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Being active in Ghana: facilitators, barriers and preferences for being physically active in community settings among Ghanaian adults

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ABSTRACT

Introduction Physical inactivity remains a major risk factor for the development of non-communicable diseases. This study investigated physical activity behaviours, as well as barriers, facilitators and preferences that influence participation in a range of community-based physical activity interventions among Ghanaian adults.

Methods Adults living in six regions of Ghana completed a cross-sectional survey. Participants were recruited using a multi-stage sampling technique. Data were collected using a researcher-developed structured questionnaire, administered to participants using Kobo Toolbox, with data reported descriptively and analysed using binary logistic regression.

Results A total of 1122 out of 1164 participants completed the survey (mean age±SD=31.0±12.0; women=621). Overall, 648 (60.1%) participants engaged in ≥150 min of moderate-to-vigorous intensity physical activity (MVPA)/week, while 375 (33.4%) participants completed muscle-strengthening exercises≥twice/week. About a quarter of respondents (n=301, 26.8%) were knowledgeable about the guidelines for physical activity. Six out of ten participants expressed that social media is an effective way to encourage regular physical activity among Ghanaian adults. Over half of the participants (n=624, 55.6%) reported they would take part in physical activity interventions if offered by their place of worship and about half (n=443, 45.6%) indicated they would attend gyms/fitness centres regularly if they were more accessible and affordable in Ghana. Being male (adjusted odds ratios (AOR) 1.92, 95% CI 1.48 to 2.50), having a basic level of education (AOR 2.44, 95% CI 1.29 to 4.63) and being knowledgeable about guidelines for physical activity (AOR 1.86, 95% CI 1.37 to 2.53) were associated with higher odds of engaging in ≥150 min of MVPA per week as per guidance. These findings suggest that social media and faith-based settings may be effective contexts for promoting physical activity in Ghana. Improving accessibility and affordability of gyms/fitness centres may also increase engagement in structured and unstructured physical activity.

Conclusion This study found that a large percentage of participants were not meeting the guidance for daily physical activity. Knowledge about the guidelines for physical activity was very low and concerning. Participants expressed a strong preference for physical activity interventions to be delivered through social media channels, by healthcare professionals and in places of worship. These findings highlight the importance of leveraging these settings for promoting physical activity in Ghana.

BACKGROUND

Globally, the prevalence of insufficient physical activity levels has risen from 23.4% in 2000 to 31.3% in 2022, with higher rates in females (33.8%) compared with males (28.7%).[1] Physical inactivity is a significant public health concern, as it heightens the risk of developing non-communicable diseases (NCDs) and contributes to weight gain, reduced physical and cognitive function and mental health issues.[2 3] The 2022 Global Status Report on physical activity forecasts that without intervention, physical inactivity will result in nearly 500 million preventable cases of NCDs between 2020 and 2030, incurring over US$ 300 billion in annual treatment costs.[4] Despite the significant health and economic burden of physical inactivity, fewer public health programmes are promoting physical activity compared with other areas such as HIV prevention, reducing maternal mortality and tobacco control in Ghana.[5 6] This disparity underscores the urgent need to prioritise physical activity promotion in Ghana.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Studies that have investigated physical activity in Ghana have primarily focused on physical activity preferences and behaviours among adolescents and older adults.

⇒ In 2022, the age-standardised prevalence of insufficient physical activity among adults in Ghana was between 20.0% and 29.9% of the population, indicating that it is unlikely that the WHO global target of a 15% reduction in physical inactivity will be met by 2030.

WHAT THIS STUDY ADDS

⇒ Overall, in this population of Ghanaian adults 18 years and over, 60% engaged in ≥150 min of moderate-to-vigorous intensity physical activity per week, while only 33.4% completed muscle-strengthening exercises ≥twice per week as required for optimal health.

⇒ Only a quarter of participants were knowledgeable about the guidelines for physical activity recommended for optimal health.

⇒ Participants strongly preferred physical activity interventions delivered through social media channels, by healthcare professionals and at places of worship, highlighting the importance of leveraging these settings to promote physical activity in Ghana.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study provides insight into the barriers, facilitators and preferences for participation in physical activity among young adults in rural and urban community settings in Ghana and highlights the potential role that health professionals may have in promoting physical activity during routine consultations.

⇒ These findings set the stage for the development of targeted interventions to support efforts to increase physical activity engagement and contribute to national health initiatives and guidelines aimed at reducing the incidence of non-communicable diseases in Ghana.

The establishment of global and national directives for physical activity is integral to a comprehensive public health governance framework. The WHO's (WHO) Global Action Plan on Physical Activity (2018–2030) garnered unanimous support from all 194 member states, aiming for a 15% relative reduction in global physical inactivity by 2030.[7] In 2020, WHO issued updated global guidelines for physical activity, endorsing national guidelines and specific targets for all countries, emphasising the importance that citizens participate in at least 150–300 min of moderate intensity aerobic physical activity or 75–150 min of vigorous intensity aerobic physical activity or an equivalent combination of both each week.[8] Moderate to vigorous intensity physical activity (MVPA) is defined as activities requiring a moderate to high level of effort (≥3–6 metabolic equivalents) that substantially increase respiratory and heart rate, resulting in high energy expenditure. Examples include brisk walking, running, playing sports and dancing.[9] WHO guidelines also state that adults should engage in muscle-strength and balance-based activities on two or more days a week.[10] Notwithstanding significant improvements to try and reduce physical inactivity in sub-Saharan Africa, it remains unlikely that the WHO target of a 15% reduction in physical inactivity by 2030 will be achieved.[11] This highlights the urgency for targeted community and population-based interventions in Ghana to promote physical activity and improve health outcomes.[12] However, data supporting such interventions remain scarce.

