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PREVALENCE AND PATTERNS OF PHYSICAL INACTIVITY AND SEDENTARY BEHAVIOUR AMONG ADULTS IN TIRANA, ALBANIA

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ABSTRACT

Objective: Physical inactivity (PI) and sedentary behaviour (SB) are conceptually distinct risk factors for non-communicable disease, yet are often treated as interchangeable in surveillance. Our study estimated the prevalence and sociodemographic patterns of PI and SB among adults in Tirana, Albania, and examined their relationship with cardiometabolic characteristics.

Methods: A cross-sectional study was conducted among 200 adults aged 18 years or older. Physical activity was assessed through face-to-face interviews using the Global Physical Activity Questionnaire (GPAQ), and the data were analysed according to the GPAQ Analysis Guide. PI was defined as fewer than 600 metabolic equivalent of task (MET)-minutes per week and SB as six or more hours of sitting per day. Groups were compared using Pearson chi-square, two-sided Fisher exact and Fisher–Freeman–Halton exact tests.

Results: PI prevalence was 30.5% (95% confidence interval 24.5–37.2) and 33.8% reported sitting six or more hours daily. PI was highest among participants with eight or fewer years of education (51.5%) and retired participants (48.6%), whereas SB was highest among those with more than 12 years of education (46.8% versus 18.2%). Hypertension (55.0% versus 34.1%) and family history of cardiovascular disease (61.7% versus 34.5%) were significantly more frequent among inactive participants. PI and SB were not significantly associated.

Conclusion: About one adult in three in Tirana is physically inactive and about one in three is highly sedentary, but the two behaviours were not significantly associated and followed opposite educational gradients, so they identify only partly overlapping groups. The two behaviours require separate surveillance indicators and separate intervention strategies.

Keywords: Physical Inactivity; Sedentary Behaviour; Cardiovascular Risk Factors; Albania; Cross-Sectional Study

1 INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (1). Adults who do not accumulate at least 150 minutes of moderate-intensity aerobic activity, or 75 minutes of vigorous-intensity aerobic activity, or an equivalent combination per week — the lower bound of the ranges of 150–300 and 75–150 minutes recommended by the current World Health Organization (WHO) guidelines — are classified as physically inactive (2). Sedentary behaviour is a separate construct, defined by the Sedentary Behavior Research Network as any waking behaviour characterised by an energy expenditure of 1.5 metabolic equivalents of task (METs) or lower while in a sitting, reclining or lying posture (3). The two definitions are built on different axes: one describes the volume of moderate-to-vigorous activity accumulated during the week, the other describes the amount of waking time spent in a low-energy posture. An individual may therefore satisfy the physical activity recommendation and nevertheless spend the greater part of the waking day seated.

Insufficient physical activity is among the most prevalent modifiable risk factors worldwide (4). The most recent pooled analysis of 507 population-based surveys estimated a global age-standardised prevalence of 31.3% in 2022, an increase from 23.4% in 2000, with prevalence rising in slightly more than half of all countries and the global target of a 15% relative reduction between 2010 and 2030 unlikely to be met (5). The health consequences are substantial: physical inactivity contributes materially to the burden of coronary heart disease, type 2 diabetes and several cancers, and the majority of deaths attributable to inactivity now occur in middle-income countries (6,7).

Evidence on sedentary behaviour has accumulated more recently but points in the same direction. Prolonged sitting has been associated with all-cause and cardiovascular mortality and with incident type 2 diabetes in dose–response analyses (8). Harmonised meta-analyses of prospective cohorts have shown that the excess mortality risk associated with prolonged sitting is greatest among adults who accumulate little moderate-to-vigorous activity, and that it is eliminated only at very high activity volumes, in the order of 60–75 minutes of moderate-intensity activity per day or more than 35 MET-hours per week (9,10). This partial independence has led several authors to argue explicitly that sedentary behaviour is not simply physical inactivity under a different name (11).

