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Density and Proximity: A Study of Physical Activity in Four Neighborhoods in Valencia, Spain

Densidad y proximidad: un estudio de actividad física en cuatro barrios de Valencia, España

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Palabras clave

- Actividad física
- Estrategia poblacional
- Sedentarismo
- Entorno construido
- Salud
- Centro deportivo

Resumen

Este estudio examina la relación entre la densidad y la proximidad de los centros deportivos y la participación en actividades físicas en cuatro barrios de Valencia, España, así como las percepciones de los residentes sobre las posibles mejoras urbanísticas. Se llevó a cabo un estudio transversal con 1446 habitantes, utilizando la versión larga del Cuestionario Internacional de Actividad Física (IPAQ-LF) para cuantificar la frecuencia y la duración de la actividad física intensa, moderada y ligera, junto con un análisis cualitativo de las sugerencias abiertas relativas a las intervenciones urbanas. Los resultados revelan niveles muy bajos de actividad física en todos los barrios, especialmente en aquellos con menos centros deportivos. Se observaron diferencias significativas en la actividad física intensa y ligera, pero no en el ejercicio de intensidad moderada. El análisis cualitativo identificó

Key words

- *Physical activity*
- *Population strategy*
- *Sedentarism*
- *Built environment*
- *health*
- *sport center*

diez áreas prioritarias de mejora, entre las que destacan la ampliación de los espacios verdes, la mejora de los caminos peatonales y la creación de centros deportivos tanto cubiertos como al aire libre. Dada la urgente necesidad de abordar la inactividad física de la población, se propone el diseño de «parques deportivos» como estrategia integradora para la salud pública, la planificación urbana y la cohesión social.

Abstract

This study examines the relationship between the density and proximity of sport centers and physical activity participation in four neighbourhoods of Valencia, Spain, as well as residents' perceptions of potential urban improvements. A cross-sectional study was conducted with 1,446 inhabitants, employing the long form of the International Physical Activity Questionnaire (IPAQ-LF) to quantify the frequency and duration of vigorous, moderate and light physical activity, together with a qualitative analysis of open-ended suggestions regarding urban interventions. The results reveal very low levels of physical activity across all neighbourhoods, especially in those with fewer sport centers. Significant differences were observed for vigorous and light physical activity, but not for moderate-intensity exercise. The qualitative analysis identified ten priority areas for improvement, notably the expansion of green spaces, enhancement of pedestrian pathways and the creation of both indoor and outdoor sport centers. Given the urgent need to address physical inactivity among the population, the design of 'sports parks' is proposed as an integrative strategy for public health, urban planning and social cohesion.

Introducción

Physical activity (PA) is closely linked to health. Its importance not only revolves around the prevention of non-communicable diseases (Shreves et al. 2025; Perry et al. 2023), but also plays a role in communicable diseases (Chastin et al. 2021) and can even be prescribed as part of medication for diseases such as cancer (Courneya et al. 2025). It is also important for brain health and function, contributing to the improvement of neurodegenerative diseases, improving memory, and generating analgesic, antidepressant, and well-being effects (Di Liegro et al. 2019). However, although all types of PA are beneficial, there is a direct relationship between intensity and benefit, with moderate to vigorous PA being more beneficial.

In parallel to this influential relationship between PA and health, there is a relationship between physical inactivity (PI) and disease, along with its corresponding economic cost. In 2013 alone, PI accounted for a loss of $67 billion worldwide in direct and indirect costs (Ding et al. 2016). At the national level, excluding musculoskeletal and mental health damage, PI tends to account for between 1% and 3% of medical expenditures, and at the individual level, it implies a drop in productivity that pushes people closer to the poverty line (World Health Organization 2018). In Spain, in 2013, PI accounted for $2.3 billion, 70% of which was covered by the public sector (Ding et al. 2016). Thus, promoting PA is a national priority, not only for health reasons but also for its economic impact.

