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Factors associated with physical activity among adults with diabetes and hypertension in the Andaman and Nicobar Islands

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Original article

Abstract

Purpose: Regular physical activity is central to the management of Non-Communicable Diseases (NCDs) including Diabetes and Hypertension, with significant implications for glycemic control, blood pressure regulation and overall quality of life. However, physical activity patterns and factors associated with it in island populations such as South Andaman remain poorly documented.

Material and methods: A facility-based cross-sectional analytical study was conducted among 400 adults aged 18 years and above diagnosed with type 2 diabetes and/or hypertension who are currently on treatment.

Results: Among the total participants, the majority were females (55.5%) and aged below 60 years (68%). Moderate to high physical activity was reported by 77% of the participants. Among individuals with Diabetes, 25.6% reported low, 43.8% moderate and 30.6% high physical activity. Among those with Hypertension, 25.0% reported low, 42.4% moderate and 32.6% high activity levels. Participants with both Diabetes and Hypertension reported low activity in 19 (17.8%), moderate in 54 (50.5%) and high in 34 (31.8%). Physical activity levels were found to be significantly associated with age ($p < 0.001$), gender ($p = 0.040$), socioeconomic class ($p < 0.001$), type of family ($p < 0.001$), educational status ($p = 0.003$), employment status ($p < 0.001$), body mass index ($p < 0.001$) and sleep duration ($p = 0.041$) while religion, caste, marital status and resident status played no significance.

Conclusions: Overall, the findings suggest that majority of participants exhibited moderate to high physical activity and it appears to be associated with demographic and lifestyle factors than by the NCD itself.

Approval of ethics committee

This study received ethical approval from the Insitutional Ethics Committee, Andaman and Nicobar Islands Insitute of Medical Sciences: No. ANIIMS/IEC/2025/29, Sept 3rd, 2025.

Keywords

- physical activity
- diabetes
- hypertension
- non-communicable diseases
- Andaman and Nicobar Islands

Contribution

A – Preparation of the research project
B – Assembly of data
C – Conducting of statistical analysis
D – Interpretation of results
E – Manuscript preparation
F – Literature review
G – Revising the manuscript

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Conflict of interest

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Introduction

Non-communicable diseases (NCDs), particularly diabetes and hypertension, contribute substantially to global mortality and morbidity.[1,2] In 2021, over 43 million deaths worldwide – equivalent to nearly three-quarters of all non-pandemic deaths – were attributed to NCDs, underscoring their dominant role in premature mortality. Among these, diabetes and its complications directly accounted for more than 2 million deaths, while elevated blood glucose contributed to an additional 11% of cardiovascular deaths, indicating a major health burden linked to metabolic diseases.[3] In India, NCDs are responsible for the majority of deaths and years lived with disability, with rapidly rising prevalence of both diabetes and hypertension in adults in recent decades, reflecting lifestyle and demographic transitions.[4] Physical inactivity has been identified as a key modifiable risk factor driving the NCD burden, with inadequate activity contributing to hypertension, high blood glucose, and increased risk of cardiovascular disease. Regular physical activity plays a critical role in both prevention and management: adults are recommended to engage in at least 150 minutes of moderate-intensity aerobic activity per week (or equivalent), together with muscle-strengthening activities on two or more days, to derive significant health benefits including improved insulin sensitivity, blood pressure control, better lipid profiles, and reduced risk of premature mortality.[5,6] Among individuals already diagnosed with diabetes or hypertension, sustained physical activity is associated with improved glycaemic control, lower cardiovascular risk, and reduced progression of disease, highlighting its importance in comprehensive NCD care.[5] Despite established benefits, data on physical activity patterns among individuals already diagnosed with diabetes and hypertension remain limited, especially in geographically distinct settings such as the Andaman and Nicobar Islands representative of a unique population with specific demographic, occupational and lifestyle characteristics that may influence activity patterns differently from mainland population. Understanding the physical activity profile of adults living with chronic conditions in this setting is essential for designing context-specific interventions and strengthening non-communicable disease management at the community level. Therefore, the present study was undertaken to assess physical activity levels and their associated factors among adults with type 2 diabetes and/or hypertension in South Andaman.

