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Research Article

Physical Activity and Associated Socioeconomic Determinants in Rural and Urban Tanzania: Results from the 2012 WHO-STEPS Survey

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Background. Physical inactivity contributes to the rising prevalence of noncommunicable diseases (NCDs). Given the rapidly increasing prevalence of NCDs in Low-Income Countries (LICs), comprehensive evaluation and documentation of physical activity (PA) status in this setting are crucial. *Methods*. We examined the demographic and social-economic antecedents of PA among adults (5398) from the 2012 Tanzania STEPS survey data. Statistical significance at the level of 0.05 was used to measure the strength of associations. *Results*. Majority of study participants attained the WHO-recommended levels of physical activity (96.7%). Levels were higher among those living in rural than in urban settings (98% versus 92%, $p < 0.0001$) and generally, urban residency, female gender, higher education achievement, and employment were significantly associated with low levels of PA. Participation in the different domains of PA (work, transport, and recreational) varied with living setting, levels of education, and employment status. *Conclusion*. These results describe PA status and associated social-economic determinants among adults in rural and urban Tanzania. The findings contribute to the growing evidence that implicates urbanization as a key driver for the growing prevalence of physical inactivity in LICs and underscore the need for tailored PA interventions based on demography and social-economic factors.

1. Introduction

Changes in lifestyle that emanates from urbanization have triggered a shift in determinants of health leading to an increase in noncommunicable diseases (NCDs) in low-income countries (LICs) [1–3]. There is a substantial increase in the overall cardiovascular risk factors in both low- and middle-income countries, especially in urban areas [3–6]. The effects of urbanization therefore need to be continuously monitored. Knowledge on rural-urban differences in social-economic determinants of diseases will help to understand the dynamics of NCDs and related risk factors in a low-income setting [4, 5, 7–10].

Physical activity (PA) is known to prevent and treat a number of NCDs, subsequently improving the overall life expectancy [11]. Estimates from the World Health Organization (WHO) indicate that physical inactivity, which is a fourth leading risk factor for global mortality, is responsible for approximately 3.2 million premature deaths globally [12]. Indeed regular PA results in a decreased risk for many diseases like type 2 diabetes mellitus (T2DM) and coronary heart diseases (CHD) as well as all-cause mortality [13–15]. A growing body of evidence shows a rapidly increasing physical inactivity problem in LICs, especially in urban areas [16].

In light of the health benefits and based on evidence, WHO has put forward global recommendations on PA necessary to maintain health and prevent diseases [17]. These recommendations require adults to execute at least 150 and 75 minutes of moderate and vigorous PA per week, respectively, or an equivalent combination of moderate to vigorous PA (MVPA) [17]. This is equivalent to an energy expenditure of more than 600 Metabolic Equivalent of Task-minutes per week (MET-minutes per week) and is considered as sufficient PA [18]. Based on these recommendations, in 2010, 23% of adults were insufficiently active globally, with the highest and lowest prevalence of insufficient PA coming from North America and Southeast Asia, respectively [17]. The prevalence of insufficient PA in African region in the year 2010 was 21% [17].

The global physical activity questionnaire (GPAQ) is one of the tools used in WHO stepwise approach to surveillance (STEPS survey). This tool offers an opportunity to collect comprehensive information on PA. Despite some practical and validity challenges that may pose limitations on data interpretation and inference, GPAQ has a high degree of reproducibility, making it a good tool for continuous PA monitoring [19–23]. While STEPS surveys are conducted regularly in many countries, published reports on the status and patterns of PA in sub-Saharan Africa (SSA) are limited. Given the current lifestyle dynamics in SSA, continuous documentation of PA status in different countries is of paramount importance. Along with this, by comparing data from different countries the reliability and reproducibility of the GPAQ are indirectly being assessed.

We therefore analyzed PA data from the 2012 WHO-STEPS survey to explore the social-economic determinants of PA in Tanzania, particularly focusing on rural-urban differences. This analysis will not only provide baseline evidence for surveillance, but also instill knowledge that will guide policy and help in executing tailored PA promotions in specific groups.

2. Methods

2.1. Sample Population. The whole STEP survey employed a sample of 5770 representative citizens of Tanzania that was selected using multistage cluster and random sampling procedures. Districts served as primary sampling units. For physical activity analysis a subsample of 5398 people (2183 and 2400 males and females, resp.) with complete and valid physical activity (PA) data was drawn from the whole survey sample and included in the current analysis. The sample population was stratified according to age, gender, residential setting, employment status, income, and education levels.