However, this promotion will not be an easy task. Compared to other European countries, Spain has PA levels slightly below average, with very disparate frequency patterns (Ríos et al. 2017) and low levels of motivation (Ríos et al. 2013). The Ministry of Culture and Sport (2022) points in the same direction: the average rating of interest in physical exercise(PE) is 5.3 out of 10, and in sport in general, 5.8 out of 10. This, therefore, represents a population with little motivation for exercise and, consequently, few people engage in it. When investigating what motivates the Spanish population to do PA, previous work has shown that it is highly focused on the social nature of the activity: sharing the activity with friends, meeting new people, developing new physical skills, and fostering a compe-

titive spirit (Ríos et al. 2013). Recent work follows a parallel line: compared to the Norwegian population, the Spanish population that already does PA shows motivations related to autonomy, social relationships, and exercising for the pleasure of doing it (Mønster-Olufsen et al. In press).

In 2022, the Ministry of Education, Vocational Training and Sports published its lines of action to promote sport and combat sedentary lifestyles and physical inactivity (Ministerio de Educación, Formación Profesional y Deportes 2022). The strategy is structured around five axes: in the school context, in the area of health, environment and sustainable development, work environments, and equality, inclusion and social integration. Within the second strategy (in the area of health), the only measure at the population level (i.e., strictly preventive) is the "creation of a manual of recommendations aimed at the population (...)". Specifically, the objective is "To develop and disseminate an awareness campaign on the importance of PA in its relationship with health (...)". This measure entails several limitations: first, awareness campaigns assume that the population will receive the message, as well as its understanding, and that they have the mental and material resources to carry it out (Adams et al. 2016); and second, they fail to take into account that what motivates the Spanish population is not so much health benefits, but rather the social component. However, this document takes a step forward in the matter of integrating the EP into the health sector.

The issue is to promote exercise from a preventive perspective—that is, before individuals even visit a doctor. Promoting PA should reach the population with the fewest possible social, cognitive, and economic filters. At this point, it is appropriate to discuss nudge theory or behavioral insights, a form of governance that is gaining increasing momentum (Sousa Lourenco et al. 2017). Applied to this issue, nudge theory would consist of constructing an environment were practicing PA is the easy choice to make. The review by Forberger et al. (2019) showed that these measures have been widely studied in the literature and have yielded positive effects. An example of nudge is the very design of the space and the service offering in an environment. Walkability is a good example: people living in more walkable neighborhoods walk more than those living in less walkable neighborhoods. This relationship has been shown in different cultural contexts: USA (Sallis et al. 2009), Australia (Owen et al. 2007), Belgium (Van Dyck et al. 2010), Sweden (Sundquist et al. 2011) and Spain (Sanchez-Rodriguez et al. In press). Along the same lines, the very presence of a sports center (SCs) in a neighborhood, not focused on performance or competition but on the practice of PA, is a nudge for the population in the form of physical proximity, the offer of directed classes, and the possibility of using the equipment and facilities. This relationship has been shown in different countries, such as Korea (Lee et al. 2016), USA (Diez Roux et al. 2007) or Sweden (Eriksson et al. 2012). Along these lines, (Eriksson et al. 2012) reveal an interesting finding: a higher density of SC implies more minutes of intense activity, but the relationship is not proportional; only those people who have more than four SCs within a 1,000-meter radius of their home engage in more activity (there are no differences between the 0 SCs and 1-3 SCs groups).

Valencia is a city that seeks to project itself to the world through sport and sustainability. Thus, it was the European Capital of Sport in 2011 (ACES, n.d.) and the European Green Capital in 2024 (Ayuntamiento de Valencia, n.d.). However, its SCs offering is not homogeneous throughout the city.

The present study therefore pursues two main objectives:

(i) to examine whether the density of SCs is associated with higher levels of physical activity (PA) among residents; and

(ii) to explore citizens' perceptions of neighborhood development, assessing whether the creation of new sport facilities represents a shared community concern.

