proportion of "yes" answers between first-year and second- to fifth-year students (Pearson's chi-square test; see Table 3). APA: adapted physical activity

Practices and intentions

Among declared practices (Table 4), regular physical activity was reported by 303 (68.9%) respondents. The most frequently reported frequency was three to four times per week (158, 35.9%), and 88 (20.0%) respondents selected "Less than once a week." Overall, 74 (16.8%) respondents had previously participated in APA programs or sessions supervised by professionals. Difficulties integrating physical activity into daily life were reported by 322 (73.2%) respondents, and the student schedule was perceived as an obstacle to regular practice by 276 (62.7%). The most frequently cited barriers (Figure 4) were lack of time (294, 66.8%), fatigue (249, 56.6%), and study-related constraints (235, 53.4%). Finally, 432 (98.2%) respondents wished to adopt an active lifestyle in their future medical practice.

Items and response options	First year (n = 68), n (%)	Second to fifth year (n = 372), n (%)	Total (N = 440), n (%)	p
14. Do you engage in regular physical activity?			N = 440	0.917[b]
Yes	46 (67.6)	257 (69.1)	303 (68.9)	0.814
No	21 (30.9)	107 (28.8)	128 (29.1)	0.724
I don't know / I'm not sure	1 (1.5)	8 (2.2)	9 (2.0)	1.000[b]
15. How often do you engage in physical activity?			N = 440	0.914[b]
Less than once a week	14 (20.6)	74 (19.9)	88 (20.0)	0.895
1 to 2 times a week	23 (33.8)	119 (32.0)	142 (32.3)	0.766
3 to 4 times a week	25 (36.8)	133 (35.8)	158 (35.9)	0.873
5 or more times a week	3 (4.4)	30 (8.1)	33 (7.5)	0.293
I don't know / I'm not sure	3 (4.4)	16 (4.3)	19 (4.3)	1.000[b]
16. Does your student schedule prevent you from engaging			N = 440	0.517[b]

in regular physical activity?				
Yes	46 (67.6)	230 (61.8)	276 (62.7)	0.362
No	20 (29.4)	118 (31.7)	138 (31.4)	0.706
I don't know / I'm not sure	2 (2.9)	24 (6.5)	26 (5.9)	0.401[b]
17. Have you ever participated in APA programs or sessions supervised by professionals?			N = 440	0.195[b]
Yes	8 (11.8)	66 (17.7)	74 (16.8)	0.226
No	55 (80.9)	293 (78.8)	348 (79.1)	0.693
I don't know / I'm not sure	5 (7.4)	13 (3.5)	18 (4.1)	0.174[b]
18. Do you wish to adopt an active lifestyle in your future medical practice?			N = 440	0.712[b]
Yes	68 (100.0)	364 (97.8)	432 (98.2)	0.615[b]
No	0 (0.0)	2 (0.5)	2 (0.5)	1.000[b]
I don't know / I'm not sure	0 (0.0)	6 (1.6)	6 (1.4)	0.597[b]
19. Do you have difficulty integrating physical activity into your daily life?			N = 440	0.451[b]
Yes	48 (70.6)	274 (73.7)	322 (73.2)	0.600
No	13 (19.1)	75 (20.2)	88 (20.0)	0.843
I don't know / I'm not sure	7 (10.3)	23 (6.2)	30 (6.8)	0.201[b]
20. What are the main barriers to your regular physical activity?[a]			N = 440	—
Lack of time	54 (79.4)	240 (64.5)	294 (66.8)	**0.016**
Lack of motivation	20 (29.4)	151 (40.6)	171 (38.9)	0.082
Lack of suitable facilities	16 (23.5)	89 (23.9)	105 (23.9)	0.944
Study-related constraints	41 (60.3)	194 (52.2)	235 (53.4)	0.216
Fatigue	37 (54.4)	212 (57.0)	249 (56.6)	0.693
I don't know / I'm not sure	3 (4.4)	13 (3.5)	16 (3.6)	0.723[b]

TABLE 4: Students' physical activity practices and intentions (overall and by year of study)