The distinction matters for public health practice. If the two behaviours cluster in the same individuals, a single surveillance indicator and a single intervention strategy would be sufficient. If, however, they are distributed differently across educational, occupational and age groups, then monitoring only one of them will systematically overlook a substantial part of the population at behavioural risk, and interventions designed for one group will not reach the other. A systematic review of sedentary behaviour in working-age adults has identified socioeconomic status, age and environmental factors among its correlates, which may differ from those associated with insufficient moderate-to-vigorous physical activity (12).

Albania is a Southeastern European country in which non-communicable diseases account for the overwhelming majority of the burden of disease and of total mortality (13–15). Over the last three decades the country has experienced rapid urbanization (16), a pronounced increase in private motorisation, and a shift of the labour force from agricultural and manual occupations towards service-sector and desk-based employment, particularly in the capital. These are precisely the transitions that tend to reduce occupational and transport-related physical activity while increasing daily sitting time. National data remain limited: a previous survey of primary healthcare users in Tirana reported a prevalence of physical inactivity of 31.6% and identified female sex, rural residence, retirement and unemployment as its principal correlates, but did not report sedentary time (17). Comparable regional data from other post-communist settings, such as the national STEPS survey of Armenia, have reported considerably lower inactivity but a very different domain structure of activity (18), underlining the need for setting-specific estimates.

The aim of our study was therefore threefold: to estimate the prevalence of physical inactivity and of prolonged sedentary time among adults in Tirana using a standardised international instrument; to describe the sociodemographic patterning of both behaviours; and to examine whether physical inactivity and sedentary behaviour identify the same individuals and are associated with the same cardiometabolic and cardiovascular characteristics.

2 MATERIALS AND METHODS

2.1 Study design, setting and participants

We conducted a cross-sectional study among adults residing in Tirana, the capital of Albania, between February 2025 and June 2025. Participants were consecutively approached and interviewed face to face by trained interviewers. Eligibility was restricted to individuals aged 18 years or older who were resident in the study area and able to provide informed consent and to complete the interview. A total of 200 participants were included in the analysis.

2.2 Instrument and data collection

Physical activity was assessed using the freely available WHO Global Physical Activity Questionnaire (GPAQ, version 2), which records the frequency and duration of moderate- and vigorous-intensity activity across work, travel, and recreation domains, together with usual daily sitting time (19). The instrument has demonstrated moderate to substantial test–retest reliability in a nine-country study, although its criterion validity against objective measures was poor to fair (20); validation against accelerometry has likewise shown acceptable agreement for moderate-to-vigorous activity but poor agreement for sedentary time (21). The questionnaire additionally collected sociodemographic characteristics (sex, age, completed years of education, employment status, marital status and self-rated economic level), behavioural characteristics (smoking, alcohol consumption and self-reported daily caloric intake), anthropometric data, and self-reported physician-diagnosed hypertension, diabetes mellitus, hypercholesterolemia and cardiovascular disease, as well as family history of cardiovascular disease.

2.3 Definitions and derived variables

Physical activity data were cleaned and processed as specified in the WHO GPAQ Analysis Guide (22). Responses were excluded from the corresponding domain when values were internally inconsistent or implausible, and daily activity time exceeding 16 hours was treated as invalid. Total physical activity was expressed in MET-minutes per week, applying a value of 4 METs to moderate-intensity activity and 8 METs to vigorous-intensity activity.

Participants were classified by total activity volume into three categories. Low activity, used here as the operational definition of physical inactivity, corresponded to fewer than 600 MET-minutes per week — the energy-expenditure equivalent of the 150 minutes of moderate-intensity activity recommended per week, and the threshold applied in WHO physical activity surveillance. Moderate activity corresponded to at least 600 MET-minutes per week without meeting the criteria for the high category, and high activity corresponded to at least 3 000 MET-minutes per week or to at least 1 500 MET-minutes per week accumulated on three or more days of vigorous activity. For the comparative analyses, the moderate and high categories were combined into a single category of sufficient physical activity. Sedentary behaviour was defined as self-reported sitting or reclining for six or more hours on a typical day, six hours being the lower bound of the six-to-eight-hour threshold above which dose–response associations between total sitting time and all-cause and cardiovascular mortality have been demonstrated (8).