Method

Research Design

This study has a cross-sectional design and uses two different methodologies. To examine the relation between the density of SCs and the levels of physical activity (PA) among residents, a quantitative method based on questionnaires was used. And to explore citizens' perceptions of neighborhood development, a qualitative method based in a semi-structured interview has been selected.

Participants and Sampling Strategy

The study was conducted in Valencia (Spain) and analysed the neighborhoods of Ayora, San Marcelino (SM), Fuente de San Luís (FSL), and La Torre (LT). Based on data from the City Council's Statistics Office (Ayuntamiento de Valencia 2023), a sample size of 378 residents of Ayora, 370 of San Marcelino, 342 of Fuente de San Luís, and 356 of La Torre was calculated, assuming a margin of error of 5% and a confidence level of 95%. This assumed a total sample size of 1,446 surveys. Data collection took place between February and April 2025, a period in which temperatures ranged between 16°C and 21°C (Weather Spark 2025), thus minimizing seasonal bias. To ensure temporal homogeneity, batches of 100 surveys were administered

cyclically—Ayora, SM, FSL, and LT—until the quota for each neighborhood was filled.

The inclusion criteria were: adults who were habitually resident in one of the study neighborhoods; exclusion criteria were: visible locomotor difficulties (e.g., limp, use of an assistive device), health conditions that limited physical activity (they were asked if there was any health condition that limited physical activity), mental disability, and temporary residence (mainly students) or lack of daily activities in the neighborhood. The sample was obtained through convenience sampling (in public spaces and health centers) complemented by snowball sampling, contacting the boards of directors of neighborhood, cultural, festive, and music associations to facilitate the involvement of their members.

Instruments

Density of SCs within the neighborhoods. SCs where identified through internet based search, and the information obtained was later confirmed by ion-site check. Those within an area of 150m of the neighborhood limits were also considered for the analysis, distance was determined using the Google Earth 6.1 geographic information system. The quantity of the public SCs are listed in Table 1 (including those privately managed) and the private ones are listed in Table 2. Table 1 also include the so-called IDEs (Elementary Sports Facilities), defined as freely accessible spaces without supervision or formal programming—for example, a ping-pong table, a basketball court, or a skating rink. Since these facilities lack staff or supervised activities, their impact on the population's PA habits is presumed to be less than that of centers that offer organized programs or services. The information about IDEs was extracted from the Sports Foundation website (Fundación Deportiva Municipal Valencia 2025).

Table 1

Information on public sports centers in each neighborhood: name, facilities, and directed activities.

	CENTER NAME	FACILITIES	GUIDED ACTIVITIES OFFERED (adult population)	
Ayora	Sports Center "La Creu del Grau"	1 gym/fitness area 1 weightlifting room	Competitive weightlifting	
	Sports Center "Supera" (Piscina Municipal Ayora, n.d.)	2 swimming pool 1 gym/fitness area 1 indoor fitness room (for guided activities)	ABS training Fitness Aquagym Aquagym for Seniors Aquapilates Aquarunning Latin Dance Body Balance Body Combat Body Pump Belly Dancing Stretching GAP	Swimming for Seniors Swimming for disabilities Adult Swimming Improvement Swimming Pre-Postpartum Swimming Preventive Swimming Pilates Run Xfit Step training Tai-Chi Xtremfit
	Polideportivo "Cabanyal–Canyamelar"	1 gym/fitness area 1 indoor fitness room (for guided activities) 1 fencing room 1 martial arts room 1 artistic gymnastics room 4 squash courts	Aerobics Ballroom Dancing Latin Dancing Belly Dancing Fitness Gymnastics	Tai Chi Fitness Yoga Competitive martial arts
	IDE	1 shared sports field (1 handball, 1 indoor football, 1 basketball) 1 skating rink.	None	
San Marcelino	IDE in School Pavilion "Ramiro Jover"	1 shared sports field (1 basketball, 1 volleyball, 6 badminton)	None	
	Forus Rambleta (Forus, n.d.)	3 swimming pool 2 indoor fitness rooms (for guided activities) 1 gym/fitness area 1 spinning room 3 padel court 1 football field 1 spa area	Physical Activity for Seniors Aquadynamic Aquafitness Body Attack Body Balance Body Combat Body Pump Indoor Cycling Running Club Swimming Club CX WORK Functional Training Stretching	Fitness G.A.P Pre-Postpartum Gymnastics Senior Swimming Swimming for disabilities Adult Swimming Padel Tennis Pilates Sh'Bam Yoga ZUMBA
Fuente de San Luís	IDE	1 shared sports field (indoor soccer, handball and basketball)	None	
La Torre	IDE	1 calisthenics area 1 shared sports field (indoor soccer and handball) 1 table tennis 1 skating rink	None	
	Soccer Field	1 Soccer Field	Competitive football	
	Universidad Popular	1 classroom of the university	Fitness exercise sessions for elderly	