N: denominator for percentages, i.e., 440 participants for all items in the Total column; in the first-year and second- to fifth-year columns, percentages were calculated on 68 and 372 participants, respectively; percentages are rounded to one decimal place. [a] Multiple answers possible; the sum of percentages exceeds 100%; each option was compared separately (selected vs not selected). P-values on the item rows compare the distribution of all response options between first-year and second- to fifth-year students; p-values on the response option rows compare each option (selected vs not selected). Pearson's chi-square test unless otherwise indicated; [b] Fisher's exact test (expected count < 5). P-values < 0.05 are shown in bold. APA: adapted physical activity. Items are presented in English; the original questionnaire was in French (see Appendices).

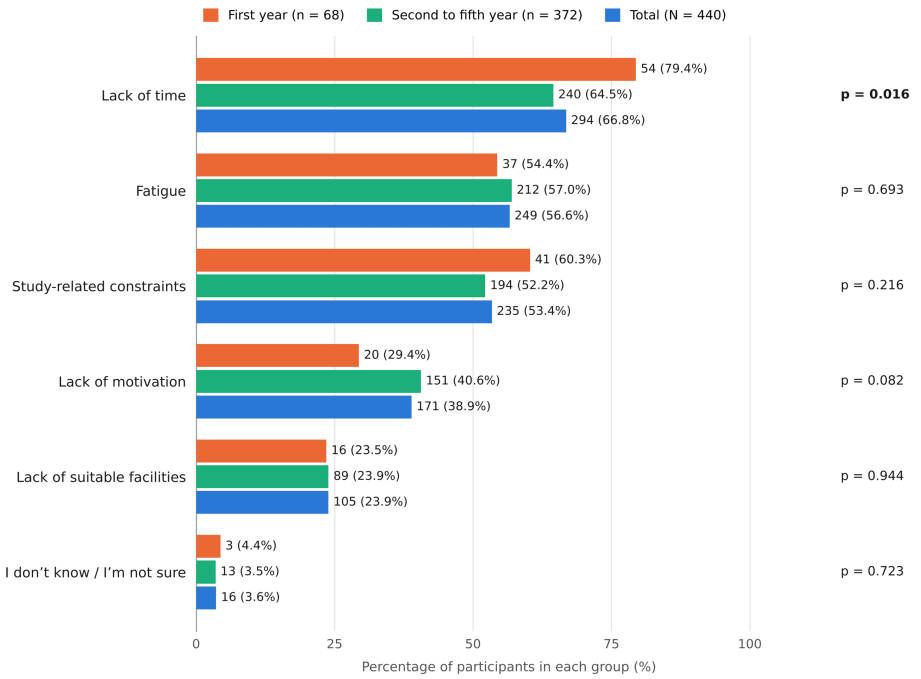


FIGURE 4: Declared barriers to regular physical activity, overall and by year of study

Item 20; multiple answers possible. Values are n (%); percentages were calculated on N = 440 for the total and on 68 first-year and 372 second- to fifth-year students for each group. P-values compare each barrier (selected vs not selected) between first-year and second- to fifth-year students (Pearson's chi-square test, or Fisher's exact test for "I don't know / I'm not sure"; see Table 4); p-values < 0.05 are shown in bold.

Comparison between first-year and second- to fifth-year students

The comparison included 68 first-year and 372 second- to fifth-year students (Tables *2*-*4*, Figures *1*-*4*). First-year students less frequently reported knowing the concept of APA (16 (23.5%) vs 148, (39.8%); p = 0.011; overall comparison of item 1, p = 0.029) and the WHO recommendations for adults (8 (11.8%) vs 121, (32.5%); p < 0.001; overall comparison of item 6, p = 0.002), and more frequently answered "No" to item 6 (44 (64.7%) vs 170 (45.7%); p = 0.004). The distribution of responses to the items on the characteristics of APA did not differ significantly between the two groups (items 2, 4, and 5: p = 0.064, p = 0.706, and p = 0.743, respectively), nor did the options selected for item 3 ($p \geqslant 0.174$) and item 7 ($p \geqslant 0.081$).