2.2. Data Collection Instrument. Data collection was done using the modified WHO stepwise approach to NCD risk factors Surveillance Instrument [24]. The survey questionnaire that includes a comprehensive PA questionnaire was translated into Kiswahili and was adapted to suit the local population environment and practices.

2.3. Data Collection Methods. The questionnaire captured all the necessary and important social-demographic information including behavioral measures. In addition the questionnaire also contained measures of socioeconomic status, diet, and PA that were also self-reported. All physical measurements were done according to standardized methods outlined in the STEPS survey manual [24].

2.4. Assessment of Physical Activity. Physical activity was assessed using the global physical activity questionnaire (GPAQ). This questionnaire collects information on PA participation in three settings (or domains): activity at work (work or occupational physical activity), travel to and from places (active travel), and on leisure time physical activity (recreational physical activities), as well as sedentary behavior.

The amount spent doing physical activity was quantified using Metabolic Equivalent of Task (MET), which is the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1 kcal/kg/hour. It is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active and eight times as high when being vigorously active. Therefore, when calculating a person's overall energy expenditure 4 METs were assigned to the time spent in moderate activities and 8 METs to the time spent in vigorous activities [25]. A combination of moderate and vigorous physical activity (MVPA) was considered for work and recreation activities (work-MVPA and recreational-MVPA).

Low levels of physical activity were defined as <600 MET-minutes per week and high levels of physical activity were defined as defined as ≥3000 MET-minutes per week. Low levels of physical activity (<600 MET-minutes/week) were considered as insufficient physical activity.

2.5. Ethical Considerations. Ethical clearance was obtained from the ethical committee of National Institute for Medical Research of Tanzania and all necessary permissions sought from relevant authorities. The study was conducted maintaining all possible ethical considerations including obtaining written informed consent from the study subjects. The respondents had the right to refuse to answer any question without providing the reason for their decisions and could withdraw from the study at any time. The information was dealt with highest confidentiality and used only for this study.

2.6. Data Management and Analysis. The data from the field was downloaded from the personal digital assistant (PDA) using Epi data version 3.1 software which was then exported on MS-Excel and Statistical Package for Social Sciences version 20 for windows (SPSS Inc., Chicago, USA) for cleaning and cross-checking inconsistencies and outliers and analysis. Descriptive analysis was presented in tables and figures. Associations between variables (dependent and independent variables) were tested using Chi-squire. Sophisticated survey data analysis was performed to obtain population estimates and their 95% confidence intervals. Differences or association between variables were considered statistically significant if p value was <0.05. Logistic regression was used for modeling multiple factors associated with low levels of physical activity (≤600 MET) and highest level of physical activity (≥3000 MET). Crude and Adjusted Odds Ratios (OR) with 95% confidence intervals (CI) were reported. In analyzing the data for diabetes cases those with impaired fasting glucose were excluded from the analysis and vice versa.

3. Results

3.1. Social-Demographic Characteristics. Out of the 5680 participants included in the STEPS survey, 5398 (95.04%) had complete and valid physical activity (PA) data and therefore were included in the current analysis. The majority of participants included came from rural areas and were self-employed (75.99% and 70%, resp.). Only 10.3% of these participants had attained more than a primary education (secondary, 7.5%; tertiary 2.8 %). The social-demographic characteristics of the participants are summarised in Table 1. In general, there were slightly more male than female participants (53.8% versus 46.2%).

3.2. Status of the Study Population Based on WHO-Recommended Physical Activity Levels. The distribution of the study population by categories of physical activity (based on WHO criteria using MET-minutes per week) is shown in Table 2. In general, majority of the study participants (96.7%) achieved the WHO-recommended PA levels (>600 MET/week) and are considered to be sufficiently active. The proportion of participants achieving this level was significantly higher in the rural compared to urban settings (98.0% versus 92.6%, $p < 0.0001$). Based on WHO-recommendations urban settings had the highest proportion of insufficiently active participants (<600 METS/week) when compared to rural settings (7.4% versus 2.0%, $p < 0.0001$). Significantly more females than males, were not achieving the WHO-recommended PA levels (4.1% versus 2.3%, $p < 0.0001$). In the occupation category the proportion of participants achieving the WHO-recommended PA levels was highest among nonpaid (98.1%) and self-employed (97.9%) compared to employed participants (93.6%, $p < 0.0001$). In comparison with other education categories (primary: 2.6%; none/not completed primary: 3.4%) the two postprimary education categories (secondary and tertiary) had higher proportions (6.6% and 6.5%, resp.) of participants who were considered insufficiently active according to WHO cut-off ($p < 0.0001$).