Table 2

Information on private sports centers in each neighborhood: name, facilities, and directed activities.

	CENTER NAME	FACILITIES AND GUIDED ACTIVITIES OFFERED (adult population)
Ayora	Basic-Fit	Gym area, fitness rooms for guided activities, spinning
	Basic-Fit	Gym area, fitness rooms for guided activities, spinning
	FuerzaFit Gym	Gym area, fitness classes
	Sweet Gym	Gym area, fitness classes
	Synergym	Gym area, fitness rooms for guided activities, spinning
	Fitness Park	Gym area, fitness rooms for guided activities, spinning
	Club Deportivo Arnau	Gym area, fitness classes
	JF Sport Center	Gym area, fitness classes
	Maritim Fitness Boutique	Gym area, fitness classes
San Marcelino	Gym Bushis Valencia	Padded room for martial arts classes (no gym area)
Fuente de San Luís	---	---
La Torre	Physiotherapy Clinic	Pilates

Considering this information, table 3 presents the hypotheses by neighborhood regarding physical activity.

Table 3

Hypothesis of activity by neighborhood.

	Density of sport centers	Hypothesized physical activity
Ayora	High	High
San Marcelino	Medium	Medium
Fuente de San Luís	Low	Low
La Torre	Low	Low

Population Physical Activity. Physical activity of the sample was quantified using the IPAQ-LF (International Physical Activity Questionnaire - Long Form). Specifically were used the questions ranging from the 22nd to the 25th, which collect information on the frequency and duration of vigorous and moderate sports activity. This tool has demonstrated validity against accelerometry, and reliability (intraclass correlation coefficients ranging from 0.46 to 0.96) and fair to moderate validity against accelerometry (Craig et al. 2003) but diverse physical activity measures in use prevent international comparisons. The International Physical Activity Questionnaire (IPAQ. It is especially useful for understanding the activity patterns of large population groups (Vanhees et al. 2005).In addition to those questions, two more where added to quantify light intensity sports activity. This added questions followed strictly the structure of those in the IPAQ:

Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do light physical activities in your leisure time?

How much time did you usually spend on one of those days doing light physical activities in your leisure time?

Nonetheless, IPAQ has two main limitations: its retrospective nature and the need for respondents to have sufficient knowledge to classify their activities according to intensity (light, vigorous or moderate). To overcome these limitations, all questionnaires were administered as interviews, always conducted by one of the study authors. This measure has been implemented in other studies (Van Dyck et al. 2015; Rzewnicki et al. 2003). Activities were classified by intensity according to the 2024 Adult Compendium of Physical Activities (Herrmann et al. 2024).