Attitudes toward APA and its place in training (items 8 to 13) did not differ significantly between the two groups (overall comparisons, $p \geqslant 0.353$). For practices and intentions, the distributions of responses to items 14 to 19 did not differ significantly ($p \geqslant 0.195$). Among the barriers to physical activity (item 20), lack of time was cited more frequently by first-year students (54 (79.4%) vs 240 (64.5%); p = 0.016), whereas the other barriers did not differ significantly ($p \geqslant 0.082$).

Discussion

This survey shows limited self-reported familiarity with the concept of APA among medical students at the FMPR. The expected answers to the three items on its main characteristics (items 2, 4, and 5) were more frequent; however, these simple questions may have been answered by common sense rather than reflecting actual knowledge of APA, and they should not be interpreted as evidence of adequate knowledge. This low declared familiarity coexists with broad support for APA and an explicit demand for training. Their own physical activity, reported by most of them, remains constrained by time and the workload of their studies. These results suggest a potential need for structured training in APA, without allowing the origin of the declared gaps to be established.

Because first-year students were at the beginning of their medical studies at the time of the survey, their inclusion could have lowered the overall level of declared knowledge. Declared familiarity with the concept of APA and with the WHO recommendations was indeed less frequent among them, which is consistent with their shorter exposure to medical teaching. However, this familiarity also remained limited among second- to fifth-year students, fewer than half of whom reported knowing the concept of APA (39.8%) and about one-third the WHO recommendations (32.5%). In addition, the recognition of the characteristics of APA and attitudes toward its teaching did not differ significantly between the two groups, so that the inclusion of

first-year students does not appear to have substantially modified the overall description of these domains. The more frequent citation of lack of time by first-year students could reflect adaptation to the start of medical studies, a hypothesis that was not assessed in our survey. These exploratory comparisons, performed on groups of unequal size and without correction for multiple testing, should be interpreted with caution.

To our knowledge, based on our literature search, no study has assessed medical students' knowledge of APA; our results are therefore compared with studies on physical activity in general, distinguishing declared knowledge of the recommendations, the only type measured in our survey, from tested knowledge. These comparisons call for caution, as the studies differed in questionnaire design, sampling, year of study, and in whether knowledge was self-reported or tested; differences may therefore reflect measurement methods and context rather than actual differences in knowledge. Declared knowledge of the recommendations was markedly less frequent among our respondents than in Tunisia, where 86.5% of students reported being informed about them [21], and in Canada, where this proportion reached 90.3% [22]. The Tunisian study, conducted in the Maghreb and based, like ours, on an online questionnaire distributed in student groups on social media, is the closest to our context, but its students were older than ours (mean age 24.5 years) [21]; the Canadian students attended the faculty with the most developed physical activity teaching in the country [22].

In these studies, declared knowledge did not imply actual or sufficient knowledge. In Tunisia, only 3.2% of students knew the methods for assessing physical activity, and 89.7% reported insufficient teaching on this topic [21]; in Canada, only 57.0% considered their knowledge sufficient to counsel patients [22]. In South Africa, where knowledge was tested, only 9.1% of students correctly reported the WHO recommendations, whereas 98.1% recognized the importance of physical activity in preventing disease [9], a contrast reminiscent of that observed among our participants. Finally, the proportion of our participants who answered that APA does not necessarily mean doing sport was close to that of Tunisian students who distinguished physical activity from sport on a similar question (62.6%) [21].

The demand for training expressed by our participants is consistent with that observed in other settings: 82.3% of South African students wanted more physical activity training in the curriculum [9]. Similarly, 74.4% of Canadian students wanted more training in physical activity counseling [22], and 90% of French physicians involved in digestive oncology wanted better training in nutrition and APA [12]. This convergence, together with the broad support for integrating APA into the curriculum expressed by our participants, suggests a potential need for training. However, our survey did not assess the existing training offer. The lower support for conferences and continuing education sessions further argues for teaching integrated into the initial curriculum, whereas physical activity courses are rarely mandatory [7].