3.3. Prevalence of Physical Inactivity for Each Physical Activity Domain in Rural and Urban Tanzania. Among the three domains of PA, the prevalence of physical inactivity was the highest in the recreation category (recreation: 71.9%, transport: 10.6%, and work-related: 8.9%), and in general there was a tendency for less participation in moderate to vigorous recreational PA (recreation-MVPA) among rural, compared to urban dwellers. Compared to those living in rural, significantly more people in the urban settings did not engage in active travel (AT) (9.6% in rural versus 13.8% in urban, $p < 0.0001$) or moderate to vigorous work-related PA (work-MVPA) (15.4% in rural versus 7.0% in urban, $p < 0.0001$). The proportion of employed participants who were neither engaging in AT (12.8%) nor work-MVPA (16.8%) was significantly higher compared to none- and self-employed participants (in both cases $p < 0.0001$). When compared to other education categories (with or without primary education), participants in the categories with postprimary education (secondary and tertiary education categories) were less likely to engage in either AT or work-MVPA, but they were more likely to participate in recreational-MVPA than either of the other groups. Table 3 summarises the prevalence of physical inactivity in different PA domains (transport, work, and recreational) categorised according to social-demographic characteristics *(within group comparison)*.

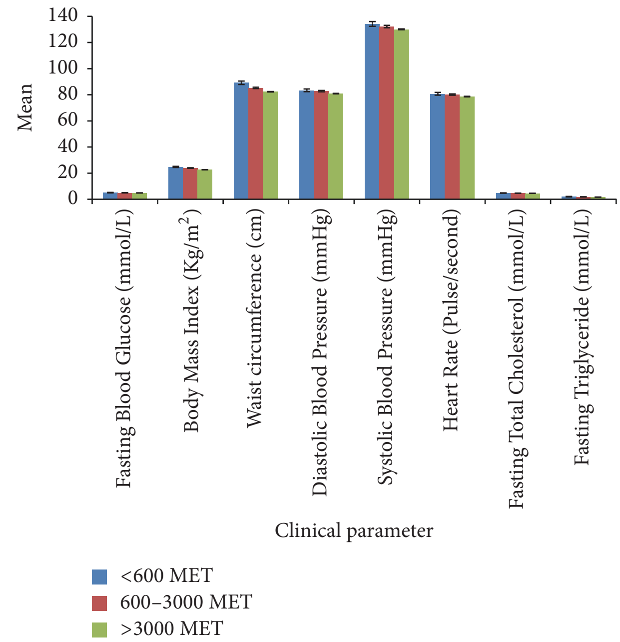

Figure 1: A dose-response relationship between physical activity levels (METS-minutes per week) and a number of cardio metabolic parameters.

3.4. Correlates of Low and High Levels of PA. Figure 1 portrays a dose-response relationship between physical activity levels (METS per week) and a number of clinical parameters. There was a negative linear relationship between physical activity levels (estimated as METS-minutes per week) and a number of clinical parameters. Mean BMI, waist circumference, systolic and diastolic BP, heart rate, and serum triglycerides showed a significant and successive decrease with increasing levels of PA. In a multivariate analysis living setting, gender, and employment status (living in urban

Table 1: Distribution of study population according to settings/residence.