Population perception. Once ended the IPAQ questions, in order to explore residents' perceptions of their neighborhood environment, participants were asked the open-ended question: "What suggestions would you make to the City Council to improve the neighborhood where you live?" From this question a semi-structured interview was started in which the interviewer noted all the suggestions for change, improvement or complaints. Residents of Ayora did not take part in this question since the objective was to collect the insights of those areas with less SCs.

Data Analysis

Quantitative analysis. A descriptive statistical analysis was conducted to examine patterns of physical activity across neighborhoods. For each intensity level—vigorous (VPA), moderate (MPA), and light (LPA)—the frequency (of both days and people engaging with the activity) and the mean duration (minutes per week) were calculated. Data were summarized for each neighborhood (Ayora, SM, FSL, and LT) and for the total sample. Comparisons between neighborhoods were based on observed differences in means and percentages, which were used to identify general trends in PA participation according to the density and proximity of sports centers. Results were presented in tabular form, complemented by confidence interval plots to facilitate visual interpretation of inter-neighborhood variability. This descriptive approach provided a comprehensive overview of the distribution of PA behaviors in the urban context, allowing for the identification of meaningful differences between areas with higher and lower sports infrastructure availability.

Qualitative analysis. The answers of the question initiated a brief semi-structured interview in which the interviewer recorded all proposals verbatim. Once the full dataset was collected, all responses were transcribed and subjected to an inductive thematic analysis (Braun & Clarke, 2008). The process involved several steps. First, all responses were read repeatedly to ensure familiarization with the data. Second, initial codes were generated to capture specific ideas or issues mentioned by residents. Third, these codes were grouped into broader thematic blocks representing common areas of improvement (e.g., green spaces, cleanliness, sports facilities, safety, commerce, transport). Fourth, the absolute and relative frequencies of each theme were calculated both by neighborhood and for the overall sample, allowing the identification of the ten most frequently mentioned priorities. Finally, a narrative synthesis was written for each neighborhood (San Marcelino, La Fuente de San Luís, and La Torre) and for the combined sample, summarizing the main concerns and proposals expressed by participants. Although the interviews were brief and descriptive in nature, this approach provided rich contextual information complementing the quantitative data and enabled the identification of collective patterns of perception regarding urban needs and opportunities for promoting physical activity.

Ethics Committee

This project was approved by the Ethics Committee of the Catholic University of Valencia with approval code: UCV/2023-2024/170. All data collection procedures adhered to ethical principles and current regulations regarding personal data protection.

Results

General characteristics of the sample

The total survey sample was 1,446. Of this total, Ayora accounted for 26.5%, SM for 25%, FSL for 24%, and LT for the remaining 24.5%. The general characteristics of the sample can be seen in Table 4. At the sociodemographic level, according to official information for each neighborhood (Ayuntamiento de Valencia 2023), our sample shows a higher number of women, as well as slightly higher age, unemployment, and educational levels (except in FSL, where our sample has a lower educational level). The immigrant population is less representative. Regarding physical activity, the percentage of the sample that engages in intense (VPA), moderate (MPA), or light (LPA) physical activity at least once a week is shown.

Table 4

General characteristics of the sample.