The regular physical activity reported by our participants should be interpreted with caution. Collected without specifying duration or intensity, it cannot be compared with activity levels measured using a standardized questionnaire, as in the Tunisian study [21]. The frequent difficulties integrating physical activity into daily life and the obstacle posed by the schedule highlight the perceived constraints despite this declared practice. These findings describe answers to distinct items and do not identify students who were both active and experiencing difficulties. The main barrier, however, is consistent: lack of time was also the first barrier cited in Tunisia [21], as well as in Spain and France, where it was attributed to the academic workload [23].

Several mechanisms may explain this profile. The concept of APA, recently formalized in some countries such as France [17], remains little taught, including to physicians [12], and physical activity itself is often omitted from medical curricula [6,7]. At the FMPR, no module dedicated to APA is included in the curriculum of any year of study. Recognition of the characteristics of APA may reflect common sense or self-directed learning, hypotheses not assessed in our survey, as among American students who were active but had little training in exercise [24]. Furthermore, physicians' personal physical activity habits influence their counseling practices [10]: the time constraints of our participants may therefore also concern their future clinical practice, especially as almost all respondents wished to adopt an active lifestyle in this practice.

For future curriculum development at the FMPR, APA teaching could be based on explicit learning objectives [25], such as assessment before prescription [3], components of the prescription [26], adaptation to chronic diseases and disability [2], and referral to community relay facilities, knowledge of which is associated with physical activity prescription in general practice [27]. These objectives should be informed by an objective assessment of students' knowledge, a needs assessment, and consultation with stakeholders. Brief interventions integrated into the curriculum improve students' confidence in physical activity counseling in the short term [28], but the level of evidence remains limited. Finally, preserving time for students' physical activity could benefit both their health and their future role as prescribers [23].

This study has several limitations. Convenience sampling and voluntary online participation expose it to self-selection bias [16]: students interested in physical activity may have been more likely to respond, which may have led to an overestimation of declared physical activity [22] and probably of favorable attitudes. Moreover, the participation rate cannot be estimated because the number of students who received the link

is unknown, and multiple responses from a person using several Google accounts could not be excluded; this limits the assessment of the sample's representativeness. In addition, second-year students accounted for a large proportion of the sample, which may therefore not represent the faculty population. First-year students, for their part, were at the beginning of their medical studies at the time of the survey and had not yet acquired basic medical notions; they may have had little prior exposure to health-related concepts, and their inclusion may have lowered the overall level of declared knowledge. For this reason, their responses were also presented separately from those of second- to fifth-year students.

Misclassification bias is also possible: although the questionnaire was reviewed by experts and pretested with 15 students for comprehension, its reliability (internal consistency, test-retest reproducibility) was not assessed, declared knowledge measures familiarity rather than tested knowledge, and responses are subject to recall and social desirability biases [22]. Furthermore, items 3 and 7 contained no incorrect options: they describe the options selected by students without testing their knowledge; future questionnaires should include incorrect options (distractors). Item 15, for its part, did not offer a "no practice" option, and regular physical activity, which was not defined in the questionnaire, was self-reported without information on its duration or intensity. Mandatory answers may also have led some participants to answer items they would otherwise have skipped, although an "I don't know / I'm not sure" option was available for each item. In addition, BMI was based on self-reported weight and height, and household income is only a proxy that may not reflect students' individual resources.

The analysis was mainly descriptive. The comparison by year of study was exploratory and limited to two groups; the small size of the first-year group limited the power to detect modest differences, the multiple comparisons increased the risk of chance findings, and no adjustment was made for potential confounders such as sex. Other associated factors were not explored, and, beyond the absence of a module dedicated to APA, the curricular content related to physical activity and APA in each year of study was not documented. Finally, the study was conducted in a single center, and its results cannot be generalized beyond the FMPR.