Ghana, like many sub-Saharan African nations, faces an escalating NCD burden despite substantial efforts on tobacco control, alcohol reduction and diet improvement.[13] In 2016, NCDs accounted for 43% of all deaths in Ghana, with cardiovascular diseases, cancers, diabetes and chronic respiratory diseases being the leading causes.[14] Addressing this burden requires evidence-based approaches that target key risk factors, particularly physical activity and diet, informed by locally relevant data.[15] The Ghana's 2021 census confirms a youthful age structure (median age 21; 38.2% aged 15–35) with youth concentrated in urban areas (60.5%), reinforcing the policy relevance of physical activity early in adulthood.[16] Over the last decade, numerous studies from Ghana have investigated dietary risk factors associated with NCDs, but not physical activity.

Existing research on physical activity in Ghana has largely examined preferences and behaviours among adolescents and older adults, with limited attention to the adult population, especially young adults.[17 18] Given Ghana's younger population profile and the rising incidence of NCDs, research needs to understand more about the health and lifestyle behaviours and preferences of this population. Our study seeks to address this gap in the literature. Moreover, existing physical activity surveillance studies in Ghana are often not nationally representative,[1] highlighting the need for extensive, nationwide studies to clearly understand the physical activity participation rates to inform interventions development and updates to guidelines and public health policies in Ghana.

This study investigated the barriers, facilitators and preferences for physical activity participation among adult Ghanaians in rural, peri-urban and urban community settings across Ghana. This study also examined the potential role of healthcare practitioners in promoting physical activity during routine health service delivery. The outcome of this study will guide the development of targeted interventions to support efforts to increase physical activity engagement and contribute to national initiatives and guidelines aimed at reducing the incidence of NCDs in Ghana. Furthermore, these insights will be relevant to other low-middle-income countries with similar contexts, helping to facilitate the development of public health policies on physical activity in Africa.

METHODS

Study design

This cross-sectional study was conducted in six regions in Ghana: Greater-Accra, Eastern, Volta, Ashanti, Northern and Upper-East regions. The study sites were purposively selected to include rural and urban areas across Ghana's

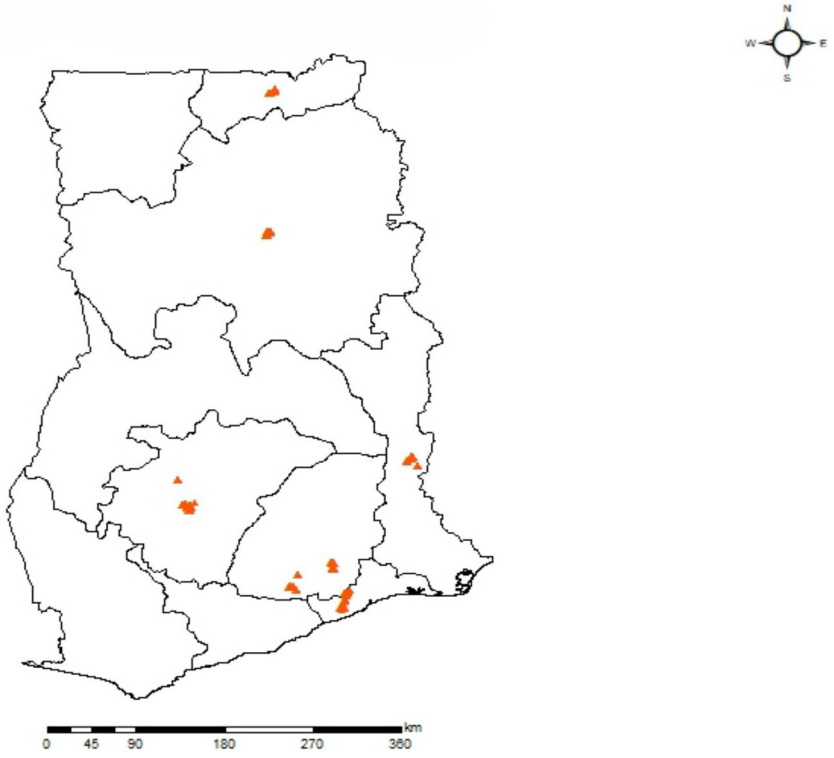

Figure 1 Data collection sites.

three ecological zones: southern, middle and northern. By considering both urban and rural contexts within each zone, tailored physical activity interventions can be designed to address specific needs and disparities within these geographical environments, ultimately fostering more effective strategies promoting public health. Figure 1 shows a map of Ghana indicating the sites where data were collected.

Patient public involvement

This study involved patients and the public at various stages of the research. The conceptualisation of the study ideas was part of a stakeholders' workshop to identify a research area for lifestyle intervention in Ghana. Various stakeholders from governmental agencies, civil societies and public universities in Ghana took part in this stakeholder meeting as described below.[19]

The stakeholders included representatives from the Ghana NCD Alliance, Ghana Health Service (Health Promotion Division and the NCD Programme Office), Kwame Nkrumah University of Science and Technology, Kintampo Health Research Centre, Food and Drugs Authority, Consumer Protection Agency, WHO, Stroke Association Support Network and World Child Cancer. In the first workshop, stakeholders collaborated with the authors/researchers to discuss and prioritise key research areas. Through this process, physical activity was identified as the first area of focus. Second, the survey tools were widely shared among the research team and other key stakeholders for their suggestions and input before data collection. Following data collection, a second stakeholder meeting was organised to present and discuss the findings, ensuring their input shaped the interpretation and provided direction for the next steps of the research process. This iterative engagement helped align the study design and outputs with national priorities and community needs.

Study population and sampling

Adults (≥18 years) who provided written informed consent were eligible. People with severe mental health or learning difficulties, with eligibility determined by the individual's demonstrated capacity to understand study information and provide informed consent, rather than by formal diagnostic assessment, were excluded. A multistage sampling technique was employed to recruit participants. This involved a purposive selection of six regions, two each from the northern, middle and southern belts of the country: a proportionate sampling of rural/ urban areas and random selection of households and individuals within each cluster (see online supplemental table 1).