Material and methods

A cross-sectional analytical study was conducted among 400 participants aged 18 years and above who were diagnosed with type 2 diabetes and/or hypertension and were on regular treatment. Individuals engaged in special exercise regimens for sports as well as those who were injured, physically disabled, cognitively impaired, pregnant or lactating were excluded from the study. The sample size was estimated using the formula for calculating prevalence in a cross-sectional study ($n = z^2p(1 - p) \div d^2$). A confidence level of 95% ($z = 1.96$) was considered with the prevalence of adequate physical activity among individuals with type 2 diabetes taken as 63% as reported by Chandran et al. and an absolute precision of 5%.[7] The calculated minimum required sample size was 359. To account for possible incomplete responses and to improve the overall robustness of the study, the final sample size was rounded up to 400 participants.

Participants were approached by trained data collectors consecutively; the purpose of study was explained in detail and informed consent was obtained. The study proforma was shared with them and data collectors helped the participants in case any query arose. Anthropometric measures were taken by the data collectors and interpreted in terms of Asian BMI classification.[8] The pretested pre-validated data collection proforma comprised of sociodemographic details of the participant followed by the International Physical Activity Questionnaire (IPAQ). Metabolic equivalent task (MET)-minutes per week were calculated by multiplying the duration and frequency of activities by their corresponding MET values (walking = 3.3 METs, moderate-intensity activity = 4.0 METs, and vigorous-intensity activity = 8.0 METs), as recommended in the IPAQ scoring protocol. Participants were subsequently categorized into low, moderate, or high physical activity levels according to the standard IPAQ classification criteria based on total MET-minutes/week and activity patterns. Moderate physical activity was defined as meeting any one of the following criteria: (i) vigorous-intensity activity on ≥3 days for at least 20 minutes per day; (ii) moderate-intensity activity and/or walking on ≥5 days for at least 30 minutes per day; or (iii) ≥5 days of any combination of walking, moderate-intensity, or vigorous-intensity activities achieving a minimum total physical activity of 600 MET-minutes/week. The high category included those achieving vigorous-intensity activity on at least 3 days accumulating at least 1,500 MET-minutes/week or any combination of activities

accumulating at least 3,000 MET-minutes/week. Participants not meeting these criteria were classified as having low physical activity.[9] The data collection was completed in three months after obtaining approval from Institutional Ethics Committee.

Data were entered and analyzed using SPSS v 26.0. Sociodemographic and clinical characteristics of the study participants were summarized using descriptive statistics. Categorical variables were presented as frequencies and percentages and stratified by non-communicable disease (NCD) status (Type 2 diabetes mellitus, hypertension, or both conditions), where appropriate. Physical activity levels were categorized as low, moderate, or high according to the IPAQ scoring protocol and presented as frequencies and percentages. Associations between physical activity categories and selected sociodemographic and clinical characteristics were assessed using the Chi-square test. Fisher's exact test was used when the assumptions of the Chi-square test were not met due to small expected cell frequencies. A p <0.05 was considered statistically significant.

Results

Out of the 400 participants, Hypertension was the most prevalent disease (43%), followed by diabetes (30.2%) and those who were affected by both the conditions (26.8%). The distribution of these conditions across various sociodemographic characteristics is depicted in Table 1.