Nevertheless, this study has several strengths. To our knowledge, based on our literature search, it is the first study dedicated to the KAP of medical students regarding APA in Morocco or elsewhere. It covers the first five years of study, presents the responses of first-year students separately, distinguishes declared knowledge from the recognition of the characteristics of APA, and follows the STROBE and CHERRIES recommendations [15,16]. In addition, each item offered an "I don't know" option to limit random answers, although this option alone does not ensure the validity of the questionnaire.

Conclusions

Among the FMPR medical students who participated in this survey, just over one-third reported knowing the concept of APA. This proportion was lower among first-year students, who were at the beginning of their medical studies, but remained below one-half among second- to fifth-year students, and attitudes did not differ significantly between these groups. Expected answers to simple questions on its main characteristics were more frequent but may reflect common sense rather than actual knowledge, and support for its teaching was strong. Most students also reported difficulties integrating physical activity into their daily lives, with lack of time as the main barrier. These findings suggest a potential educational need regarding APA and, more broadly, physical activity in initial medical training at the FMPR. Further assessment of students' objective knowledge, of existing curricular content, and of learning outcomes is required to define such teaching, which could be based on explicit learning objectives while preserving time for students' own physical activity.

Appendices

Original questionnaire (French)

Self-administered questionnaire hosted on Google Forms and administered in French, without translation, to first- to fifth-year medical students at the Faculty of Medicine and Pharmacy of Rabat (FMPR). The English versions of the 20 KAP items and their response options are shown in Tables *2*-*4*.

Légende :

* = réponse obligatoire (le formulaire ne pouvait pas être soumis sans réponse à cette question)

○ = une seule réponse possible

□ = plusieurs réponses possibles

Section 1 : Consentement et données sociodémographiques et anthropométriques

Information des participants

Cette enquête s'adresse aux étudiants en médecine de la 1re à la 5e année de la Faculté de Médecine et de Pharmacie de Rabat (FMPR). Elle a pour objectif de décrire les connaissances, les attitudes et les pratiques des étudiants concernant l'activité physique adaptée (APA).

Le questionnaire comporte une partie sur vos caractéristiques sociodémographiques et anthropométriques, puis 20 questions réparties en trois parties : connaissances, attitudes, et pratiques et intentions.

La participation est volontaire et aucune compensation n'est prévue. Vous pouvez arrêter à tout moment en fermant le formulaire sans le soumettre : les réponses non soumises ne sont pas enregistrées.

Le formulaire demande une connexion à un compte Google afin de n'accepter qu'une seule réponse par compte ; votre nom et votre adresse e-mail ne sont pas recueillis. Les réponses sont enregistrées sur Google Forms.

Acceptez-vous de participer à cette enquête ? *

○ Oui

○ Non

Âge (en années)

Réponse : _____

Sexe

○ Féminin

○ Masculin

Année d'études

○ 1re année

○ 2e année

○ 3e année

○ 4e année

○ 5e année

Type de logement

○ Domicile familial

○ Résidence universitaire

○ Location partagée

○ Location individuelle

Revenu mensuel du ménage

○ Moins de 3 800 MAD

○ De 3 800 à 12 800 MAD

○ Plus de 12 800 MAD

Poids (en kg)

Réponse : _____

Taille (en cm)

Réponse : _____

Section 2 (Q1-Q7) : Connaissances sur l'Activité Physique Adaptée (APA)

1. Connaissez-vous le concept d'Activité Physique Adaptée (APA) ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

2. L'APA signifie-t-elle forcément faire du sport ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

3. Pourquoi l'APA ne signifie-t-elle pas nécessairement "sport" ? *

(Choisissez les réponses qui vous semblent pertinentes)

□ L'APA est adaptée à des besoins spécifiques, tandis que le sport est une activité compétitive ou récréative.

□ L'APA peut inclure des exercices simples adaptés aux capacités de chacun, même sans effort intense.

□ L'APA vise à améliorer la santé et le bien-être, pas nécessairement la performance sportive.

□ L'APA peut être prescrite dans un but thérapeutique pour des personnes souffrant de maladies chroniques ou de handicaps.

□ Je ne sais pas / Je ne suis pas sûr(e).