The selected regions were Ashanti, Greater Accra, Volta, Eastern, Upper East and the Northern region. The Volta Region (population: 2.1 million) is largely rural with growing towns such as Ho and Hohoe, noted for farming, fishing and natural attractions. The Greater Accra Region (population: 5 million) is the most urbanised and densely populated, serving as Ghana's political and economic hub. The Eastern Region (2.9 million) is mainly rural, with cocoa farming and the Akosombo Dam as key features. The Ashanti Region (5.4 million), Ghana's most populous, combines Kumasi's urban growth with strong farming communities and rich

cultural heritage. The Upper East Region (1.3 million) is predominantly rural, facing drought and food insecurity, with Bolgatanga as its main town. The Northern Region (3.1 million), the largest by land area, is mainly agricultural but has Tamale as a rapidly growing urban centre.[20]

Following the methodology outlined in the 2022 Ghana Demographic and Health Survey,[21] 120 target clusters were drawn from the updated sampling frame prepared by the Ghana Statistical Service based on the 2021 Population and Housing Census.[20] Probability proportional to size (PPS) was used to ensure appropriate representation of urban and rural areas. Specifically, the probability of selecting each cluster was proportional to its population size, ensuring that more populous areas had a higher chance of selection. This approach was adopted to yield national representation for urban and rural areas, and for each of the selected regions.

10 households were selected in each cluster, totalling 1200 households. A modified Expanded Programme on Immunisation approach was adopted to select the households into the study.[22] Using this approach, data collectors identified a location near the centre of the segment/community and defined a random direction through a bottle or pen toss and a random household along the chosen direction pointing outwards from the centre of the community to its boundary. This approach has enabled the WHO and UNICEF to evaluate the coverage of childhood immunisation programmes and has also been adapted for nutritional status assessment studies.[23 24]

Within each household, one adult completed the study survey. A face-to-face, interviewer-administered survey was adopted. If more than one eligible adult lived in a selected household, one individual from the household was selected at random to complete the survey. If a selected household resident declined participation or did not meet the eligibility criteria, the data collector moved to the next household in the immediate vicinity, continuing this process until a suitable replacement was found. No more than one substitution attempt was allowed within each cluster. This procedure was repeated until the estimated sample size was achieved. The final sample included respondents from all six regions: Greater Accra (n=342), Ashanti (n=310), Eastern (n=160), Northern (n=139), Volta (n=100) and Upper East (n=71), with 47.9% residing in urban settings, 30.1% in peri-urban and 22.0% in rural areas (table 1; Online supplemental table 1). This distribution reflects our intention to recruit across high- and lower-density settings in both the northern and southern belts of Ghana.

Sample size

The sample size was calculated using Yamane's (1967) formula ($n=N/(1+Ne^2)$; where 'n' is the desired sample size, 'N' is the total population size and 'e' is the margin of error (or level of precision), typically set at 0.05 (or 5%) for a 95% confidence level.[25] Based on an estimated country population size of 30 832 019[26] and a 5% margin of error, a sample size of 400 respondents was estimated. To account for sampling design (sampling adults from both urban and rural communities across different regions in Ghana) and the cluster-based approach used in this study, a design effect of 2.0 was applied to adjust for the variance inflation introduced by clustering. For simple random sampling, the design effect (Deff) equals 1.0; however, the clustering in this study increases variance through intraclass correlation and unequal selection probabilities. To account for this, we applied a conservative Deff of 2.0, following Kish's foundational principles of survey sampling,[27] consistent with prior Ghanaian physical activity surveys that used a similar design effect[28] and supported by multi-country evidence showing design effects for physical activity outcomes often exceed 2.0.[29] This choice also aligns with WHO methodological guidance recommending values between 1.5 and 2.5 for cluster-based prevalence surveys where intra-cluster correlation is anticipated.[30]

Additionally, a 20% non-response rate was anticipated and planned for the sample size calculation, based on a similar rate observed in a prior physical activity survey response rate conducted in Kumasi, Ghana.[31] This adjustment resulted in a total required sample size of 960 participants. Online supplemental table 1 provides the regional breakdown of the sample stratified by rural, urban or peri-urban location.

Survey instruments/measures

We obtained personal characteristics and socioeconomic status information, including gender, marital, education and working status, occupation and locality of home environment using a simple questionnaire. Participation in aerobic and muscle-strengthening based physical activity was assessed using the Exercise Vital Signs Questionnaire.[32] Questions about facilitators and barriers to physical activity were based on previous research conducted in Ghana, to ensure they were culturally relevant and appropriate.[15 33 34] Assessment of knowledge about the guidelines for physical activity was based on previously published research.[35] Information about participants' perceptions of physical activity behaviours and preferences for different types of community interventions relevant to Ghanaian context was developed by the research team. The study survey instrument is available in the online supplemental material file.

