Articles

Assessment of physical activity and exercise prescription in a diverse population using the Minnesota questionnaire

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Abstract: Introduction: Physical activity plays a crucial role in promoting health and preventing chronic non-communicable diseases. In university settings, it is essential to maintain both physical and mental balance.
Objective: To assess physical activity levels and propose an appropriate exercise prescription using the Minnesota Leisure-Time Physical Activity Questionnaire.
Methods: A descriptive study was conducted with a sample of 26 individuals from diverse backgrounds, including university students, relatives, and friends. The Minnesota questionnaire was administered to estimate energy expenditure and classify participants into four categories: very active, active, moderately active, and sedentary.
Results: Most participants were classified as very active, followed by active and a small group of moderately active individuals. Collective activities such as football and handball predominated, showing a preference for group exercise.
Conclusion: The findings provide a basis for developing personalized exercise recommendations that promote adherence to regular physical activity and support healthy lifestyles.
Keywords: Physical activity, Minnesota questionnaire, exercise, prescription, health.

Introduction

Physical activity is one of the most important components for maintaining good health and preventing non-communicable chronic diseases. According to the World Health Organization (WHO, 2022), staying active helps reduce the risk of problems such as diabetes, cardiovascular diseases, and some types of cancer, in addition to promoting emotional well-being and reducing stress. In recent years, several studies have also highlighted that exercise is a key factor in improving mental health in young people and university students (Amú-Ruiz et al., 2024).

Within the university environment, this topic becomes even more important. Changes in schedules, new responsibilities, and academic workload often lead many students to reduce their level of physical activity and adopt more sedentary habits. In Peru, for example, it has been found that physical activity levels in university students are not adequate and that sedentary behavior is frequent, even among students in health-related careers (Janampa-Apaza et al., 2021). Something similar occurs in other regions of the country, where it is observed that a large proportion of students do not reach the recommended levels of daily movement (Paricahua-Peralta et al., 2024). At the international level, it has also been seen that factors such as gender, age, semester, or even the type of degree program influence how much a student moves (Edelmann et al., 2022).

Furthermore, the pandemic caused by COVID-19 intensified this situation. During confinement, many university students decreased their physical activity and spent more time sitting or in front of screens, and several studies confirm this change in habits (Rivera et al., 2021). These modifications affected not only physical health but also mental health. On the other hand, recent research suggests that having active habits could be related to better academic performance and healthier lifestyles in general, especially when combined with good nutrition (Mamani-Roque et al., 2024).

Despite all this evidence, it is still necessary to more accurately assess the actual levels of physical activity in different groups and, above all, to propose exercise recommendations tailored to the characteristics of each person. Therefore, this study uses the Minnesota Leisure-Time Physical Activity Questionnaire, an instrument that allows identifying the frequency, duration, and intensity of exercise people perform.

The main objective of this research is to analyze physical activity levels in a sample consisting of university students, family, and friends. Based on these results, the aim is to develop a personalized exercise prescription proposal, aimed at promoting more active habits and contributing to improving the health and well-being of each evaluated group.

Materials and Methods

Study design. A descriptive cross-sectional study conducted during the year 2025. The population consisted of 26 participants, mainly university students, as well as family and friends, with the purpose of having a diverse sample in terms of age, sex, and physical activity level. The study aimed to estimate physical activity levels and sports preferences in an academic and social context. All participants who correctly completed the questionnaire were included, and those with incomplete data in the analyzed variables were excluded.

Physical activity level

For the assessment of physical activity level, the short version of the Minnesota Leisure-Time Physical Activity Questionnaire (MLTPAQ) was used. This instrument was designed to estimate total energy expenditure and classify people according to their habitual physical activity level. The questionnaire allows calculating energy expenditure based on the frequency, duration, and intensity of different activities performed during the last 14 days, expressed in metabolic equivalents (MET-min/14 days).

The MLTPAQ includes items on specific physical activities such as walking, dancing, climbing stairs, doing household chores, or practicing recreational sports. Each activity is associated with a standardized metabolic coefficient, making it possible to estimate total energy expenditure using the following formula:

Total energy expenditure (MET-min) = Σ (duration in minutes × frequency × MET value)

Based on the cut-off points described in the specialized literature for assessing physical activity level, participants can be classified into four categories:

Subjects classified as "very active" record values above 5,000 MET-min/14 days, while those considered "active" fall within a range of 3,000 to 4,999 MET-min/14 days. The "moderately active" category corresponds to values between 1,250 and 2,999 MET-min/14 days, and finally, those with less than 1,250 MET-min/14 days are classified as "sedentary" (Ainsworth et al., 2011).