Body mass index was calculated as weight in kilograms divided by the square of height in metres and categorised according to WHO cut-off points as underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2) and obesity (≥30.0 kg/m^2). Educational attainment was grouped into eight or fewer completed years, 9–12 years and more than 12 years. Age was grouped into 18–34, 35–49, 50–64 and 65 years or older.

2.4 Statistical analysis

Continuous variables are presented as mean ± standard deviation and categorical variables as absolute frequencies and percentages calculated on non-missing observations. Missing data were handled by complete-case analysis, and the number of missing observations is reported in the footnote of the corresponding table. Differences in the distribution of categorical variables between groups were tested with Pearson chi-square test for variables with more than two categories, replaced by the Fisher–Freeman–Halton exact test where any expected cell count was below five, and with two-sided Fisher exact test for binary variables. Confidence intervals for prevalence estimates were calculated by the Wilson score method. No adjustment was made for multiple comparisons. All tests were two-sided and a p-value below 0.05 was considered statistically significant. ChatGPT (OpenAI), powered by GPT-5.6, was used for language editing and improving the clarity of the manuscript. The authors reviewed and approved the final text and take full responsibility for its content. Analyses were performed in IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA), and Python version 3.11 (Python Software Foundation, Wilmington, DE, USA) and the pandas (v3.0) and SciPy (v1.17) libraries.

2.5 Ethical considerations

All participants received an explanation of the purpose of the study and provided informed consent before the interview. Data were collected anonymously and no individually identifying information was recorded.

3 RESULTS

3.1 Characteristics of the study population

A total of 200 adults were included, of whom 112 of 199 participants with available sex data (56.3%) were women and 87 (43.7%) were men. The mean age was 48.20 ± 17.38 years, mean educational attainment was 13.29 ± 3.31 completed years, and mean body mass index was 26.63 ± 4.36 kg/m^2. Most respondents were employed (69.0%), while 13.5% were unemployed and 17.5% were retired. Regarding marital status, 68.0% were married, 20.5% were single, and smaller proportions were widowed (4.5%), cohabiting (4.0%), or divorced (3.0%).

Self-rated economic level was reported as average (Level 3) by 44.7% of participants with available data, good (Level 4) by 25.6%, very good (Level 5) by 22.6%, low (Level 2) by 5.0%, and very low (Level 1) by 2.0%. Never smoking was reported by 60.0% of respondents, while 16.5% were regular smokers, 15.0% occasional smokers, and 8.5% former smokers. Alcohol was never consumed by 50.0%, once a month or less by 29.0%, two to four times per month by 15.0%, two to three times per week by 4.5%, and four or more times per week by 1.5%. Daily caloric intake was reported as moderate by 72.0% of participants, high by 17.0%, and low by 11.0%.

Diabetes mellitus was present in 13.5% of the sample and hypercholesterolemia in 40.5%. Hypertension was reported by 80 of 198 participants with valid data (40.4%). Cardiovascular disease was present in 25 participants (12.5%), while a family history of cardiovascular disease was reported by 85 of 199 participants (42.7%). Baseline characteristics are presented in Table 1.

The prevalence of physical inactivity was 30.5% (61 of 200; 95% CI 24.5–37.2). A further 31.5% of participants (63; 95% CI 25.5–38.2) were classified as moderately active and 38.0% (76; 95% CI 31.6–44.9) as highly active. Sedentary behaviour of 6 hours or more per day was reported by 66 of the 195 participants with valid sitting-time data (33.8%; 95% CI 27.6–40.7) (Table 1).