Table 1. Distribution of non-communicable disease status according to sociodemographic characteristics among study participants (N = 400)

Sociodemographic variables		Non-communicable diseases*			
		Diabetes n (%)	Hypertension n (%)	Both n (%)	Total n (%)
Age	Less than 60 years	91 (33.5)	109 (40.1)	72 (26.4)	272 (100.0)
	More than 60 years	30 (23.5)	63 (49.2)	35 (27.3)	128 (100.0)
Education	No education	32 (24.6)	61 (46.9)	37 (28.5)	130 (100.0)
	Primary education	20 (29.9)	25 (37.3)	22 (32.8)	67 (100.0)
	Secondary education	51 (34.5)	61 (41.2)	36 (24.3)	148 (100.0)
	Higher education	18 (32.7)	25 (45.5)	12 (21.8)	55 (100.0)
Gender	Male	47 (26.4)	89 (50.0)	42 (23.6)	178 (100.0)
	Female	74 (33.3)	83 (37.4)	65 (29.3)	222 (100.0)
Current employment status	Working	56 (31.6)	80 (45.2)	41 (23.2)	177 (100.0)
	Not working	65 (29.1)	92 (41.3)	66 (29.6)	223 (100.0)
Socioeconomic status	Upper	14 (40.0)	14 (40.0)	7 (20.0)	35 (100.0)
	Upper Lower	50 (25.5)	85 (43.4)	61 (31.1)	196 (100.0)
	Upper Middle	18 (35.3)	22 (43.1)	11 (21.6)	51 (100.0)
	Lower Middle	24 (38.7)	21 (33.9)	17 (27.4)	62 (100.0)
	Lower	15 (26.8)	30 (53.6)	11 (19.6)	56 (100.0)
Religion	Hindu	83 (28.4)	130 (44.5)	79 (27.1)	292 (100.0)
	Muslim	28 (36.4)	28 (36.4)	21 (27.2)	77 (100.0)
	Christian	10 (32.2)	14 (45.2)	7 (22.6)	31 (100.0)
Caste	General	90 (29.1)	137 (44.3)	82 (26.5)	309 (100.0)
	Others	31 (34.0)	35 (38.5)	25 (27.5)	91 (100.0)

Sociodemographic variables		Non-communicable diseases*			
		Diabetes n (%)	Hypertension n (%)	Both n (%)	Total n (%)
Type of family	Nuclear	67 (32.1)	93 (44.5)	49 (23.4)	209 (100.0)
	Joint	46 (29.1)	63 (39.9)	49 (31.0)	158 (100.0)
	Extended	8 (24.2)	16 (48.5)	9 (27.2)	33 (100.0)
Marital status	Married	111 (31.3)	154 (43.4)	90 (25.3)	355 (100.0)
	Others	10 (22.2)	18 (40.0)	17 (37.8)	45 (100.0)
Residence	Native island resident	116 (30.8)	159 (42.2)	102 (27.1)	377 (100.0)
	Non-native resident	5 (21.7)	13 (56.6)	5 (21.7)	23 (100.0)

*Note: Values are presented as n (%). Percentages were calculated within each category of the sociodemographic variable and represent the distribution of participants across the three non-communicable disease groups (type 2 diabetes mellitus, hypertension, and both conditions). Percentages therefore sum to 100% across each row. Percentages may not total exactly 100% because of rounding.

Hypertension was found to be more common among participants aged more than 60 years (49.2%) while prevalence of type 2 diabetes was threefold more among younger age group (30 vs 91 among participants with less and more than 60 years of age respectively). Females showed a somewhat equal prevalence of type 2 diabetes (33.3%), hypertension (37.4%) and comorbid status (29.3%) compared to males, among whom Hypertension was more prevalent (50.0%). Marked variation was observed across socioeconomic strata – hypertension predominated among the upper lower (43.4%), upper middle (43.1) and lower (53.6%) socioeconomic status (SES) groups – while diabetes alone was strikingly more common among upper (40.0%) and lower middle (38.7%) SES groups. Notably, among Hindus, hypertension and comorbid condition accounted for nearly 72% of cases while among Muslims and Christians the burden of hypertension and diabetes was comparable. Extended family type showed only 8% of NCD burden while the remaining 92% burden was shared majorly by nuclear family members (52.3%) followed by joint family members (39.5%). These patterns suggest that disease distribution varies considerably across sociodemographic subgroups.