Variable	Category	Ayora	San Marcelino	Fuente de San Luís	La Torre
Sociodemographic characteristics					
Sex	Man	36,77%	41,08%	43,57%	38,48%
	Woman	63,23%	58,92%	56,43%	61,52%
Age	18-24	7,41%	11,35%	6,43%	7,58%
	25-29	6,88%	9,73%	6,73%	4,78%
	30-34	4,76%	7,30%	9,36%	9,55%
	35-39	7,14%	7,84%	7,02%	10,67%
	40-44	6,35%	9,73%	7,89%	7,30%
	45-49	8,47%	7,57%	10,53%	8,99%
	50-54	9,79%	7,03%	11,40%	5,62%
	55-59	7,67%	6,49%	7,31%	7,02%
	60-64	11,90%	10,27%	8,19%	10,67%
	65-100	29,63%	22,70%	25,15%	27,81%
Educational level	University studies	41,27%	25,41%	22,22%	18,82%
	High school diploma or Higher VET	14,02%	17,84%	9,06%	11,80%
	Intermediate VET	17,46%	14,32%	15,79%	12,08%
	Secondary education certificate	26,46%	36,22%	42,40%	47,19%
	No formal education	0,79%	6,22%	10,53%	10,11%
Occupation	Yes	51,59%	49,46%	49,71%	38,76%
	No	16,13%	23,78%	24,27%	30,05%
	Retired	32,28%	26,76%	26,02%	31,18%
Nationality	Spain	85,45%	77,84%	78,65%	73,60%
	Within UE	1,32%	0,27%	2,05%	1,40%
	Outside UE	13,23%	21,89%	19,30%	25,00%
Physical activity data					
Physical Exercise	VPA once a week	22,61% (n=327)			
	MPA once a week	13,62% (n=197)			
	LPA once a week	4,36% (n=63)			

Results in the association of the density of sports centers and the levels of physical activity among residents.

PA itself has very low participation in all neighborhoods. Table 5 shows participation in PA at least once a week in the different neighborhoods. Ayora consistently shows a tendency toward higher participation.

Table 5

Percentage of the sample that engages in physical activity one or more times a week, according to neighborhood.

	Ayora	SM	FSL	LT
Vigorous physical activity	28,31%	28,65%	20,47%	12,36%
Moderate physical activity	20,37%	11,89%	9,36%	12,36%
Light physical activity	7,41%	4,86%	3,51%	1,40%

Note: Abbreviations are as follows: SM, San Marcelino; FSL, Fuente de San Luís; LT, La Torre.

Table 6 shows the number of minutes per week spent on a specific activity by neighborhood. The previous trend reappears, with Ayora showing more minutes of activity in all categories than the other neighborhoods.

Table 6

Mean, standard deviation and standard error of physical activity according to neighborhood.

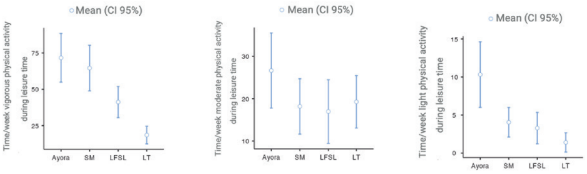
	Neighborhood	Mean	SD	SE

Time/week in VPA	Ayora	71.68	165.5	8.511
	SM	64.60	153.5	7.980
	FSL	41.21	100.9	5.455
	LT	18.48	58.1	3.080
Time/week in MPA	Ayora	26.64	87.6	4.508
	SM	18.18	63.9	3.321
	FSL	16.96	70.6	3.816
	LT	19.26	59.4	3.147
Time/week in LPA	Ayora	10.32	42.6	2.190
	SM	4.05	19.0	0.985
	FSL	3.29	19.4	1.047
	LT	1.40	12.1	0.640

Note: Abbreviations are as follows: VPA, vigorous physical activity; MPA, moderate physical activity; LPA, light physical activity. Overall, the VPA and LPA show significant differences (p<0.001), while only the MPA does not (p = 0.37). The means and confidence intervals between neighborhoods can be seen in Figure 1. In the VPA, Ayora and SM show very similar levels, but there are significant or marginally significant differences (p = 0.07) between the remaining neighborhoods. In the LPA, only Ayora shows a significant difference compared to the rest of the neighborhoods.

Figure 1

Confidence intervals (CI 95%) of the means according to PA by neighborhood.