Data collection

Data collection took place from December 2023 to January 2024 using a survey questionnaire. The questionnaire or data collection tool was validated by first piloting it in 10 households in the Ashanti Region to assess clarity, validity, reliability and comprehensiveness of the questions and to identify any challenges to administering the survey. Following the feedback and observations from the piloting phase, adjustments were made to the tool, as necessary. The adjustment included refining the flow and logic of the questions to ensure data is appropriately

Table 1 Socio-demographic characteristics of participants stratified by gender

Socio-demographic characteristics	Total N (%)	Male N (%) (n=501)	Female N (%) (n=621)
Age group (in years)			
Mean, ±SD	31.0±12.0	31.2±11.0	30.8±12.7
18–40	932 (83.1)	411 (82.0)	521 (83.9)
≥41	190 (16.9)	90 (18.0)	100 (16.1)
Marital status			
Never married	699 (62.3)	327 (65.3)	372 (59.9)
Married	364 (32.4)	157 (31.3)	207 (33.3)
Separated/divorced	28 (2.5)	13 (2.6)	15 (2.4)
Widowed	17 (1.5)	0 (0.0)	17 (2.8)
Prefer not to say	14 (1.3)	4 (0.8)	10 (1.6)
Educational level			
No formal/basic education	337 (30.0)	151 (30.1)	186 (30.0)
Secondary	354 (31.6)	149 (29.8)	205 (33.0)
Tertiary	431 (38.4)	201 (40.1)	230 (37.0)
Employment/working status			
Employed (full/part-time)	275 (24.5)	149 (29.7)	126 (20.3)
Retired	14 (1.2)	7 (1.4)	7 (1.1)
Self-employed (full/part-time)	387 (34.5)	186 (37.1)	201 (32.4)
Student	346 (30.8)	112 (22.4)	234 (37.7)
Unable to work/unemployed	100 (8.9)	47 (9.4)	53 (8.5)
Occupation, if employed (n=662)			
Manual (skilled/unskilled)/agriculture	292 (44.1)	165 (49.3)	127 (38.8)
Sales/services and clerical	218 (32.9)	83 (24.8)	135 (41.3)
Professional/managerial/technical	152 (23.0)	87 (25.9)	65 (19.9)
Place of residence			
Peri-urban	338 (30.1)	134 (26.7)	204 (32.9)
Rural area	247 (22.0)	102 (20.4)	145 (23.3)
Urban	537 (47.9)	265 (52.9)	272 (43.8)
Region of residence			
Ashanti	310 (27.6)	90 (18.0)	220 (35.4)
Eastern	160 (14.3)	77 (15.4)	83 (13.4)
Greater Accra	342 (30.5)	150 (29.9)	192 (30.9)
Northern	139 (12.4)	89 (17.7)	50 (8.1)
Upper East	71 (6.3)	49 (9.8)	22 (3.5)
Volta	100 (8.9)	46 (9.2)	54 (8.7)

collected. For example, skip patterns were revised to ensure respondents were not asked irrelevant follow-up questions (eg, unemployed participants being asked about physical activity in the workplace). Data from the pilot households were not included in the analyses.

The questionnaire was divided into the following five sections: (1) socio-demographic characteristics; (2) physical activity behaviours; awareness of the guidelines for physical activity; (3) participants' views or preferences for using a range of approaches for promoting physical activity, including social media platforms (access, ownership, frequency of use and preference for mobile phone-based interventions); (4) barriers and facilitators to physical activity (what will help or stop them from taking part in more physical activity/exercise); (5) healthcare professionals raising the topics of physical activity in consultations and (6) using churches/mosque and other places of worship to deliver interventions; and the implementation of walks in local communities. Questions regarding preferences for interventions to be delivered

in workplaces were also included but not reported due to a technical error during the translation of the data collection tool unto the online data collection platform.

Trained fieldworkers conducted interviewer-administered surveys on tablets using KoboCollect, a widely used open-source tool for digital data collection. Data entry incorporated range checks and skip logic to minimise errors. In rural clusters with intermittent or no connectivity, forms were completed offline and synchronised once a stable connection was available. Supervisors reviewed daily uploads to identify and query inconsistencies before analysis. To ensure consistency in the data collection process, the data collectors (n=8) were provided with comprehensive study-specific training, which emphasised familiarity with the study objectives and survey questions, procedures for effectively utilising and administering the data collection tools.

The survey was administered in a quiet environment with minimal or no interruptions and ensured anonymity for all participants. Once data collection was completed, the data were downloaded from the KoboCollect online server for management and analysis.

Data analysis

Socio-demographic information of participants was analysed descriptively. Data regarding respondents' participation in physical activity and knowledge about the guidance for physical activity were also analysed descriptively and presented as frequencies and proportions. Participation in physical activity (minutes of MVPA per week, and times per week that muscle strength-based exercises were completed) was cross-tabulated with socio-demographic variables. In line with the study aims, a χ^2 test was used to assess the relationships between total minutes per week engaged in MVPA (0=<100 and 100–149 MVPA, 1=≥150 min MVPA) and whether participants had received advice from a healthcare professional, for example, a doctor or nurse in the last 2 years to be more physically active (Yes/No/Unsure).

Multivariable logistic regression analyses were conducted to investigate associations between socio-demographic variables, knowledge of guidance of physical activity and total minutes per week engaged in MVPA. The independent variables were self-adjusted to control for confounding, and the AORs and corresponding 95% CIs were reported. The dependent variable was total minutes per week engaged in MVPA (categorised as 0=<100 and 100–149 MVPA, 1=≥150 min MVPA, based on the WHO guidelines related to participation in physical activity for optimal health). The independent variables for the logistic regression analyses were socio-demographic characteristics (age category: 18–40, ≥41, based on reasonable bandwidth), gender (male, female), place of residence (rural, urban, peri-urban), education (no formal, basic, secondary, tertiary), employment status (full time or part-time, self-employed, unable to work, unemployed, retired, student) and knowledge of the guidance for physical activity. Knowledge about physical activity guidance (minutes of moderate-vigorous intensity physical activity do you think Ghanaian adults should be doing each week) was recategorised into a binary variable named 'knowledge of guidance for physical activity' (incorrect=30 min, 60 min, 90 min, 120 min: correct=150 min). Views about facilitators and barriers to participation in physical activity and preferences for different community-based physical activity interventions are presented as frequencies and proportions. A multivariable logistic regression analysis was conducted to investigate the association between the independent variables and preferences for physical activity interventions. The dependent variables were preferences (categorised as yes/no in all cases) for different types of interventions to support participation in physical activity, these being social media platforms, places of worship, using a gym facility regularly (if it were available) and participation in community walks.