Among lifestyle characteristics, the distribution of NCDs varied across BMI categories and sleep duration, as depicted by Table 2.

Tabele 2. Distribution of non-communicable disease status according to clinical characteristics among study participants (N = 400)

Lifestyle characteristics		Non-communicable diseases*			
		Diabetes n (%)	Hypertension n (%)	Both n (%)	Total n (%)
BMI (Asian classification)	Underweight	3 (25.0)	8 (66.7)	1 (8.3)	12 (100.0)
	Normal	29 (33.7)	40 (46.5)	17 (19.8)	86 (100.0)
	Overweight	23 (29.5)	28 (35.9)	27 (34.6)	78 (100.0)
	Obese	66 (29.5)	96 (42.9)	62 (27.6)	224 (100.0)
Number of hours of sleep	Adequate	69 (31.4)	88 (40.0)	64 (28.6)	221 (100.0)
	Inadequate	52 (29.1)	84 (46.9)	43 (24.0)	179 (100.0)

*Note: Values are presented as n (%). Percentages were calculated within each category of the sociodemographic variable and represent the distribution of participants across the three non-communicable disease groups (type 2 diabetes mellitus, hypertension, and both conditions).

Hypertension alone was the most prevalent category across all BMI groups. Underweight participants showed the highest proportion of hypertension alone (66.7%), while those who were overweight had a comparatively higher burden of both NCD types. Obese participants, who constituted the largest subgroup (n = 224), showed a distribution similar to the overall sample, with hypertension alone being most prevalent (42.9%), followed by diabetes alone (29.5%) and both conditions combined (27.6%). Regarding sleep, participants getting inadequate sleep had a higher proportion of hypertension alone (46.7%) compared to those with adequate sleep (40.0%). These patterns suggest that BMI and sleep duration may influence the distribution of disease categories, with overweight status being associated with a higher burden of multiple comorbidities.

As per MET score categories of IPAQ, physical activity was categorised into high, moderate and severe. Activity levels of the study participants are depicted in Figure 1.

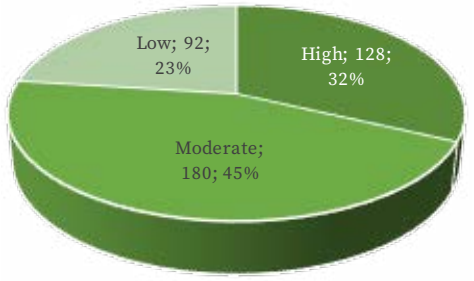

Figure 1. Distibution of physical activity levels among adults with type 2 diabetes and/or hypertension in South Andaman according to IPAQ classification (N = 400)

High physical activity was exhibited by 127 people (31.8%), moderate by 180 (45%) and low by 93 (23.2%) participants. If high or moderate physical activity is considered as 'adequate' physical activity then it can be interpreted that the majority (77%) of participants have adequate physical activity. The distribution of physical activity among the participants across various NCD profiles is depicted in Figure 2.

The distribution of physical activity levels across non-communicable disease categories revealed that participants with hypertension alone demonstrated the highest proportion of high physical activity (32.6%), followed closely by those with both conditions combined (31.8%) and diabetes alone (30.6%). Regarding sedentary behavior, participants with only diabetes and only hypertension showed comparable proportions of low physical activity (25.6% and 25.0% respectively), while participants with both conditions combined had the lowest proportion of low physical activity (17.8%), suggesting a relatively more active profile in this subgroup despite carrying a dual disease burden. Moderate physical activity was the predominant category across all three groups, being highest among participants with both conditions combined (50.5%) compared to hypertension alone (42.4%) and diabetes alone (43.8%). Overall, while differences across disease categories were modest, participants with diabetes alone and hypertension alone exhibited comparatively more sedentary behavior than those with both conditions combined.