Table 1: Baseline characteristics of the study population

Variable	**Frequency (percentage) / Mean ± SD**
Sex	
Male	87 (43.7)
Female	112 (56.3)
Employment status	
Employed	138 (69.0)
Unemployed	27 (13.5)
Retired	35 (17.5)
Marital status	
Single	41 (20.5)
Married	136 (68.0)
Divorced	6 (3.0)
Widowed	9 (4.5)
Cohabiting	8 (4.0)
Economic level	
Level 1	4 (2.0)
Level 2	10 (5.0)
Level 3	89 (44.7)
Level 4	51 (25.6)
Level 5	45 (22.6)
Smoking	

Regular smoker	33 (16.5)
Occasional smoker	30 (15.0)
Never	120 (60.0)
Former smoker	17 (8.5)
Alcohol consumption	
Never	100 (50.0)
Once a month or less	58 (29.0)
2–4 times per month	30 (15.0)
2–3 times per week	9 (4.5)
4 or more times per week	3 (1.5)
Daily caloric intake	
Low	22 (11.0)
Moderate	144 (72.0)
High	34 (17.0)
Diabetes	
Yes	27 (13.5)
No	173 (86.5)
Hypercholesterolemia	
Yes	81 (40.5)
No	119 (59.5)
Hypertension	
Yes	80 (40.4)
No	118 (59.6)
Physical activity level	
Physical inactivity	61 (30.5)
Moderate activity	63 (31.5)
High activity	76 (38.0)
Sedentary behaviour ≥6 h/day	
Yes	66 (33.8)
No	129 (66.2)
Presence of cardiovascular disease	
Yes	25 (12.5)
No	175 (87.5)
Family history of cardiovascular disease	
Yes	85 (42.7)
No	114 (57.3)
Age (years)	48.20 ± 17.38
Years of education	13.29 ± 3.31
Body mass index (kg/m^2)	26.63 ± 4.36

SD, standard deviation. Percentages are calculated on non-missing observations. Sex, economic level and family history of cardiovascular disease were each missing for 1 participant; hypertension status was missing for 2 participants; and sitting time was missing for 5 participants.

3.2 Physical activity status and cardiometabolic characteristics

Table 2 summarises cardiometabolic and cardiovascular characteristics according to physical activity status. Hypertension was significantly more frequent among physically inactive participants (55.0%) than among those with sufficient physical activity (34.1%; odds ratio 2.37, 95% CI 1.27–4.39; $p = 0.007$). A family history of cardiovascular disease was also substantially more common in the inactive group (61.7% versus 34.5%; odds ratio 3.05, 95% CI 1.63–5.71; $p < 0.001$).

Diabetes mellitus was more frequent among physically inactive participants than among those with sufficient physical activity (19.7% versus 10.8%), although the difference was not statistically significant (odds ratio 2.02, 95% CI 0.88–4.63; $p = 0.115$). The distribution of body mass index categories did not differ significantly between the two groups ($p = 0.191$). Overweight was observed in 41.0% of inactive and 39.6% of sufficiently active participants, while obesity was present in 29.5% and 20.1%, respectively.

Hypercholesterolemia was reported by 37.7% of physically inactive and 41.7% of sufficiently active participants ($p = 0.641$). Cardiovascular disease was present in 13.1% of physically inactive participants compared with 12.2% of those with sufficient physical activity ($p = 0.821$). Sedentary behaviour of 6 hours or more per day was somewhat more frequent among physically inactive participants (39.3%) than among sufficiently active participants (31.7%), but this association was not statistically significant ($p = 0.320$). The two behaviours therefore identified overlapping but not equivalent groups within the study sample, although the study was not powered to exclude a moderate association (odds ratio 1.40, 95% CI 0.73–2.66) (Table 2).