Data were analysed using STATA statistical software V.16.0. The Hosmer-Lemeshow goodness of fit test was used to assess the goodness of fit of the logistic regression models. P values of ≤0.05 were considered statistically significant in all analyses.

RESULTS

Participants' characteristics

Table 1 presents participants' socio-demographic characteristics. A total of n=1164 individuals were approached, of which n=42 declined, resulting in a final sample size of 1122 participants (n=501 men, n=621 women). The mean age of participants was 31 years (±12.0), with most participants (83.1%) aged between 18 and 40 years. A higher proportion of participants (47.9%) resided in an urban setting, with 30.1% and 22% residing in peri-urban and rural areas respectively. See table 1.

Participation in physical activity

A total of 648 (60.1%) participants engaged in ≥150 min of MVPA per week and 375 (33.4%) completed muscle-strengthening exercises≥twice per week (table 2). Marginally, more men (51.5%) engaged in ≥150 min of MVPA per week than females (48.5%), with proportions also higher among manual and agriculture workers (45.1%) compared with sales/services/clerical (30.6%), and professional/managerial (24.3%) workers. The proportion who engaged in ≥150 min of MVPA was higher in those who lived in urban (51.4%) than peri-urban (23.7%) and rural areas (24.9%). In contrast, the proportion who engaged in 5+days of muscle strength-based exercises was higher among females (53.8%) than males (46.2%). 5+days muscle strength-based exercises were also higher among manual/agriculture-based workers (42.9%) compared with sales/services/clerical (24.5%), and professional/managerial (32.6%).

Table 2 Participation in physical activity

	Total minutes per week engaged in MVPA*			Days a week engaged in muscle strength-based exercises		
	<100 min	100–149 min	≥150 min	0–1	2–4	5+
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
	305 (27.2)	143 (12.7)	674 (60.1)	747 (66.6)	256 (22.8)	119 (10.6)
Age group, years						
18–40	271 (88.9)	122 (85.3)	539 (80.0)	590 (79.0)	234 (91.4)	108 (90.8)
≥41	34 (11.1)	21 (14.7)	135 (20.0)	157 (21.0)	22 (8.6)	11 (9.2)
Gender						
Female	208 (68.2)	86 (60.1)	327 (48.5)	439 (58.8)	118 (46.1)	64 (53.8)
Male	97 (31.8)	57 (39.9)	347 (51.5)	308 (41.2)	138 (53.9)	55 (46.2)
Occupation						
Manual/ agriculture	57 (47.9)	29 (33.7)	206 (45.1)	216 (44.5)	55 (43.0)	21 (42.9)
Sales/services/ clerical	41 (34.5)	37 (43.0)	140 (30.6)	174 (35.9)	32 (25.0)	12 (24.5)
Professional/ Managerial/ technical	21 (17.6)	20 (23.3)	111 (24.3)	95 (19.6)	41 (32.0)	16 (32.6)
Place of residence						
Peri-urban	157 (51.5)	21 (14.7)	160 (23.7)	189 (25.3)	87 (34.0)	62 (52.1)
Rural	48 (15.7)	31 (21.7)	168 (24.9)	188 (25.2)	39 (15.2)	20 (19.8)
Urban	100 (32.8)	91 (63.6)	346 (51.4)	370 (49.5)	130 (50.8)	37 (31.1)
Region						
Ashanti	106 (34.8)	47 (32.9)	157 (23.3)	161 (21.6)	87 (34.0)	62 (52.1)
Eastern	34 (11.1)	22 (15.4)	104 (15.4)	127 (17.0)	19 (7.4)	14 (11.8)
Greater Accra	115 (37.7)	45 (31.5)	182 (27.0)	281 (37.6)	44 (17.2)	17 (14.3)
Northern	34 (11.1)	12 (8.4)	93 (13.8)	50 (6.7)	65 (25.4)	24 (20.2)
Upper East	14 (4.6)	12 (8.4)	45 (6.7)	34 (4.5)	35 (13.7)	2 (1.7)
Volta	2 (0.7)	5 (3.5)	93 (13.8)	94 (12.6)	6 (2.3)	–

*Total minutes per week = minutes by day × days in a week of physical activity.
MVPA, moderate to vigorous physical activity.

Knowledge about the guidance for physical activity and perceptions about physical activity behaviours

Overall, 26.8% of participants had good knowledge of the recommended weekly duration of aerobic based physical activity per week (ie, ≥150 min of MVPA per week). A total of 11.8% of participants believed they were less physically active compared with other people of the same age, 42.3% believed they were more active and 45.8% perceived they were as physically active as their counterparts (see online supplemental table 2). 41% indicated that they engaged in MVPA for 5 days or more as part of their work (online supplemental table 2).

Associations between socio-demographic characteristics and participation in physical activity

Being male (OR 1.92; 95% CI 1.48 to 2.50), having a basic education (OR 2.44; 95% CI 1.29 to 4.63) and having knowledge of the guidance for physical activity (OR 1.86; 95% CI 1.37 to 2.53) were associated with engagement in ≥150 min MVPA per week in the adjusted model, relative to their counterparts (see table 3). Participants who live in peri-urban areas (OR 0.58; 95% CI 0.40 to 0.83) and those who had no form of employment (unable to work, unemployed, retired or students) (OR 0.65; 95% CI 0.47 to 0.91) had lower odds of engaging in ≥150 min MVPA as compared with those living in rural areas and employed respectively.