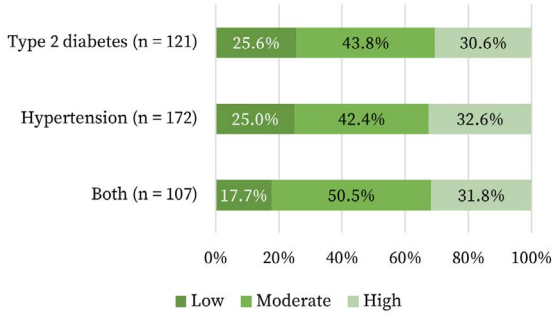

Figure 2. Distibution of physical activity levels among participants with type 2 diabetes mellitus and/or hypertension (N = 400)

Note: Physical activity levels were classified as low, moderate, or high according to the International Physical Activity Questionnaire–Short Form (IPAQ-SF). Percentages are calculated within each disease category and therefore sum to 100% across each horizontal bar.

The distribution of physical activity levels across non-communicable disease categories revealed that participants with hypertension alone demonstrated the highest proportion of high physical activity (32.6%), followed closely by those with both conditions combined (31.8%) and diabetes alone (30.6%). Regarding sedentary behavior, participants with only diabetes and only hypertension showed comparable proportions of low physical activity (25.6% and 25.0% respectively), while participants with both conditions combined had the lowest proportion of low physical activity (17.8%), suggesting a relatively more active profile in this subgroup despite carrying a dual disease burden. Moderate physical activity was the predominant category across all three groups, being highest among participants with both conditions combined (50.5%) compared to hypertension alone (42.4%) and diabetes alone (43.8%). Overall, while differences across disease categories were modest, participants with diabetes alone and hypertension alone exhibited

comparatively more sedentary behavior than those with both conditions combined.

The mean time spent sitting on weekdays was reported to be 3.17 ± 2.05 hours per day. On weekends, the average sitting time increased to 3.93 ± 3.36 hours per day. The total time spent sitting per week was 24.88 ± 12.97 hours. Overall, the average time spent sitting per day was 3.56 ± 1.85 hours. The observed increase in sitting time from weekdays to weekends can be of clinical significance in a population already burdened with diabetes and/or hypertension. When examined by disease category, participants with both conditions combined recorded the highest mean weekly sitting time (26.72 ± 15.25 hours/week), followed by those with hypertension alone (24.44 ± 12.66 hours/week) and diabetes alone (23.88 ± 11.01 hours/week).

Participants aged less than 60 years showed a higher proportion of moderate and high physical activity, whereas those aged 60 years and above were more likely to report low physical activity ($\chi^2 = 36.803$, $p < 0.001$). A significant association was also observed with gender ($\chi^2 = 6.459$, $p = 0.040$); females reported a higher proportion of moderate activity, while males had a comparatively greater proportion of high physical activity. Given the inadequate number of participants in certain socioeconomic categories of the Modified Kuppuswamy Classification, the categories were collapsed for analysis – upper and upper middle were combined into a single upper middle category and upper lower and lower were merged into a lower category. Individuals belonging to the middle socioeconomic group demonstrated relatively higher levels of high physical activity ($\chi^2 = 25.372$, $p < 0.001$), while those in the upper and lower socioeconomic groups showed variation across activity categories. Type of family was significantly related to physical activity ($\chi^2 = 25.865$, $p < 0.001$), with participants from nuclear families reporting higher levels of high physical activity compared to those from joint families, among whom moderate activity was more common. Educational attainment also influenced activity levels ($\chi^2 = 19.440$, $p = 0.003$), as participants with secondary and higher education reported greater proportions of high physical activity compared to those without formal education. Employment status showed a strong association ($\chi^2 = 65.426$, $p < 0.001$), with working individuals more likely to engage in high physical activity, whereas non-working participants predominantly reported moderate activity levels. In contrast, no statistically significant association was observed between physical activity and religion ($\chi^2 = 4.444$, $p = 0.349$), caste ($\chi^2 = 0.650$, $p = 0.722$), marital status ($\chi^2 = 4.970$, $p = 0.083$) or resident status ($\chi^2 = 1.179$, $p = 0.555$). The associations described are depicted in Table 3.