Table 2: Association between physical activity status and cardiometabolic and cardiovascular characteristics

Variable	Category	Sufficient physical activity n (%)	Physical inactivity n (%)	p-value
BMI category	Underweight	2 (1.4)	2 (3.3)	0.191
	Normal weight	54 (38.8)	16 (26.2)	
	Overweight	55 (39.6)	25 (41.0)	
	Obesity	28 (20.1)	18 (29.5)	
Hypertension	Yes	47 (34.1)	33 (55.0)	0.007
	No	91 (65.9)	27 (45.0)	
Hypercholesterolemia	Yes	58 (41.7)	23 (37.7)	0.641
	No	81 (58.3)	38 (62.3)	
Diabetes mellitus	Yes	15 (10.8)	12 (19.7)	0.115
	No	124 (89.2)	49 (80.3)	
Cardiovascular diseases	Yes	17 (12.2)	8 (13.1)	0.821
	No	122 (87.8)	53 (86.9)	
Family history of CVD	Yes	48 (34.5)	37 (61.7)	<0.001
	No	91 (65.5)	23 (38.3)	
Sedentary ≥6 h/day	Yes	44 (31.7)	22 (39.3)	0.320
	No	95 (68.3)	34 (60.7)	

CVD, cardiovascular disease; BMI, body mass index. Sufficient physical activity comprises the moderate and high activity categories. Two-sided Fisher exact tests were used for binary characteristics and the Fisher–Freeman–Halton exact test for the body mass index categories, in which expected cell counts were below five. A p-value <0.05 was considered statistically significant.

3.3 Sociodemographic patterns of physical inactivity and sedentary behaviour

Table 3 presents the sociodemographic patterns of physical inactivity and sedentary behaviour. Physical inactivity differed significantly according to educational attainment (p = 0.013) and employment status (p = 0.008). The highest prevalence of physical inactivity was observed among participants with ≤8 completed years of education (51.5%), followed by retired participants (48.6%) and unemployed participants (40.7%). In comparison, physical inactivity was reported by 25.0% of participants with more than 12 years of education and by 23.9% of employed participants.

Sedentary behaviour showed an opposite educational pattern. Sitting for 6 hours or more per day was reported by 46.8% of participants with more than 12 years of education, compared with 23.5% of those with 9–12 years and 18.2% of those with ≤8 years of education (p = 0.001). Sedentary behaviour decreased descriptively across age groups, from 45.3% among adults aged 18–34 years to 24.3% among those aged 65 years or older, although this difference was not statistically significant (p = 0.145). Neither physical inactivity nor sedentary behaviour differed significantly according to sex (Table 3).

Table 3: Sociodemographic patterns of physical inactivity and sedentary behaviour

Characteristic	Category	Physical inactivity, n/N (%)	p-value	Sedentary behaviour ≥6 h/day, n/N (%)	p-value
Sex	Male	24/87 (27.6)	0.535	30/86 (34.9)	0.761
	Female	36/112 (32.1)		35/108 (32.4)	
Age group	18–34 years	18/56 (32.1)	0.173	24/53 (45.3)	0.145
	35–49 years	7/35 (20.0)		12/33 (36.4)	
	50–64 years	20/72 (27.8)		21/72 (29.2)	
	≥65 years	16/37 (43.2)		9/37 (24.3)	
Educational attainment	≤8 years	17/33 (51.5)	0.013	6/33 (18.2)	0.001
	9–12 years	19/70 (27.1)		16/68 (23.5)	
	>12 years	24/96 (25.0)		44/94 (46.8)	
Employment status	Employed	33/138 (23.9)	0.008	52/136 (38.2)	0.134
	Unemployed	11/27 (40.7)		5/24 (20.8)	
	Retired	17/35 (48.6)		9/35 (25.7)	

Percentages are row percentages calculated within each category on non-missing observations. Totals vary slightly across characteristics because sex and educational attainment were missing for 1 participant each and sitting time was missing for 5 participants. Pearson chi-square test was used for characteristics with more than two categories and two-sided Fisher exact test for binary characteristics.