Facilitators and barriers to physical activity

The most frequently reported factors that would encourage and support participants to be more physically active were mobile phone apps that track physical activity (40%), being active with other people such as friends (31.7%), encouragement from other people (31%), mobile phone alerts reminding and encouraging achievement towards physical activity goals (28.4%),

Table 3 Logistic regression of factors associated with participation in physical activity

Respondent characteristics	Engaging in≥150 min MVPA	
	AOR	95% CI
Age group (years)		
18–40 (ref)	1	1
≥41	1.15	(0.78 to 1.70)
Gender		
Female (ref)	1	1
Male	1.92***	(1.48 to 2.50)
Place of residence		
Rural (ref)	1	1
Urban	1.01	(0.72 to 1.42)
Peri-urban	0.58**	(0.40 to 0.83)
Educational level		
No formal (ref)	1	1
Basic	2.44**	(1.29 to 4.63)
Secondary	1.63	(0.87 to 3.06)
Tertiary	1.22	(0.65 to 2.31)
Employment status		
Employed (full/part-time)	1	1
Self-employed (full/part-time)	1.35	(0.93 to 1.96)
Unable to work/ unemployed/ retired/ student	0.65**	(0.47 to 0.91)
Knowledge of guidance for physical activity		
Incorrect (<150 mins) (ref)	1	1
Correct (≥150 mins)	1.86***	(1.37 to 2.53)
Goodness of fit test		
Hosmer-Lemeshow	X^2=*12.87*	p=*0.117*

**p<0.01; ***p<0.001.
AOR, adjusted odds ratio; MVPA, moderate to vigorous physical activity; Ref, reference category.

regular challenges sent to emails to facilitate motivation (17.5%) and having encouragement from work colleagues (16.1%). The most frequently reported barriers that prevent participants from engaging in physical activity were lack of time/being too busy (16.1%), not interested in physical activity (10.4%), lack of motivation to participate in physical activity (8.6%) and physical activity not being a priority (7.9%) (online supplemental table 2).

Preferences for community-based physical activity interventions

Social media platforms

Most study participants indicated that they owned or had access to a smartphone/electronic device (83.9%). Of these participants, 91.3% used social media, with nearly two-thirds (63.1%) using it several times a day and one-third (33.3%) using it once/a few times a day. A total of 14.3% of participants were interested in viewing social media posts or messages that promoted/encouraged physical activity and a further 58.7% reported that they may be interested. Nearly two-thirds (63.1%) indicated that they believed the use of social media is a good strategy for helping adults in Ghana to engage regularly in physical activity (online supplemental table 3).

Promotion of physical activity by doctors and nurses in health consultations

A third of the participants (29.7%) had consulted with a doctor/nurse in the past 6 months, of whom 45.9% indicated their doctor/nurse had asked them about their physical activity levels during a consultation. Furthermore, 20.9% had been advised by their doctors/nurse to engage in physical activity in the last 2 years (online supplemental table 4). χ^2 analysis indicated an association between participants receiving doctor/nurse advice to be physically active and self-reported participation in MVPA (online supplemental table 5).

Most participants (81.4%) believed that advising people about the importance of physical activity/exercise and encouraging them to be active is an important part of a doctor's job, while 14.7% disagreed. Similarly, most participants (77.4%) believed that advising people about the importance of physical activity/exercise and encouraging them to be active is an important part of a nurse's job, with 18.5% stating it was definitely not.

Using places of worship to promote physical activity

Most participants (91%) belonged to a church, mosque or other place of worship, and 41.2% visited their place of worship once in a week, and a further 39% visited twice/three times per week. Around half of participants (55.6%) reported they would participate in physical activity if these were organised by their place of worship (online supplemental table 4).

Attending gyms or fitness centres

A total of 13.4% of participants reported being members of a gym/fitness centre. Almost half (45.6%) of participants indicated that they would use gyms/fitness centres regularly each week if they were accessible and affordable, but a third (28.2%) would not use these facilities (online supplemental table 4).

Participation in community walks

Overall, 19.2% and 36.4% of participants were very likely/likely, respectively, to participate in organised community walks on weekdays. For weekends, 26.0% and 37.7% of

reported being very likely/likely to take part in organised community walks (online supplemental table 4).

Associations between socio-demographic characteristics and preferences for community physical activity interventions

Being older (>41 years) was associated with lower odds of having preferences for using a fitness centre/gym facility (OR 0.32; 95% CI 0.22 to 0.48), places of worship (OR 0.57; 95% CI 0.39 to 0.83) or participating in organised community walks (OR 0.53; 95% CI to 0.36 to 0.76), compared with respondents aged 18–40 years (See table 4). Being male was associated with significantly higher odds of preferring to use a gym/fitness centre regularly if it were available (OR 1.42; 95% CI to 1.09 to 1.85), having preferences for physical activity at a place of worship (OR 1.42; 95% CI 1.07 to 1.88) or as part of organised community walks (OR 1.35; 95% CI 1.01 to 1.80). People living in urban (OR 0.55; 95% CI 0.36 to 0.84) and peri-urban (OR 0.35; 95% CI 0.22 to 0.56) areas were less likely to prefer participating in a physical activity promoted by social media compared with those living in rural areas.

DISCUSSION

Physical activity decreases the risk of developing NCDs, where the incidence is growing rapidly in Ghana. It is, therefore, a public health priority to identify physical activity interventions that are likely to be appealing and acceptable to Ghanaians and can make an impact. The main issue, however, is the lack of data and empirical evidence to support research for planning and implementing physical activity interventions in Africa, a gap that this study sought to address in Ghana.[36] Most participants reported engaging in>150 min of MVPA per week, but the proportion who completed muscle strength-based exercises twice per week was low. Men, participants with a basic level of education and those who had correct knowledge about the guidance for physical activity had higher odds of reporting engaging in≥150 min MVPA per week compared with their counterparts.