Procedures

The questionnaire was self-administered in person and virtually, accompanied by a brief verbal orientation on how to respond. Participants were asked to record the activities performed during the last two weeks, specifying the type of activity, average daily duration, and weekly frequency. With the collected information, an anonymized database was created. Subsequently, the data were manually reviewed to detect outliers or inconsistencies. The final classification of physical activity level was performed according to the standardized criteria of the MLTPAQ.

Statistical analysis

Data were analyzed using descriptive statistics. Absolute and relative frequencies were calculated for categorical variables (type of sport practiced, physical activity level) and measures of central tendency for quantitative variables (age, average duration of activity). Information was processed with Microsoft Excel 2021. General comparisons were established between physical activity levels (very active, active, moderate, and sedentary) and the reported sports characteristics.

Results

From the total participants, 19 were classified as very active, 6 as active, and 1 as moderately active. The most practiced disciplines were football (19.2%) and handball (15.4%), followed by futsal, volleyball, and jogging (7.7% each). Individual activities such as swimming, martial arts, and gym workouts were also recorded. Most complemented their energy expenditure through daily activities like climbing stairs or walking for shopping.

Table 1 shows the general results of the sample, including sociodemographic variables (age and sex) and the main physical indicators recorded during the study, such as weight, height, body mass index (BMI), and physical activity values obtained. Overall, participants showed stable levels in most variables, although with some differences between the analyzed groups. It was observed that the average values of the physical indicators show slight variations among the subjects, which could be related to factors such as age or habitual activity level. These results provide a general overview of the sample's behavior and will serve as a basis for comparative analysis and subsequent data interpretation.

Table 1

General results of the sample studied

ID	Age	Walking (days)	Walking (min/day)	Dancing (days)	Dancing (min/day)	Sport	Sport Days	Sport Min	Stairs(days/month)	Floors/day	Cleaning(min/week)	Shopping(min/week)
1	16	9	40	2	20	Handball	5	40	14	2	120	40
2	17	6	30	0	0	Swimming	6	40	10	2	30	20
3	17	11	30	0	0	Handball	5	120	26	3	60	30
4	17	12	45	7	10	Jogging	12	60	6	2	120	70
5	17	15	30	5	10	None	0	0	30	20	20	150
6	18	15	40	3	25	Football	4	60	30	4	360	30
7	18	6	120	2	10	Volleyball	6	90	25	1	40	60
8	18	15	20	0	0	Athletics	8	70	20	3	120	70
9	18	15	60	10	30	None	0	0	31	1	50	140
10	19	15	40	0	0	None	0	0	30	3	20	60
11	19	10	60	10	20	Handball	10	50	31	3	15	90
12	19	15	30	8	120	Dancing	8	120	30	4	630	210
13	20	13	60	0	0	Football	5	60	26	4	60	30
14	20	10	30	2	10	Handball	10	120	15	5	300	30

15	20	15	270	15	30	Karate	6	90	30	2	0	35
16	22	15	120	2	30	Rugby	1	80	30	2	420	360
17	23	10	25	0	0	Boxing	6	60	6	7	30	10
18	23	10	70	0	0	Footbal l	3	120	25	3	90	50
19	23	15	30	2	120	Judo	4	90	15	2	60	60
20	23	10	30	0	0	Futsal	10	40	20	3	240	80
21	24	12	40	0	0	Footbal l	6	40	15	3	60	25
22	24	5	30	1	240	Joggin g	5	30	30	3	60	30
23	24	15	40	5	5	Climbi ng	8	40	5	2	245	105
24	47	15	45	0	0	None	0	0	30	1	120	40
25	50	15	30	0	0	Gym	8	90	25	1	20	180
26	51	15	10	0	0	Footbal l	4	60	20	2	0	50

Source: Own Elaboration

Table 2 presents the results corresponding to the energy expenditure values (METs) and the classification of the physical activity level of the evaluated participants. Overall, a predominant trend towards high activity levels is observed, with 19 individuals classified as "very active," 6 as "active," and 1 as "moderately active."