4 DISCUSSION

In our study of 200 adults living in Tirana, close to one third were physically inactive (30.5%) and a very similar proportion reported sitting for six hours or more per day (33.8%). Although the two prevalences were almost identical in magnitude, they identified only partly overlapping groups: of the 100 participants who carried either risk, only 22 carried both. The proportion of highly sedentary participants was only modestly higher among the inactive than among the sufficiently active (39.3% versus 31.7%, p = 0.320), and the two behaviours followed opposite educational gradients. Physical inactivity was concentrated among participants with the lowest educational attainment and among those outside the labour force, whereas prolonged sitting was concentrated among the most highly educated. Of the cardiometabolic characteristics examined, only hypertension and family history of cardiovascular disease were significantly more frequent among physically inactive participants.

The prevalence of physical inactivity observed in our study is remarkably close to the global age-standardised estimate of 31.3% reported for 2022 (5) and almost identical to the 31.6% reported in an earlier survey of primary healthcare users in Tirana conducted in 2020–2021 (17). The convergence of two estimates obtained with the same instrument in the same city four years apart, in separately recruited samples and by the same investigators, suggests that physical inactivity in the adult population of Tirana has settled at a high plateau rather than continuing to increase. Our estimate is nevertheless considerably higher than the 21.6% reported by the nationally representative STEPS survey of Armenia (18). Part of this difference is likely to be methodological. The Armenian survey sampled adults aged 18 to 69 years, whereas our sample had no upper age limit, and inactivity was highest in the oldest group (43.2% among those aged 65 years or older), which the Armenian survey covered only up to age 69. Our sample was also drawn exclusively from an urban capital while the Armenian estimate is nationwide; capital cities in the region consistently report higher inactivity than rural areas, where agricultural and manual occupational activity still contributes substantially to weekly energy expenditure.

The most informative finding of our study is the inversion of the educational gradient between the two behaviours. Sitting for six or more hours per day was reported by 46.8% of participants with more than 12 years of education, compared with 18.2% of those with eight or fewer years, while physical inactivity showed exactly the reverse pattern (25.0% versus 51.5%). This divergence is socially coherent. In Tirana, higher educational attainment is closely tied to white-collar, desk-based employment and to car-based commuting, both of which accumulate sitting time while removing occupational and transport-related activity from the day; at the same time, this group retains access to organised recreational activity, which sustains its moderate-to-vigorous volume. Lower educational attainment, by contrast, is associated with manual or informal work and, in this sample, with retirement and unemployment, circumstances in which total daily sitting may be relatively low but structured moderate-to-vigorous activity is largely absent. This interpretation is consistent with broader evidence showing that sedentary behaviour in adults is associated with individual-level factors including socioeconomic status and physical activity levels, alongside social and environmental correlates (12).

Taken together, these observations support the argument that sedentary behaviour is not simply physical inactivity under another name (11). These findings are consistent with a recent review emphasizing that sedentary behaviour and physical inactivity are related but non-equivalent exposures, as prolonged screen-based sitting may contribute to cardiovascular risk even among individuals who meet recommended physical activity levels (23). The two exposures are defined on different axes and, in our data, they identified overlapping but distinct segments of the same population. This has an immediate consequence for surveillance: had we monitored only the WHO physical activity trichotomy, roughly two thirds of the highly sedentary participants in our sample would have been classified as being at no behavioural risk, because they met the activity recommendation. The prognostic relevance of that misclassification is supported by prospective evidence showing that the excess mortality risk associated with prolonged sitting disappears only in the most active quartile of adults, above approximately 35 MET-hours — some 2 100 MET-minutes — per week, a volume more than three times the 600 MET-minutes per week used here, and in surveillance more generally, to classify an adult as sufficiently active (9), and that below that volume sedentary time remains associated in dose–response fashion with all-cause and cardiovascular mortality, with a threshold of six to eight hours of daily sitting above which risk begins to rise, and linearly with incident type 2 diabetes (8–10).