Participants were asked to provide their preferences for engaging in a range of community-based physical activity interventions, to inform the development of interventions in Ghana. The most frequent factors for facilitating physical activity were the use of mobile phone apps that track activity and provide feedback, nudges and alerts, as well as being physically active with others and receiving encouragement from others. The most common barriers to physical activity were lack of time, being too busy and lack of motivation. Preferences for different types of community-based physical activity interventions varied among the participants.

Physical activity behaviour

Although 60% of participants self-reported engaging in≥150 min of MVPA per week, a substantial proportion did not meet this target, putting their health at risk. Notably, while many participants reported meeting the guidance for MVPA, most perceived that they needed to do more. Physical activity guidelines recommend that the public participate in muscle strengthening activities at least twice per week. In the current study, however, very few participants reported doing so. This finding is concerning because muscle and strength-based physical activity is known to decrease the risk of falls and osteoporosis, particularly in older people.[37] Surveillance studies in other populations have reported low participation levels in muscle and strength-based activity, highlighting that this behaviour may be more difficult to change regardless of country.[38] Consistent with other studies, men and participants with basic education were more likely to report engagement in≥150 min MVPA per week compared with women and participants with no formal education, respectively.[39–41] Overall, these findings highlight the populations in greatest need of support to be physically active in Ghana.

Knowledge about the guidance for physical activity

Knowledge about the amount of physical activity required for optimal health was low.[42] These findings highlight the public health necessity for the Ghanaian population to not only understand the guidelines and adhere to physical activity guidelines but also acknowledge the significant role that physical activity plays in reducing the risk of NCDs in addition to improving physical function and mental health. Without proper knowledge of health guidelines, the public is unlikely to take steps to change their health behaviours. Participants who were knowledgeable about the guidelines for physical activity were more likely to engage in≥150 mins of MVPA per week. Collectively, these findings point towards the need for education and public health systems in Ghana to directly consider ways of promoting the guidelines for physical activity, as a means of encouraging citizens to reflect on their current behaviour, and then to take appropriate action. Indeed, as Ghana moves towards preferring automation, the need for both population-wide and individual-based physical activity interventions to improve public health.

Facilitators and barriers to participation in physical activity in Ghana

A variety of facilitators and barriers to physical activity were reported by participants, many of which have been identified in other populations, both within and outside of Africa.[43 44] This study aimed to explore these questions specifically in the context of Ghana. Social support has consistently been reported as an important facilitator for promoting physical activity, so it was not surprising to find that being physically active with others and receiving encouragement from others both emerged as important. Moreover, in settings where family cohesion and networks are important cultural and social considerations, designing interventions that incorporate and facilitate social and family dynamics could enhance the adoption of these interventions. Furthermore, research has identified key roles that the family plays in

Table 4 Logistic regression results of factors associated with preferences for community-based physical activity interventions

Respondent characteristics	Social media platforms		Using places of worship		Attending fitness centres or gyms if available		Participation in community walks	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Age group (years)								
18–40 (ref)	1	1	1	1	1	1	1	1
≥41	0.69	(0.42 to 1.14)	0.57***	(0.39 to 0.83)	0.32***	(0.22 to 0.48)	0.53***	(0.36 to 0.76)
Gender								
Female (ref)	1	1	1	1	1	1	1	1
Male	0.91	(0.67 to 1.23)	1.42**	(1.07 to 1.88)	1.42***	(1.09 to 1.85)	1.35*	(1.01 to 1.80)
Place of residence								
Rural (ref)	1	1	1	1	1	1	1	1
Urban	0.55**	(0.36 to 0.84)	0.71	(0.49 to 1.01)	1.12	(0.79 to 1.58)	0.87	(0.60 to 1.24)
Peri-urban	0.35***	(0.22 to 0.56)	0.90	(0.60 to 1.35)	0.88	(0.60 to 1.29)	1.26	(0.83 to 1.92)
Educational level								
No formal (ref)	1	1	1	1	1	1	1	1
Basic	1.28	(0.53 to 3.09)	1.20	(0.62 to 2.31)	1.22	(0.63 to 2.37)	0.81	(0.41 to 1.62)
Secondary	1.76	(0.76 to 4.06)	1.41	(0.72 to 2.75)	1.38	(0.71 to 2.66)	1.05	(0.52 to 2.11)
Tertiary	0.99	(0.43 to 2.28)	0.73	(0.38 to 1.42)	1.13	(0.58 to 2.20)	0.70	(0.35 to 1.42)
Employment status								
Employed (full/part-time)	1	1	1	1	1	1	1	1
Self-employed (full/part-time)	0.93	(0.61 to 1.43)	0.76	(0.51 to 1.13)	0.83	(0.57 to 1.21)	0.82	(0.55 to 1.23)
Unable to work/ unemployed/ retired/ student	0.75	(0.51 to 1.08)	0.87	(0.60 to 1.26)	0.80	(0.57 to 1.13)	0.97	(0.67 to 1.42)
Knowledge of guidance for physical activity								
Incorrect (<150 min) (ref)	1	1	1	1	1	1	1	1
Correct (≥150 min)	1.58**	(1.12 to 2.19)	1.30	(0.95 to 1.80)	0.90	(0.67 to 1.21)	1.29	(0.92 to 1.79)
Goodness of fit-test								
Hosmer-Lemeshow	X^2=4.81	p=0.778	X^2=5.26	p=0.729	X^2=6.41	p=0.602	X^2=7.34	p=0.501

*p<0.05; **p<0.01; ***p<0.001.
AOR, adjusted odds ratio.

supporting physical activity, seeing the 'family as a second pair of ears', 'family as physical activity regulators', and 'family as social support'.[45] For instance, in Malawi, a study found that social support from family, friends and health workers facilitated physical activity,[46] similar to our findings in Ghana. This highlights the potential for community-based, socially supported interventions across sub-Saharan Africa. Health behaviour theories highlight the important role of social/peer support and/or families in supporting individuals to cope with illness and in serving as ecosystems for learning health practices that can persist across the lifespan.[47 48] This underscores the need to focus not only on individuals, but also on families when designing and implementing health promotion interventions.[49]