These results suggest that much of the sample maintains a physically active lifestyle, which could be associated with a higher frequency and intensity in the practice of sports or recreational activities. Likewise, the observed differences between categories reflect individual variability in physical activity patterns, an aspect that will be considered for exercise planning in relation to the 3 levels obtained in the sample.

Table 2.

Energy expenditure values (METs) and classification of participants' physical activity level

Participant	MET-min/14 days	Classification
1	6.255	Very active
2	3.962	Active
3	7.502	Very active
4	6.758	Very active
5	3.887	Active
6	8.431	Very active

7	10.195	Very active
8	5.666	Very active
9	5.551	Very active
10	2.77	Moderately active
11	6.734	Very active
12	11.472	Very active
13	6.295	Very active
14	9.52	Very active
15	16.612	Very active
16	14.54	Very active
17	4.736	Active
18	9.235	Very active
19	11.318	Very active
20	7.311	Very active
21	4.729	Active
22	13.323	Very active
23	6.562	Very active
24	3.362	Active
25	6.662	Very active
26	3.975	Active

Source: Own elaboration

Table 3 presents the proposed weekly exercise planning for each physical activity level identified in the sample, classified as moderately active, active, and very active. This planning was developed considering the energy expenditure values (METs) and the individual capacities of the participants, with the purpose of promoting progressive improvement in physical condition and optimizing overall performance.

The plan design was based on the results obtained from the surveyed participants, who were previously categorized according to their energy expenditure level. Based on this, specific activities adjusted to the individual characteristics of each group were established, considering intensity, duration, frequency, and type of exercise. In this way, a balanced distribution of the workload is ensured and adherence to the regular practice of physical activity is encouraged.

These guidelines constitute a solid methodological basis for the implementation and evaluation of future interventions aimed at maintaining and improving the physical condition and general health of the evaluated individuals. Also, a weekly plan for moderate active people.

Likewise, the proposal allows evaluating the applicability and effectiveness of physical activity programs adapted to different fitness levels, serving as a reference for the development of strategies to promote physical health in populations with similar characteristics.

Table 3

Plan semanal para personas moderadamente activas

Day	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5	Activity 6	Activity 7
Monday	General mobility 5 min	Light walk 5 min	Half chair squat 3×15	Table push-ups 3×10	Elastic row 3×12	Glute bridge 3×12	Dynamic stretching
Tuesday	General mobility 5 min	Static bike 20 min	Knees to chest 3×20 sec	Heel raises 3×10	Static stretching		
Wednesday	Hip & ankle mobility	Lunges 3×8	Abdominal crunch 3×12	Isometric plank 3×20 sec	Dynamic stretching		
Thursday	Shoulder & neck mobility	Bottle shoulder press 3×10	Wall push-ups 3×12	Foot slides 3×10	Static stretching		
Friday	Mobility 3 min	Brisk walk 15 min	Half chair squat 3×15	Elastic row 3×12	Glute bridge 3×12	Breathing	
Saturday	REST						
Sunday	REST						

Source: Own elaboration

Table 4.

Weekly plan for active people

Día	Actividad 1	Actividad 2	Actividad 3	Actividad 4	Actividad 5	Actividad 6
Monday	General mobility 5 min	Jumping jacks 3×15	Knee push-ups (floor) 4×10	Band row 4×12	Low plank 4×30 sec	Dynamic stretching
Tuesday	Brisk walk 5 min	Lateral shuffles 5×30 sec	Mountain climbers 3×12	Active breathing	Static stretching	

Wednesday	Hip mobility 5 min	Isometric squat 3×30 sec	Heel raises 4×15	Single-leg glute bridge 3×10	Static stretching	
Thursday	Shoulder mobility 5 min	March in place 3 min	Bent-over row 4×12	Military press 4×12	Side plank 3×20 sec	Static stretching
Friday	Burpees 4×10	Squat 3×15	Mountain climbers 4×12	Jumping jacks 4×12	Breathing	
Saturday	REST					
Sunday	REST					