Demographic factor	Total, $n = 5680$ (%)	Setting Rural, $n = 4316$ (%)	Urban, $n = 1364$ (%)
Age group (n = 5398)			
25–34	1866 (32.9)	1381 (32.0)	485 (35.6)
35–44	1658 (29.2)	1279 (29.6)	379 (27.8)
45–54	1252 (22.0)	977 (22.6)	275 (20.2)
55–64	904 (15.9)	679 (15.7)	225 (16.5)
Sex			
Female	2622 (46.2)	2229 (51.6)	829 (60.8)
Male	3058 (53.8)	2087 (48.4)	535 (39.2)
Occupation			
Employed	477 (8.4)	310 (7.2)	167 (12.3)
Self-employed	4000 (70.4)	3190 (73.9)	810 (59.5)
Nonpaid	381 (6.7)	331 (7.7)	50 (3.7)
Homemaker	648 (11.4)	403 (9.3)	245 (18.0)
Others (retired, students, unemployed, etc.)	171 (3.0)	81 (1.9)	90 (6.6)
Missing	3 (0.1)		
Education			
None/not completed primary school	1745 (30.7)	1430 (33.1)	315 (23.1)
Primary school	3349 (59.0)	2572 (59.6)	777 (57.0)
Secondary	425 (7.5)	223 (5.2)	202 (14.8)
Tertiary	161 (2.8)	91 (2.1)	70 (5.1)

Table 2: Distribution of study population according to physical activity status and social economic categories (proportions).

Demographic factor	Total, n (%)	Physical activity status ≥600 MET/week, n (%)	<600 MET/week, n (%)	p value
Age group (n = 5398)				
25–34	1787 (33.10)	1726 (96.6)	61 (3.4)	
35–44	1590 (29.5)	1552 (97.6)	38 (2.4)	0.002
45–54	1188 (22.0)	1154 (97.1)	34 (2.9)	
55–64	833 (15.4)	789 (94.7)	44 (5.3)	
Sex (n = 5398)				
Female	2901 (53.7)	2781 (95.9)	120 (4.1)	$p < 0.0001$
Male	2497 (46.3)	2440 (97.7)	57 (2.3)	
Occupation (N = 5397)				
Employed	452 (8.4)	423 (93.6)	29 (6.4)	
Self-employed	3825 (70.9)	3744 (97.9)	81 (2.1)	
Nonpaid	367 (6.8)	360 (98.1)	7 (1.9)	$p < 0.0001$
Homemaker	607 (11.2)	569 (93.7)	38 (6.3)	
Others (retired, students, unemployed, etc.)	146 (2.7)	124 (84.9)	22 (15.1)	
Education (N = 5398)				
None/not completed primary school	1653 (30.6)	1596 (96.6)	57 (3.4)	
Primary school	3195 (59.2)	3111 (97.4)	84 (2.6)	$p < 0.0001$
Secondary	396 (7.3)	370 (93.4)	26 (6.6)	
Tertiary	154 (2.9)	144 (93.5)	10 (6.5)	

Meets WHO physical activity recommendations (>600 MET/week). Do not meet WHO physical activity recommendations (<600 MET/week).

Table 3: Proportional of participants reported not to engage in transport, recreational, and work physical activities (PA) by social-demographic characteristics *(within group comparison)*.

Demographic factor	Transport PA, *n* (%)	Vigorous/moderate recreational PA, *n* (%)	Vigorous/moderate work, PA, *n* (%)
Age group			
25–34	179 (9.6)	1214 (65.1)	141 (7.6)
35–44	165 (10.0)	1195 (72.1)	114 (6.9)
45–54	128 (10.2)	938 (74.9)	121 (9.7)
55–64	132 (14.6)‡	738 (81.6)‡	134 (14.8)‡
Sex			
Female	397 (13.0)‡	2394 (78.3)‡	243 (7.9)
Male	207 (7.9)	1691 (64.5)	267 (10.2)*
Settings			
Rural	416 (9.6)	3115 (72.2)	300 (7.0)
Urban	188 (13.8)‡	970 (71.1)	210 (15.4)‡
Occupation			
Employed	61 (12.8)	284 (59.5)	80 (16.8)
Self-employed	367 (9.2)	2859 (71.5)	281 (7.0)
Nonpaid	40 (10.5)	317 (83.2)‡	19 (5.0)
Homemaker	97 (15.0)	498 (83.2)‡	78 (12.0)
Others (retired, students, unemployed, etc.)	37 (21.6)‡	125 (73.1)	50 (29.2)‡
Education			
None/not completed primary school	205 (11.7)	1356 (77.7)‡	160 (9.2)
Primary school	314 (9.4)	2392 (71.4)	256 (7.6)
Secondary	58 (13.6)	243 (57.2)	65 (15.3)
Tertiary	27 (16.8)‡	94 (58.4)	29 (18.0)‡

$^‡p < 0.0001$ and $^*p < 0.05$.

setting, female gender, and having an employment) showed significant associations with low PA levels (<600 METS-minutes/week). Table 4 summarises the association between low levels of PA and a number of social-demographic factors. In addition living in rural settings, male gender, being self-employed, and young age were found to have a significant association with the highest levels of PA (>3000 METS-minutes/week) (Table 5).