Hypertension was significantly more frequent among physically inactive participants (55.0% versus 34.1%), which is consistent with the established contribution of insufficient activity to the development of raised blood pressure and, through it, to the cardiovascular disease burden attributed to inactivity worldwide (6,7). The association with family history of cardiovascular disease (61.7% versus 34.5%) is more difficult to interpret in a cross-sectional design. It may reflect genuine clustering of familial and behavioural risk within households, since activity habits, dietary patterns and body weight are strongly shared within families; it may also reflect differential recall, as participants who perceive themselves to be at risk tend to report family history more completely. Diabetes mellitus was almost twice as frequent among the inactive (19.7% versus 10.8%) and obesity was more common (29.5% versus 20.1%), but neither difference reached statistical significance (odds ratio 2.02, 95% CI 0.88–4.63 for diabetes and 1.66, 95% CI 0.83–3.30 for obesity), most plausibly because of limited statistical power rather than absence of effect.

No association was detected with prevalent cardiovascular disease (13.1% versus 12.2%, $p = 0.821$). This null result is unsurprising and should not be read as evidence of no relationship. Only 25 participants had cardiovascular disease, which leaves very little power to detect even a moderate difference, and the cross-sectional design cannot separate the two opposing directions of effect that operate simultaneously in prevalent cases: some patients reduce their activity after diagnosis, while others increase it as part of structured secondary prevention. Longitudinal designs with incident outcomes are required to resolve this. The age patterns observed reinforce the same message. Physical inactivity was highest among participants aged 65 years or older (43.2%), while prolonged sitting was highest among the youngest adults (45.3% among those aged 18–34 years), although neither gradient reached statistical significance in this sample. The age pattern for inactivity is consistent with the global finding that insufficient physical activity has increased among adults aged 60 years and above in every region and in both sexes (5). The concentration of sitting time among young adults is consistent with the expansion of screen-based study, work and leisure, and it again illustrates that the two behaviours peak in different segments of the same population.

The main strengths of our study are the use of a standardised international instrument with documented reliability and established comparability across surveillance systems (19–21), the application of the WHO GPAQ Analysis Guide for data cleaning and classification, which makes our estimates directly comparable with STEPS surveys elsewhere, and the simultaneous reporting of physical inactivity and sedentary behaviour in the same sample, which remains rare in the Albanian literature.

Several limitations should be acknowledged. The cross-sectional design precludes causal inference, while the small sample recruited from a single urban setting limits precision and generalisability to rural Albania. Physical activity and sitting time were self-reported and may therefore overestimate activity and underestimate sedentary behaviour. Moreover, the GPAQ assesses sitting through a single question without distinguishing domains or patterns of accumulation. Cardiometabolic conditions were also self-reported and not verified through measurements or medical records, potentially underestimating undiagnosed hypertension and diabetes. The analyses were unadjusted, so residual confounding by age, sex and other covariates remains possible; larger studies with multivariable modelling are needed. Finally, complete-case analysis was used, although the small number of missing observations makes substantial bias unlikely.

5 CONCLUSION

In our study, approximately one adult in three living in Tirana did not meet the World Health Organization recommendation for physical activity, and a similar proportion spent six or more hours per day sitting. These two groups overlapped only partially — of the 100 participants carrying either risk, only 22 carried both — and were distributed in opposite directions across the educational spectrum: physical inactivity clustered among adults with low educational attainment, the retired and the unemployed, whereas prolonged sitting clustered among the most highly educated and the youngest adults. Physical inactivity was significantly associated with hypertension and with a family history of cardiovascular disease, while its associations with diabetes, obesity and prevalent cardiovascular disease were in the expected direction but did not reach statistical significance in a sample of this size.

Physical inactivity and sedentary behaviour should therefore be treated as two distinct targets for surveillance and for intervention rather than as a single behavioural risk factor. Monitoring only the proportion of adults who meet the activity recommendation would leave a substantial and socioeconomically advantaged segment of the urban Albanian population unrecognised as being at behavioural risk. Larger population-representative studies, employing device-based measurement of both activity and sitting, multivariable adjustment and longitudinal follow-up, are needed to quantify the independent contribution of each behaviour to cardiovascular risk in this setting and to guide national prevention policy.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no financial or non-financial conflict of interest.

Statement of ethical approval

All procedures were carried out in accordance with the ethical standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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