Table 3. Association between sociodemographic characteristics and physical activity levels among adults with type 2 diabetes mellitus and/or hypertension in South Andaman (N = 400)

Sociodemographic factors		Physical activity level n (%)*			Chi-square	*P*-value
		Low	Moderate	High		
Age	Less than 60 years	47 (17.3)	114 (41.9)	111 (40.8)	36.803	<0.001
	More than 60 years	46 (35.9)	66 (51.6)	16 (12.5)		
Gender	Male	44 (24.7)	68 (38.2)	66 (37.1)	6.459	0.040
	Female	49 (22.0)	112 (50.5)	61 (27.5)		
Socioeconomic status	Upper	14 (40.0)	15 (42.9)	6 (17.1)	25.372	<0.001
	Middle	14 (12.4)	45 (39.8)	54 (47.8)		
	Lower	65 (25.8)	120 (47.6)	67 (26.6)		
Religion	Hindu	66 (22.6)	126 (43.2)	100 (34.2)	4.444	0.349
	Muslim	21 (27.2)	36 (46.8)	20 (26.0)		
	Christian	6 (19.4)	18 (58.1)	7 (22.6)		
Caste	General	69 (22.3)	141 (45.6)	99 (32.0)	0.650	0.722
	Others	24 (26.3)	39 (42.9)	28 (30.8)		

Sociodemographic factors		Physical activity level n (%)*			Chi-square	*P*-value
		Low	Moderate	High		
Type of family	Nuclear	46 (22.0)	74 (35.4)	89 (42.6)	25.865	<0.001
	Joint	40 (25.3)	88 (55.7)	30 (19.0)		
	Extended	7 (21.2)	18 (54.6)	8 (24.2)		
Marital status	Married	84 (23.7)	153 (43.1)	118 (33.2)	4.970	0.083
	Divorced/ Separated/ Widowed	9 (20.0)	27 (60.0)	9 (20.0)		
Resident status	Native island resident	86 (22.8)	172 (45.6)	11 (31.6)	1.179	0.555
	Non-native resident	7 (30.4)	8 (34.8)	8 (34.8)		
Education	No education	37 (28.5)	67 (51.5)	26 (20.0)	19.440	0.003
	Primary	15 (22.4)	33 (49.3)	19 (28.4)		
	Secondary	34 (23.0)	53 (35.8)	61 (41.2)		
	Higher	7 (12.7)	27 (49.1)	21 (38.2)		
Current employment status	Working	23 (13.0)	61 (34.5)	93 (52.5)	65.426	<0.001
	Not working	17 (31.4)	119 (53.4)	34 (15.2)		

*Note: Percentages are calculated within each row and may not total 100% due to rounding.

Body mass index (BMI), however, showed a statistically significant association with physical activity levels ($\chi^2 = 43.950$, $p < 0.001$). A markedly higher proportion of underweight participants reported low physical activity, whereas individuals with normal BMI, overweight and obesity demonstrated a greater distribution across moderate and high activity categories. Moderate physical activity was more commonly observed among overweight and obese participants, while high physical activity was reported in appreciable proportions among those with normal BMI and overweight. Number of hours of sleep was also significantly associated with physical activity ($\chi^2 = 6.373$, $p = 0.041$). Participants with higher physical activity were associated with adequate sleep while participants with low physical activity reported inadequate sleep. On analysis no statistically significant association was observed between chronic disease status and physical activity levels ($\chi^2 = 2.995$, $p = 0.559$), as depicted in Table 4.