4. Discussion

Physical inactivity is one of the main instigates for the raising problem of noncommunicable diseases (NCDs) globally [3]. Based on this observation the World Health Organization (WHO) has put forward physical activity (PA) recommendations necessary for maintaining good health and for prevention of diseases [3]. In the present study we examined PA using the global physical activity questionnaire (GPAQ) and report PA levels and associated social-economic determinants in rural and urban Tanzania.

Our findings indicate that overall majority of study participants achieved the WHO-recommended PA levels (expressed as METS-minutes/week) and were considered sufficiently active. The proportion of sufficiently active participants in our study is higher than that reported from a pooled analysis of data from 22 African countries (Tanzania not included) [26]. This difference is likely due to overrepresentation of rural participants (who are relatively more active) in our study. In addition, evidence from questionnaire validating studies shows that PA overreporting is common among urban dwellers and in those who are very active [7, 19]. While the finding of high PA levels in our population is consistent with the existing evidence in SSA [7, 19, 26], given the reports from questionnaire validating studies, the effect of overreporting should not be neglected. This might have contributed to the enormously high proportion of sufficiently active participants in our study.

Based on WHO-recommended PA cut-off (<600 MET-minutes/week), we found a higher prevalence of insufficient PA in urban compared to rural settings, and participants from rural areas had the highest levels of PA. The observed differences in PA status in rural and urban settings have also been reported previously and reflect the rural-urban differences in NCDs prevalence [27–29]. Different studies conducted in Africa have consistently reported higher prevalence of diabetes, hypertension, and cardiovascular risk factors in urban compared to rural settings [27–29]. In addition, we observed a negative linear relationship between PA levels and a number of cardio metabolic risk factors including high blood pressure. Similarly, a recent publication reported

Table 4: Factors associated with low levels of physical activity (≤600 MET).

Demographic factor	High (≥3000 MET/minutes/week), n (%)	Odds ratio	
		Unadjusted [AOR (95% CI)]	Adjusted [AOR (95% CI)]
Settings			
Rural	83 (2.0)	1	1
Urban	94 (7.4)	3.9 (2.9–5.2)‡	2.9 (2.1–3.9)‡
Occupation			
Nonpaid	7 (1.9)	1	1
Employed	29 (6.4)	3.5 (1.5–8.1)*	3.0 (1.2–7.2)*
Self-employed	81 (2.1)	1.1 (0.5–2.4)	1.1 (0.5–2.4)
Homemaker	38 (6.3)	3.4 (1.5–7.8)*	2.2 (0.9–5.0)
Others (retired, students, unemployed, etc.)	22 (15.1)	9.1 (3.8–21.9)‡	5.0 (2.0–12.5)†
Education			
None/not completed primary school	57 (3.4)	1	1
Primary school	84 (2.6)	0.8 (0.5–1.1)	0.9 (0.6–1.3)
Secondary	26 (6.6)	2.0 (1.2–3.2)*	1.3 (0.8–2.3)
Tertiary	10 (6.5)	1.9 (1.0–3.9)	0.9 (0.4–1.9)
Age group			
25–34	61 (3.4)	1	1
35–44	38 (2.4)	0.7 (0.5–1.0)	0.8 (0.5–1.2)
45–54	34 (2.9)	0.8 (0.5–1.3)	0.9 (0.6–1.4)
55–64	44 (5.3)*	1.6 (1.1–2.3)*	1.4 (0.9–2.3)
Sex			
Male	57 (2.3)	1	1
Female	120 (4.1)	1.9 (1.3–2.5)‡	1.6 (1.1–2.3)*

‡$p < 0.0001$, †$p < 0.001$, and *$p < 0.05$.

a significant association between physical inactivity and high blood pressure in urban Tanzania [30]. Low levels of PA have also been linked to obesity in rural and urban Cameroon [7]. Put together, these data affirm the negative role of urbanization on PA and associated health consequences in SSA.