Results of the citizens' perceptions of neighborhood development

When grouping the three neighborhoods (1,068 respondents), ten areas for improvement clearly emerge. First place goes to the expansion of green areas (387 mentions). This refers to a green space where activities can be done, i.e., where there is space to sit on the grass or designated areas for running or walking. Second place goes to waste removal and pedestrian street repairs (253), and third place goes to the revitalization of local commerce (136). This is followed by indoor sports facilities (131) and the creation of well-equipped walking areas (128). By "conditioned walking areas," the population meant pedestrian routes where people could go for a walk and that were conditioned for this purpose, with sidewalks of sufficient width, trees along the sidewalk to reduce high temperatures and provide shade, benches for the elderly or those with mobility problems to rest, and fountains for the hottest months. Children's playgrounds (122) and the ongoing maintenance of garden spaces (112), including pruning and leaf collection in the fall, are close behind. Of the more than 1,000 people surveyed, only 110 said they viewed the neighborhood as positive or didn't know how to improve it. In ninth and tenth place are requests to pedestrianize or widen sidewalks (101) and increased safety (89) in neighborhoods.

Analyzing the specific responses from La Torre, the most frequently cited demand is the expansion of green areas, mentioned by 105 of the 356 respondents, followed by the creation of indoor sports facilities (96 mentions) and improvements in neighborhood cleanliness and maintenance (73), with an emphasis on broken sidewalks and accumulated garbage. Next in line are requests for more local commerce (70 mentions) and better service from the local medical service (55). It should be noted that this improvement in the medical service referred to long wait times, not staffing. Next in line are the creation of improved pedestrian routes (51), playgrounds (38), more efficient public transportation (35), maintenance of green areas (33), and pedestrianization, sidewalk widening, and street connectivity (32).

In Fuente de San Luís, where 342 residents responded, the priorities partially coincide: they demand more green areas (129 mentions), cleaning and repair of public spaces (101), and regular maintenance of these green areas (54). In this regard, the only green space in this neighborhood is perceived as dirty, dangerous, and full of architectural barriers. Next in line are the revitalization of local commerce (52), the creation or improvement of playgrounds (47), the installation of ATMs or bank branches (45), strengthening citizen security (44), and optimizing public transportation (34). In ninth place are those surveyed who said they viewed the neighborhood as positive or didn't know how to improve it (29). The top ten priorities are rounded out by the demand for sports facilities, this time outdoors (24 mentions).

In San Marcelino, with 370 participants, the demand for more green areas again leads the list (153 mentions), followed by urban cleaning and maintenance (103). A significant group (52) considers that the neighborhood is functioning well or does not know how to give an opinion, while 43 highlight the need for more pedestrian routes adapted for this purpose and 42 propose making use of the numerous vacant lots in the neighbourhood. Other frequent demands include pedestrianisation of streets (40), the creation or improvement of children's playgrounds (37), the installation of additional parking (31), the maintenance of garden areas (25) and outdoor sports areas (24).

Discussion

This study reveals three main findings. First, the clear predominance of the population that never engages in any type of PA. Overall, 77.39% never engage in vigorous-intensity , 86.38% never engage in moderate-intensity exercise, and 95.64% never engage in light exercise. The WHO recommends a minimum of 75 minutes per week of vigorous-intensity physical activity or 150 minutes of moderate-intensity physical activity (World Health Organization, n.d.). In our sample, no neighborhood reaches this minimum. In the best-case scenario (Ayora), 71.68 minutes/week of VPA and 26 minutes/week of MPA are achieved. Although our study only analyses PA related with sport practise, and ignores the physical activity that this population may engage in during the rest of the day (related with work or household maintenance), these data show an alarming risk that a very high percentage of the population could be categorized as sedentary, far exceeding the global average of 31% (World Health Organization 2024). Our work also quantifies the population that engages in LPA. This aspect is considered a strength because, although it does not play a significant metabolic role due to its low intensity, it is important as a source of mental health and well-being, as well as being fundamental for socialization (Shi et al. 2024) but the associations of sedentary behaviors and LPA.