Table 4. Association between clinical characteristics and physical activity levels among adults with type 2 diabetes mellitus and/or hypertension in South Andaman (N = 400)

Clinical factors		Physical activity level n (%)**			Chi-square / Fischer's Exact Value	P-value
		Low	Moderate	High		
Chronic diseases	Diabetes	31 (25.6)	53 (43.8)	37 (30.6)	2.995	0.559
	Hypertension	43 (25.0)	73 (42.4)	56 (32.6)		
	Both	19 (17.7)	54 (50.5)	34 (31.8)		

Clinical factors		Physical activity level n (%)**			Chi-square / Fischer's Exact Value	P-value
		Low	Moderate	High		
BMI	Underweight	11 (91.7)	1 (8.3)	0 (0)	35.877*	<0.001
	Normal	28 (32.6)	30 (34.8)	28 (32.6)		
	Overweight	16 (20.5)	33 (42.3)	29 (37.2)		
	Obese	38 (17.0)	116 (51.7)	70 (31.3)		
Number of hours of sleep	Adequate	43 (19.5)	111 (50.2)	67 (30.3)	6.373	0.041
	Inadequate	50 (28.0)	69 (38.5)	60 (33.5)		

*Fischer's Exact test was applied.
**Percentages are calculated within each row and may not total 100% due to rounding.

Discussion

Physical activity has been proven to have a protective effect against lifestyle diseases including diabetes and hypertension.[3] The systematic review and meta-analysis by W. Geidl et al. in 2020 even reports a dose-response relationship with physical activity and mortality in adults with NCDs where increase of 10 MET hours of physical activity decreased the mortality by 4% in type 2 diabetes patients (HR, 0.96; 95% CI: 0.93, 0.99; I: 71.8%).[10] This study examined physical activity patterns among adults with type 2 diabetes, hypertension or both conditions in South Andaman and explored their relationship with sociodemographic and lifestyle factors. Moderate physical activity was the most commonly reported level across all three groups, which aligns with the recommended levels by Indian Council for Medical Research, New Delhi.[11] However, the distribution of low, moderate and high physical activity was comparable across the three disease categories. This could be due to the possible stronger role of sociodemographic factors in determining activity levels than disease category itself, as suggested by the significant associations observed with age, education, employment and socioeconomic status.

The notably higher sedentary time among participants carrying a dual burden of diabetes and hypertension is of particular clinical concern, as prolonged sitting is an independent risk factor for poor glycemic control, elevated blood pressure and adverse cardiovascular outcomes – all of which are already compounded in individuals managing both conditions simultaneously. These findings suggest that targeted interventions to reduce sedentary behavior, particularly among those with multiple comorbidities, may be an important component of chronic disease management in this population.

Participants below 60 years were significantly more likely to report moderate and high activity levels, while those aged 60 years and above more frequently reported low activity. This pattern is not unexpected, as increasing age is often accompanied by reduced mobility and lower overall physical engagement. Gender was also significantly associated with activity levels. Females more commonly reported moderate activity, whereas males showed a relatively higher proportion of high activity. These associations with age and gender are in accordance with the majority of the available literature.[12-14]

Socioeconomic class, education and employment status were significantly associated with physical activity. Participants belonging to the upper and lower middle socioeconomic groups and those with secondary or higher educational attainment were more likely to report high levels of physical activity. This finding may reflect differences in health literacy, access to health-related information, and awareness of the benefits of physical activity for the prevention and management of chronic diseases. Individuals with higher educational attainment may be better positioned to understand and implement lifestyle recommendations provided by healthcare professionals. The relationship between socioeconomic status and physical activity is likely multifactorial and may reflect differences in occupational demands, access to resources, and adoption of health-promoting behaviours. These findings are further supported by evidence from the cross-sectional study conducted by L.S.L. da Silva et al. among 789 Brazilian hypertensives in 2022 and the European case control study of Carlos Llamas-Saez et al. conducted among 2053 matched pairs in 2020.[13,14] However, there has also been studies, such as that of Emma Cho where a secondary data analysis of 541 American participants was conducted in 2024, which reported significant

prevalence of higher physical activity among older adults with diabetes.[15] Present study also reported that working individuals were more likely to fall into the high activity category, while non-working participants more frequently reported moderate levels. Type of family also showed a significant association. These findings indicate that structured daily engagement, occupational demands and possibly greater health awareness may contribute to higher activity levels.