The ongoing urbanization in most developing countries has also steered the emergency of semiurban/semirural areas, mostly in places that are ordinarily classified as rural settings [31–34]. This might pose challenges while trying to describe urban-rural differences in disease risk factors. However, few studies that attempted to compare the prevalence of risk factors and NCDs between urban and semiurban areas reported no differences [35, 36]. Despite these observations, given the ongoing transition, future studies should strive to subclassify urban and rural areas into urban, rural, semiurban, and/or semirural areas. This will help to strengthen the tracing of the ongoing lifestyle and disease transition that comes along with urbanization.

We also found a significant association between employment and insufficient PA. Employed people presented the highest proportion of those who were insufficiently active. As expected our study found the highest proportion of employed participants in urban than in rural settings. Furthermore, participants with higher social-economic status (postprimary education and/or employed) were less likely to engage in AT and/or work-MVPA, had the highest prevalence of insufficient PA, and were more prevalent in urban than in rural areas. Based on these observations, the relatively higher prevalence of insufficient PA in urban areas is likely due to lower participation in AT and work-MVPA among urban dwellers.

On the other hand our data show that, in addition to a significant participation in AT, people living in rural areas were more likely than their urban counterparts, to be involved in work-MVPA, and had the lowest overall prevalence of insufficient PA. Being self-employed which was ubiquitous in rural settings was significantly associated with the highest PA levels (>3000 MET-minutes/week), another possible reason for the favorable PA profile seen in rural areas. Together, these observations show that while rural societies tend to maintain traditional lifestyles characterized by manual work and active travel, urban societies in Africa are continually adopting western lifestyles, with a substantial reliance on passive ways of living [7, 27, 37]. This shift in commuting preferences, coupled with the continuous automation of work and life in general, is closely linked to the raising prevalence of NCDs in African region [3, 33–36].

In line with the above observations, a comprehensive analysis of PA data from 22 African countries in the year

Table 5: Factors associated with highest level of physical activity (≥3000 MET).

Demographic factor	High (≥3000 MET/minutes/week), n (%)	Odds ratio Unadjusted [AOR (95% CI)]	Odds ratio Adjusted [AOR (95% CI)]
Settings			
Urban	928 (72.6)	1	1
Rural	3670 (89.1)‡	3.1 (2.6–3.6)‡	2.4 (2.0–2.9)
Occupation			
Retired, students, unemployed, and so on	93 (63.7)	1	1
Employed	321 (71.0)	1.4 (0.9–2.1)	1.0 (0.7–1.5)
Homemakers	456 (75.1)	1.7 (1.2–2.5)*	1.4 (0.9–2.2)
Self-employed	3389 (88.6)	4.4 (3.1–6.3)‡	2.6 (1.8–3.8)‡
Nonpaid	338 (92.1)‡	6.6 (4.0–11.0)‡	3.8 (2.2–6.4)‡
Education			
Tertiary	107 (69.5)	1	1
Secondary	291 (73.5)	1.2 (0.8–1.8)	0.9 (0.6–1.4)
Primary	2777 (86.9)‡	2.9 (2.0–4.2)	1.4 (0.9–2.1)
Non	1423 (86.1)	2.7 (1.9–3.9)	1.5 (1.0–2.3)
Age group			
55–64	669 (80.3)	1	1
45–54	1027 (86.4)	1.6 (1.2–2.0)‡	1.5 (1.2–2.0)*
35–44	1378 (86.7)‡	1.6 (1.3–2.0)‡	1.5 (1.2–2.0)†
25–34	1524 (85.3)	1.4 (1.1–1.8)†	1.5 (1.2–1.9)†
Sex			
Female	2382 (82.1)	1	1
Male	2216 (85.2)‡	1.7 (1.5–2.0)‡	1.6 (1.3–1.9)‡

$^‡p < 0.0001$, $^†p < 0.001$, and $^*p < 0.05$.

2011 showed a dominant contribution of AT and work-MVPA in the overall MVPA [26]. This implies that changes in AT and work-MVPA can significantly affect the overall PA levels. Contrary to what has been reported in high-income countries [38] recreational-MVPA seems to have a minimal contribution on the overall MVPA in African countries [26]. Indeed in the present analysis, the prevalence of recreational-MVPA was the lowest when compared to other PA domains. Interestingly, participants who were employed and living in urban areas were more likely to engage in recreational-MVPA than their rural and self-employed counterparts.