4. L'APA est-elle destinée uniquement aux athlètes de haut niveau ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

5. L'APA peut-elle être utilisée pour des personnes atteintes de maladies chroniques ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

6. Connaissez-vous les recommandations de l'OMS pour l'activité physique chez les adultes ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

7. Quelles sont les recommandations de l'OMS pour l'activité physique ? *

(Cochez toutes les réponses pertinentes)

□ Au moins 150 minutes d'activité modérée par semaine (comme la marche rapide).

□ Au moins 75 minutes d'activité intense par semaine (comme le jogging).

□ Combinaison d'activités modérées et intenses pour atteindre l'équivalent de 150 minutes d'activité physique par semaine.

□ Inclure des exercices de renforcement musculaire au moins 2 jours par semaine.

□ Réduire le temps passé en position assise et augmenter le temps de mouvement.

□ Je ne sais pas / Je ne suis pas sûr(e)

Section 3 (Q8-Q13) : Attitudes envers l'Activité Physique Adaptée (APA)

8. Pensez-vous que l'APA devrait être intégrée dans le programme des études médicales à la FMPR ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

9. Aimeriez-vous suivre un module d'APA dans votre cursus ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

10. Seriez-vous intéressé(e) par une formation continue sur l'APA après vos études ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

11. Participeriez-vous à des colloques ou des formations continues sur l'APA ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

12. Pensez-vous que l'APA peut améliorer le parcours de soin des patients ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

13. Croyez-vous que les futurs professionnels de santé doivent être formés à prescrire de l'APA ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

Section 4 (Q14-Q20) : Pratiques en Activité Physique

14. Pratiquez-vous une activité physique régulière ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

15. À quelle fréquence pratiquez-vous une activité physique ? *

○ Moins d'une fois par semaine

○ 1 à 2 fois par semaine

○ 3 à 4 fois par semaine

○ 5 fois ou plus par semaine

○ Je ne sais pas / Je ne suis pas sûr(e)

16. Votre emploi du temps d'étudiant vous empêche-t-il de pratiquer régulièrement une activité physique ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

17. Avez-vous déjà participé à des programmes d'APA ou des séances encadrées par des professionnels ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

18. Souhaitez-vous adopter un mode de vie actif dans votre future pratique médicale ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

19. Avez-vous des difficultés à intégrer l'activité physique dans votre quotidien ? *

○ Oui

○ Non

○ Je ne sais pas / Je ne suis pas sûr(e)

20. Quels sont les principaux obstacles à votre pratique régulière d'une activité physique ? *

(Plusieurs réponses possibles)

□ Manque de temps

□ Manque de motivation

□ Absence d'installations adaptées

□ Contraintes liées aux études

□ Fatigue

□ Je ne sais pas / Je ne suis pas sûr(e)

English translation of the questionnaire

(English translation provided for English-language readers; the questionnaire was administered in French only.)

Key:
* = mandatory answer (the form could not be submitted without an answer to this question)
○ = only one answer possible
□ = multiple answers possible

Section 1: Consent and sociodemographic and anthropometric data

Participant information
This survey is intended for first- to fifth-year medical students at the Faculty of Medicine and Pharmacy of Rabat (FMPR). It aims to describe students' knowledge, attitudes and practices regarding adapted physical activity (APA).
The questionnaire includes a section on your sociodemographic and anthropometric characteristics, followed by 20 questions divided into three sections: knowledge, attitudes, and practices and intentions.
Participation is voluntary, and no compensation is provided. You may stop at any time by closing the form without submitting it; unsubmitted answers are not recorded.
The form requires signing in to a Google account so that only one response per account is accepted; your name and email address are not collected. Responses are recorded on Google Forms.