Mobile phone apps designed to promote and support physical activity were also identified as important facilitators. This finding is important here for several reasons. First, systematic reviews have shown that technology-based interventions can be effectively increasing physical activity. Second, these interventions are cost-effective at scale and have the potential to reach large populations. Finally, the majority of adults in Ghana have access to a mobile phone.[50]

Several barriers to physical activity were identified, with the most reported reasons being a lack of time or being too busy, not being interested in physically active or exercise and it not being a priority. These reasons have been reported elsewhere in both high-income and low-income settings.[51–53] Barriers of this kind often result from the widely held belief that other commitments and responsibilities are more important in people's lives, which require their time or energy.[51] Nevertheless, our findings provide valuable insights for the development of physical activity interventions in Ghana. Drawing explicitly on the COM-B model within the Behaviour Change Wheel,[54] this study highlights the importance of addressing capability, opportunity and motivation as interdependent conditions for physical activity engagement. Specifically, action planning can enhance psychological capability and reflective motivation by supporting individuals to plan when and where physical activity will take place within their daily routines. In parallel, consciousness raising can strengthen reflective motivation by increasing awareness of the health benefits of physical activity and reinforcing the prioritisation of health. Importantly, consistent with the systems-oriented logic of COM-B, these strategies must be supported by improvements in physical and social opportunity, including access to safe and affordable spaces for physical activity, supportive social norms and enabling organisational or policy environments.[54] Together, these COM-B–informed mechanisms provide a coherent framework for operationalising multilevel physical activity interventions that are responsive to the Ghanaian context.

Preferences for different types of community-based physical activity interventions

The majority of participants in this study owned a mobile phone, used social media and expressed interest in viewing posts or messages on social media platforms that promote and encourage increased physical activity each week. The rising advancement in technology and communication platforms throughout the world could provide an opportunity for the implementation of physical activity interventions in Africa. Additionally, evidence from systematic reviews about the effects of social media interventions on physical activity has found that social media interventions can increase participation in physical activity.[55 56] While the evidence collectively suggests that social media could be an effective platform for the development of physical activity interventions in Ghana, it is essential to consider the rapid evolution of social media applications. Therefore, exploring the feasibility and contextual adaptation of such interventions to enhance physical activity within a Ghanaian setting is crucial. For instance, tailored, culturally relevant social media campaigns delivered through widely used platforms such as WhatsApp and Facebook and integrated with existing public health initiatives could provide a feasible and engaging way to promote physical activity in Ghana. This may include weekly short videos, infographics or community challenge posts co-created with local influencers, healthcare providers and educators to increase engagement and credibility.

Participants believed it was appropriate and within the role of doctors and nurses to promote participation in physical activity during health consultations. Combined with the finding that 29.7% had consulted a doctor or nurse in the past 6 months, this suggests that healthcare consultations may serve as a suitable context for routinely and consistently promoting physical activity among Ghanaian adults. Healthcare providers could integrate brief physical activity counselling into routine consultations, while educators could incorporate guideline awareness into health and physical education curricula.[57] However, a logical next step would be to consult further with doctors, nurses and public health officials in Ghana to explore how this approach could be implemented, particularly considering the potential time implications for health services in Ghana. In Ghana, the majority of people attend a place of worship at least once per week.[58] Unsurprisingly, in our study, there was a preference for participating in physical activity interventions offered in this setting. Overall, these preferences align with findings from an exploratory study in Ghana that found group-based physical activity programmes encouraged by healthcare providers and delivered in churches through a train-the-trainer model would be well received by ageing adults from three urban areas of Ghana.[59] However, it is important to explore in more detail the reasons for this preference (or not) to better design acceptable physical activity interventions for Ghanaian adults.

Participation in community walks was also a popular choice for intervention, and such approaches have proved

popular in other countries.[60 61] For example, the organised weekly parkrun or parkwalk initiative has been very successful in providing safe and supportive environments where people and families can be active together in green spaces.[60 61] It may well be the case that similar opportunities can be offered in Ghana.

Strengths and limitations

The findings of this study should be interpreted considering several strengths and limitations. A systematic approach was adopted to selecting households to identify individuals to complete the survey. Data were collected from across six geographical areas of Ghana to ensure a range of views from across the country were represented. Furthermore, both urban and rural contexts were included within the data collection strategy. Often, studies are only able to collect data from more affluent and educated individuals. In contrast, this study was able to capture the views of people from all educational backgrounds, including a 30% proportion who had a basic level of education in Ghana. Participants were asked to self-report their physical activity and this type of data may be prone to over-reporting. The study was researcher-administered; therefore, the data may be influenced by social desirability. Most participants were 40 years or younger; therefore, findings may be less generalisable to older adults. We did not directly measure household socioeconomic status; although region and urbanicity capture structural differences related to physical activity opportunities, residual confounding by socioeconomic status (SES) is possible. Operationally, intermittent internet connectivity and occasional device issues in remote areas may have delayed synchronisation, although offline data capture and daily supervisory checks were used to mitigate these risks. The use of categorical explanatory variables in the logistic regression may also lead to a loss of information and an increase in the number of model parameters, which can increase the risk of overfitting.

CONCLUSION

Although most participants self-reported meeting the recommended levels of MVPA per week, many did not. Relatively few participants were meeting the weekly guidelines for muscle-strengthening physical activity each week, and most lacked knowledge about the recommended amount of physical activity they should engage in each week. When asked about preferred intervention formats, participants showed interest in approaches delivered through social media, endorsed by healthcare professionals during consultations, integrated into places of worship, and supported by organised community walks, underscoring the importance of leveraging these platforms to promote physical activity.

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