Body mass index was significantly associated with physical activity. A large proportion of underweight individuals reported low activity, whereas participants with normal BMI, overweight and obesity were more evenly distributed across moderate and high activity categories. This may reflect attempts at lifestyle modification among individuals with higher BMI who are already under treatment for chronic conditions. Previous studies have also reported associations between BMI and physical activity among individuals with NCDs, although the magnitude of this relationship varies across settings and populations.[16,17] The comparatively lower activity observed among underweight participants may reflect reduced functional capacity or other health-related limitations that were not captured in the present study. As the study was cross-sectional, the temporal relationship between BMI and physical activity could not be determined. Alongside BMI, sleep duration was also related to activity levels. Participants reporting adequate sleep showed higher proportions of moderate activity compared to those with inadequate sleep. This relationship highlights the close link between lifestyle patterns and physical activity behaviour. Although moderate physical activity was common (45%), the mean daily sitting time exceeded three hours, indicating that sedentary behaviour remains considerable in this population. This coexistence of moderate activity with prolonged sitting warrants attention, particularly in individuals with cardiometabolic conditions.

An interesting finding of the present study was the comparatively lower sedentary behavior and higher levels of moderate physical activity observed among participants with both type 2 diabetes mellitus and hypertension. One possible explanation is that individuals living with multiple chronic conditions may have more frequent interactions with healthcare providers, resulting in greater exposure to lifestyle modification advice, including recommendations regarding regular physical activity. Increased disease awareness and perceived susceptibility to complications may also encourage engagement in health-promoting behaviors. Alternatively, the observed association may reflect reverse causality, whereby individuals who are more adherent to recommended lifestyle practices are also more likely to remain engaged with healthcare services and chronic disease management. As these factors were not directly assessed in the present study, further research is needed to better understand the mechanisms underlying this observation.

This study included a substantial sample of adults with type 2 diabetes and/or hypertension from South Andaman and utilized a standardized instrument (IPAQ-7 days). However, physical activity was assessed through self-report and may therefore be subject to recall error and social desirability bias, potentially resulting in overestimation of activity levels. Furthermore, the facility-based recruitment strategy may limit the representativeness of the sample, as participants attending healthcare facilities may actively pursue lifestyle modifications including exercise routines and dieting and therefore, not fully reflect the broader community of individuals living with type 2 diabetes and hypertension. Consequently, the generalizability of the findings beyond similar healthcare settings should be interpreted with caution. The analysis was limited to descriptive and bivariate statistical methods; consequently, the observed associations were not adjusted for potential confounding factors, and therefore, confidence intervals for effect estimates were not available. Future studies employing multivariable regression approaches may provide a more robust assessment of independent factors associated with physical activity.

Overall, the findings suggest that physical activity levels were more strongly associated with sociodemographic and lifestyle characteristics than with disease status among adults with type 2 diabetes and/or hypertension in South Andaman. Interventions aiming to promote physical activity may therefore benefit from particular attention to older adults, non-working individuals, and those with lower educational attainment.

Conclusions

In the present study, three-fourths of the participants reported moderate to high physical activity. Sociodemographic factors such as age, gender, socioeconomic class, type of family, educational status, employment status, BMI and sleep duration was found to be statistically associated with physical activity levels. Since physical activity was significantly associated with these modifiable factors than the disease status, NCD care protocols should incorporate routine physical activity screening alongside targeted behavioural interventions for older, less-educated, and economically disadvantaged patients – groups demonstrably at greatest risk of sustained inactivity.

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