In parallel, the second finding shows that seems to be a trend between density and proximity of SCs with greater PA among the population, especially in VPA and LPA. The most notable example in this regard is the comparison between Ayora and LT: 28% of the sample engages in VPA in Ayora, while only 12% do so in LT; Ayora spends an average of 71 minutes/week of VPA, while LT only 18 minutes/week. This finding is in line with research in the field, but especially with the findings of Eriksson et al., (2012): high density and proximity of SC is related to greater PA, but the relationship is not proportional. However, despite this SC-PA relationship, it should not be forgotten that Ayora still does not engage in sufficient activity. Thus, although this relationship plays an important role, it is another social variable to consider in the puzzle of physical inactivity. Therefore, it is important to conduct a more in-depth study of the barriers (e.g., economic barriers) and perceptions of neighborhood residents.

In this regard, we have the third finding, which is the result of the qualitative part of the work. It is revealing that of the ten suggestions with the highest number of mentions, many of them are directly related to physical activity in general. Examples include the desire to expand green areas, which is the main suggestion regardless of the neighborhood, sports facilities, both indoor and outdoor, equipped walking areas, and pedestrianization or widening of sidewalks. This demonstrates a concern, whether conscious or not, for PA. Of course, these suggestions should not be understood in isolation; many of them could be addressed together: equipped walking areas, children's parks, and primarily outdoor sports facilities could be created within a large green space. The importance the population places on green spaces is also revealing, and it is align with the research in other populations (Kazdin and Vidal-González 2021; Sanchez-Rodriguez et al. 2025).

Given the high prevalence of physical inactivity, it is appropriate to rethink the offering of traditional sports facilities, whose construction and maintenance require significant investment and specific land. Instead of concentrating resources on conventional gyms, we propose the design of "sports parks": expanses of green space equipped with outdoor exercise areas (e.g., the training equipment installed in parks in Alcorcón; (Lesmas 2023)) and paths designed for walking or running. This multipurpose model provides interrelated benefits: from an environmental perspective, it increases soil permeability, mitigates the heat island effect, and improves air quality; at the urban level, it enriches the aesthetics of the landscape and promotes community ownership of public space; in terms of sport, it reduces maintenance costs and eliminates economic barriers, facilitating access to exercise for the entire population; and, finally, it promotes social cohesion and well-being by offering safe and attractive environments for physical activity, thus contributing to reducing the risk of chronic diseases associated with inactivity and promoting healthier lifestyles.

This work has three weaknesses. First, there are limitations associated with the very nature of the study (cross-sectional), which means that a cause-effect relationship cannot be established, but rather an association. Second, the sampling was not random, which increases the likelihood of bias. The statistical analysis used only allow to state that seems to be a trend, rather than make any fix conclusion. Further studies should improve this aspects.

This study also has several strengths. On the one hand, it has provided a comprehensive analysis of PA, including not only vigorous and moderate intensity, but also light intensity. All surveys were conducted in interview format by one of the researchers, thus eliminating barriers to comprehension or mental fatigue derived from the survey that could affect the data. Furthermore, the surveys were conducted over a short period of time, so seasonal variation is not an element of bias. It also has a solid sample size (1,446 surveys) and data collection on the presence of gyms has been done in two layers: first through an internet search and then

through a street check, which guarantees the veracity of the information.

Conclusions

The combined analysis of quantitative and qualitative data reveals a worrying deficit in the regular practice of structured PA among residents of the studied neighborhoods. Although the density and proximity of sports centers are positively associated with higher levels of light and vigorous activity—consistent with previous findings in European urban contexts—infrastructure alone is not sufficient: economic, motivational, and social barriers emerge that limit adherence. Neighborhood input emphasizes the need for integrated interventions—expanding green areas, improving pedestrian routes, and creating indoor and outdoor facilities—indicating a social consensus on the value of a healthy environment. In response, we propose the development of multifunctional "sports parks" that combine green areas with open-air exercise equipment, promoting urban sustainability, community cohesion, and reducing access barriers.

Declaration of Competing Interests

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