Source: Own elaboration

Table 5.
Weekly plan for very active people

Day	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5	Activity 6
Monday	Dynamic mobility 5 min	Skipping 3×60 sec	Explosive push-ups 4×8	Plank with shoulder tap 3×30 sec	Hip mobility	Dynamic stretching
Tuesday	Jump rope 3×25	Sprint 4×30 m	Mountain climbers 4×12	Dynamic stretching		
Wednesday	Hip mobility	Skipping 3×2 min	Bulgarian split squat 4×10	Hip thrust 4×12	Side plank 3×12	
Thursday	Shoulder mobility	Push-ups 4×12	Chair dips 4×12	Static stretching		
Friday	Burpees 5×12	Jump squat 5×12	Push-ups 4×12	Russian kettlebell swing 4×12	Breathing & stretching	
Saturday	REST					
Sunday	REST					

Source: Own elaboration

Discussion

This study found that most participants, aged between 16 and 51 years, were classified as active or very active, indicating a positive trend towards regular physical activity practice in the evaluated population. This pattern coincides with recent research that highlights that both young people and adults show relevant levels of physical activity in their leisure time, especially when they have consolidated habits and support structures for their practice (Zadarko-Domaradzka et al., 2024; Šporin & Šporin, 2021). Physical activity continues to be an essential element for health and well-being, although factors such as lack of time or low motivation can limit long-term adherence (García-Vigara et al., 2024).

The use of the Minnesota Leisure-Time Physical Activity Questionnaire allowed for an objective estimation of total energy expenditure considering the frequency, duration, and intensity of activities performed in the last two weeks. This instrument has demonstrated good utility for the assessment of general populations and facilitates the identification of different activity patterns (Rial-Vázquez et al., 2023). In this study, the questionnaire allowed us to observe that active daily activities, such as walking, climbing stairs, or doing household chores, contributed significantly to the total physical activity, complementing formal sports practice. This suggests that accumulating physical activity through daily activities remains an effective way to improve health and maintain adequate levels of movement.

Furthermore, the high proportion of active participants in this study is above the levels reported in some international populations, where physical inactivity continues to be a public health problem.

Research with adolescents, young people, and older adults has shown that higher levels of physical activity are associated with benefits in various areas, such as lower risk of hospitalizations for mental health problems (Fahim et al., 2024), slower transition to frailty states (Lee et al., 2025), and better health satisfaction in older women (Kuska et al., 2025). Furthermore, studies in postmenopausal women have shown that sustainable, low-cost exercise programs can improve adherence and reduce frailty indicators (García-Vigara et al., 2024).

Overall, the results of this study reinforce the importance of developing physical activity promotion strategies that adapt to different ages, occupations, and social contexts. Validated and accessible tools like the questionnaire used allow for more precise guidance of exercise programs in educational, work, and community settings. This type of intervention can contribute significantly to fostering sustainable habits and improving the overall well-being of diverse populations.

Conclusions

This study allowed identifying physical activity levels in a heterogeneous population through the application of the Minnesota Leisure-Time Physical Activity Questionnaire, showing a predominance of active and very active participants. This result confirms the usefulness of the instrument for discriminating activity patterns and consistently estimating energy expenditure, integrating both formal sports activities and daily tasks that significantly contribute to daily movement.

Likewise, the findings highlight the relevance of collective practices, particularly football and handball, as facilitators of adherence and continuity in physical practice, which coincides with the literature pointing to the role of the social component in the consolidation of healthy habits.

Based on the obtained classification, a weekly prescription proposal adjusted to each activity level was developed, demonstrating the applicability of the questionnaire as a guide for individualized exercise planning.

Overall, results reinforce the need to promote interventions that integrate various types of physical activity and consider the social, occupational, and recreational context of individuals. This study provides evidence supporting the use of validated instruments like the MLTPAQ for assessment and prescription in diverse populations and constitutes a basis for future research aimed at optimizing sustainable physical activity programs adapted to different population profiles.

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Declaration of no conflicts of interest

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Declaration of Competing Interests

The authors declare that there are no competing interests of a financial, commercial, institutional, or personal nature that could have influenced the results or the interpretation of the data presented in this study.

Declaration of author participation in the research

The authors participated significantly and equitably in all stages of the research. They contributed to the conception and design of the study, data collection, analysis and interpretation of the results, manuscript writing, and approval of the final version for publication.

Author Contributions

The authors contributed significantly and equally to all stages of the research. Specifically, they were involved in the conception and design of the study, data collection, analysis and interpretation of the results, manuscript writing, and approval of the final version for publication.