This particular engagement in recreational-MVPA among employed people and/or urban dwellers may reflect their efforts in trying to create PA opportunities missed during work and commuting, by participating in recreational activities. Participating in recreational activities requires motivation and may be affected by awareness of benefits and accessibility to recreational facilities, including income [7, 35, 36]. In agreement with that observation we found higher levels of education, employment, and income among urban compared to rural dwellers, a possible reason for their particular engagement in recreational-MVPA. Similarly, previous studies have reported a positive association between education and recreational-MVPA [39]. People with high education and good income tend to voluntarily engage in recreational PA than those with less education and limited income [7, 37, 40]. It is however evident from these data and as reported previously [22, 26, 37] that the main contributions to the overall PA both in urban and rural SSA come from AT and work-MVPA. Put together, these observations have special implications for countries' PA, transport, and work place wellness policies.

Several studies have reported consistent gender differences in the overall PA levels in Africa, with women reporting lower levels than men [7, 10, 41, 42]. We also found a higher prevalence of insufficient PA in women irrespective of their age, living setting, education, or employment status. Findings from a study that employed both objective and subjective PA assessments have also shown a gender difference in levels of PA [7], implying that, in general, African women still have lower overall PA levels when compared to men. In contrary, a study conducted in urban Nigeria reported no difference in the levels of PA between males and females [43]. This Nigerian study, which involved an entirely urban population, could be an evidence for the changing PA trends in urban populations, which further substantiate the impact of urbanization on PA. Whether the closing gap in PA levels between the two genders is a result of declining or improving PA in men and women, respectively, is a question for further research. Therefore, future studies should confirm and investigate the reasons for the changing trends in PA in urban areas with special focus on gender differences.

5. Study Limitations

These data came from a survey that was conducted following all the necessary criteria and procedures. However, overrepresentation of rural population (very active population) might have significantly contributed in pooling the absolute values for the overall PA levels towards the higher side.

In addition challenges affecting the validity of GPAQ in middle and low-income countries have been previously reported [7, 20, 39, 41, 44, 45]. GPAQ validity may be influenced by various factors including cultural norms, education levels, and unevenness in perceived social appeal [19, 20]. This could render GPAQ less appropriate for in between groups' evaluation, meaning that some of the comparisons between groups have been interpreted with caution. Despite these limitations, studies employing different PA questionnaires and/or objective PA assessment have reported similar trends of PA [27–29]. This means that while the observations presented in the current study require further verification, the overall PA status reported reflects the real situation.

6. Strength

Despite some limitations, this manuscript provides one of the first detailed reports on PA including the associated social-economic antecedents in rural and urban Tanzania. Given an appropriate sampling that was used to select study areas and participants, these data came from a representative Tanzanian population. It therefore provides baseline information that will be used as a reference for monitoring changes in PA status and trends in the country and Africa at large. One of the biggest strengths of this study is the use of GPAQ, which is a globally standardized tool in assessing PA. The inclusion of both rural and urban population is also another strength, as it offers an opportunity to evaluate the health effects of urbanization, a common phenomenon in all African countries.

7. Conclusion

In conclusion, despite a favorable PA status observed in this study, rural-urban differences in the overall levels of PA exist and reflect the existing differences in the prevalence of major NCDs in rural and urban Tanzania. Social-economic factors such as gender, employment, and education statuses significantly modulate PA and are the reasons for the observed differences. Despite some slight variations in the preferences leading to a more engagement in recreational-MVPA among educated and employed urban dwellers, AT and work-MVPA are the main contributors to the overall PA levels across all groups in Tanzania. Promoting physical activity in this setting therefore should be context specific but specifically involves rigorous promotion of AT (walking and cycling) and considers work place exercise programs.

Conflicts of Interest

The authors declare no conflicts of interest.

Authors' Contributions

Fredirick L. Mashili, Gibson B. Kagaruki, and Mary T. Mayige conceptualized and planned for the analysis. Fredirick L. Mashili led the data analysis, interpretation, and discussion of the findings as well as writing of the manuscript. Gibson B. Kagaruki did the analysis and contributed to writing and review of the manuscript. Joseph Mbatia, Alphoncina Nanai, Grace Saguti, Sarah Maongezi, Ayoub Magimba, Joseph Mbatia, Mathias Kamugisha, Eric Mgina, Clement N. Mweya, and Ramaiya Kaushik reviewed the manuscript and contributed to the discussion.

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