Do you agree to participate in this survey? *
○ Yes
○ No

Age (in years)
Answer: _____

Sex
○ Female
○ Male

Year of study
○ First year
○ Second year
○ Third year
○ Fourth year
○ Fifth year

Type of housing
○ Family home
○ University residence
○ Shared rental
○ Individual rental

Monthly household income
○ Less than 3,800 MAD
○ 3,800 to 12,800 MAD
○ More than 12,800 MAD

Weight (in kg)
Answer: _____

Height (in cm)
Answer: _____

Section 2 (Q1-Q7): Knowledge of adapted physical activity (APA)

1. Do you know the concept of adapted physical activity (APA)? *
○ Yes
○ No
○ I don't know / I'm not sure

2. Does APA necessarily mean doing sport? *

○ Yes
○ No
○ I don't know / I'm not sure

3. Why does APA not necessarily mean "sport"? *
(Choose the answers that seem relevant to you)
□ APA is adapted to specific needs, whereas sport is a competitive or recreational activity.
□ APA can include simple exercises adapted to each person's abilities, even without intense effort.
□ APA aims to improve health and well-being, not necessarily sports performance.
□ APA can be prescribed for therapeutic purposes for people with chronic diseases or disabilities.
□ I don't know / I'm not sure.

4. Is APA intended only for elite athletes? *
○ Yes
○ No
○ I don't know / I'm not sure

5. Can APA be used for people with chronic diseases? *
○ Yes
○ No
○ I don't know / I'm not sure

6. Do you know the WHO recommendations for physical activity in adults? *
○ Yes
○ No
○ I don't know / I'm not sure

7. What are the WHO recommendations for physical activity? *
(Check all relevant answers)
□ At least 150 minutes of moderate activity per week (such as brisk walking).
□ At least 75 minutes of vigorous activity per week (such as jogging).
□ A combination of moderate and vigorous activities to reach the equivalent of 150 minutes of weekly physical activity.
□ Including muscle-strengthening exercises at least 2 days per week.
□ Reducing time spent sitting and increasing time spent moving.
□ I don't know / I'm not sure

Section 3 (Q8-Q13): Attitudes toward adapted physical activity (APA)

8. Do you think APA should be integrated into the medical curriculum at the FMPR? *
○ Yes
○ No
○ I don't know / I'm not sure

9. Would you like to take an APA module as part of your curriculum? *
○ Yes
○ No
○ I don't know / I'm not sure

10. Would you be interested in continuing education on APA after your studies? *
○ Yes
○ No
○ I don't know / I'm not sure

11. Would you attend conferences or continuing education sessions on APA? *
○ Yes
○ No
○ I don't know / I'm not sure

12. Do you think APA can improve patients' care pathways? *
○ Yes
○ No
○ I don't know / I'm not sure

13. Do you believe that future health professionals should be trained to prescribe APA? *
○ Yes
○ No
○ I don't know / I'm not sure

Section 4 (Q14-Q20): Physical activity practices

14. Do you engage in regular physical activity? *
○ Yes
○ No
○ I don't know / I'm not sure

15. How often do you engage in physical activity? *
○ Less than once a week
○ 1 to 2 times a week
○ 3 to 4 times a week
○ 5 or more times a week
○ I don't know / I'm not sure

16. Does your student schedule prevent you from engaging in regular physical activity? *
○ Yes
○ No
○ I don't know / I'm not sure

17. Have you ever participated in APA programs or sessions supervised by professionals? *
○ Yes
○ No
○ I don't know / I'm not sure

18. Do you wish to adopt an active lifestyle in your future medical practice? *
○ Yes
○ No
○ I don't know / I'm not sure

19. Do you have difficulty integrating physical activity into your daily life? *
○ Yes
○ No
○ I don't know / I'm not sure

20. What are the main barriers to your regular physical activity? *
(Multiple answers possible)
□ Lack of time
□ Lack of motivation
□ Lack of suitable facilities
□ Study-related constraints
□ Fatigue
□ I don't know / I'm not sure

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Yasser Bouchouata, Hanan Rkain, Sara Bahloul, Fatine Kronbi, Latifa Tahiri, Fadoua Allali

Acquisition, analysis, or interpretation of data: Yasser Bouchouata, Khalil El Abdi

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Biomedical Research Ethics Committee of Rabat, Mohammed V University – Rabat, Faculty of Medicine and Pharmacy of Rabat issued approval 118/26. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the

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