Exploring the Relationship between Adult Women's Participation in Recreational Soccer and Self-Efficacy in Rural Kenya

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Abstract

Background Increases in non-communicable diseases in Kenya are attributed in part to a decrease in physical activity. Although, sports programs for girls and young adult women promote health, reduce risk behaviors and build self-efficacy, similar programs for adult women in Kenya are largely unavailable. The Nikumbuke Soccer League, a recreational soccer program for adult women in southeastern Kenya, is a notable exception.

Methods Data for this analysis were taken from a 2018–2019 study of women's experiences in an adult women's soccer league coordinated by the Nikumbuke Project in ten communities in southeastern rural Kenya. 702 project members, 229 of whom play soccer, participated in semi-structured interviews containing questions on demographics, self-efficacy, and health. Frequencies were run for all variables with separate bivariate analyses examining socio-demographic attributes and two outcome variables of interest, general self-efficacy (GSE) and participation in soccer. Linear and logistic regressions were run to explore the relationship between women's self-efficacy and participation in soccer, controlling for socio-demographic covariates.

Results The average age of respondents was approximately 40 years with the majority of women being married with three or more children and living below the national poverty line. 40% of women had no formal education, and another 30% had some schooling but had not completed primary education. Results from the linear regression suggest that participation in recreational soccer, controlling for other demographic attributes, was associated with a 1.57 point increase on the GSE scale. Results from the logistic regression suggest that a single point increase on the GSE scale is associated with 8% higher odds of being a member of the soccer program at Nikumbuke, suggesting a bi-directional relationship between self-efficacy and participation in recreational soccer.

Conclusion Programs such as the Nikumbuke Soccer League provide adult women with opportunities to engage in recreational physical activity outside of the highly gendered domestic world in which they live. Given its potential to improve women's health, build self-efficacy, and expand social roles for women, programs like the Nikumbuke Soccer League should be expanded across Kenya and other countries in the region where similar opportunities for women do not currently exist.

Background

Physical activity is a major determinant of health that is associated with reductions in premature mortality and the global burden of non-communicable disease (NCD).¹ Despite the known benefits of physical activity, physical inactivity continues to account for an estimated 6–10% of the global burden of disease attributed to coronary heart disease, type 2 diabetes, and breast and colon cancer, as well as 9% of all premature mortality.² Physical inactivity increases with age, accounting for an estimated 3.2 million deaths each year.³ Strategies to encourage participation in physical activity, particularly leisure activity targeting adults, are an integral part of the NCD-risk reduction programs in many countries.⁴

Physical activity behaviours occur within an ecosystem of individual, household, community, and societal attributes that shape individual behaviors.⁵ Research suggests that a number of attributes are consistent

predictors of initiation and adherence to physical activity by adult women, including age, education, marital status, self-efficacy, and health status.^{6–10}

A substantial body of research supports the link between self-efficacy, defined by Bandura as “people’s beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives,”¹¹ [p. 118] and certain health behaviors.^{12–16} High levels of perceived self-efficacy have been positively associated with smoking cessation, recovery from post-traumatic stress, HIV preventive behaviours, and treatment adherence for a variety of communicable and non-communicable diseases. In Kenya, a number of recreational programs targeting girls and young adult women have been shown to promote health, lower risk behaviours, and build self-efficacy.^{17,18}

Studies investigating self-efficacy in exercise groups show a consistent positive relationship between efficacy and exercise participation.¹⁹ Perceived self-efficacy has been shown to be a significant predictor of exercise adherence and compliance, as well as a consequence of physical activity participation.⁹ Self-efficacy beliefs about one’s ability to carry out a task may influence the adoption of physical activity while outcome expectations due to those beliefs may influence adherence.²⁰

Women in Sub-Saharan Africa face a number of socio-cultural, environmental, and behavioural obstacles in terms of access and engagement in leisure-time physical activity. In countries in Sub-Saharan Africa, physical inactivity has been linked to overweight/obesity, hypertension, and diabetes among women.^{21–25} A 2011 study of physical activity in 22 African countries found that approximately 76% of females and 83.8% of males met the World Health Organization recommendations for at least 150 minutes of moderate-intensity physical activity per week. Importantly, the study found that the majority of physical activity stemmed from work or transportation and physical activity during leisure was rare.²⁶ Reasons for high rates of physical inactivity among women in this setting include a lack of material resources, cultural norms discouraging the wearing of tight-fitting clothes when participating in sports, and the gendered nature of domestic and household chores that afford women limited time for leisure activities of any kind.^{21,27} Women in Nigeria were reported to experience structural, interpersonal and intrapersonal constraints to participating in recreational sports activities, with lack of time and norms reinforcing women’s responsibilities as mothers and homemakers presenting the biggest obstacles.²⁸ While opportunities exist in the region for adults to participate in sports like soccer, rugby, and boxing, these are considered traditionally ‘male’ activities; sports remains a gendered domain that preclude adult women from participating in organized leisure sports.²² Several studies, for the most part conducted in Nigeria or South Africa, have variously identified self-efficacy, social support, marital status, high parity, and norms regarding women’s roles as significant predictors of adult women’s participation in physical activities.^{22,29–31}

The burden of non-communicable diseases in Kenya is on the rise, with NCDs accounting for 27% of all deaths and 50% of all hospital admissions in 2015.³² Among the risk factors to which this increase in NCDs is attributed is the corresponding decrease in physical activity in the population; reversing this trend has been identified as a central objective in the country’s national strategy for combatting NCDs.³³

Research examining the relationship between self-efficacy and physical inactivity in Sub-Saharan Africa has largely focused on patient populations with health conditions such as hypertension and type-2 diabetes.^{30,31,34} A few studies link higher levels of self-efficacy to physical activity in university students in low-, middle-, and high-income countries³⁵ and healthy women ages 18–64 years study in Nigeria.²⁹

Despite a growing burden of non-communicable diseases in East Africa and the adoption of healthy lifestyles as a risk-reduction strategy in countries like Kenya, almost no research has been conducted to date on adult women's engagement in organized recreational sports nor on the psycho-social attributes that might encourage their participation in and adherence to such activities. This study contributes to filling that gap by examining the relationship between women's self-efficacy and their participation in a recreational soccer league in rural southeastern Kenya. We hypothesized that women's participation in the soccer league would be positively associated with self-efficacy that this relationship would be bi-directional.

Methods

Data and sample

Data for this analysis were taken from a 2018–2019 study focused on women's experiences in a small, but established, adult women's soccer league coordinated by the Nikumbuke Project in Lunga Lunga, Kenya on the border with Tanzania.³⁶ The Nikumbuke Project is a local, internationally supported non-governmental organization that offers basic health and literacy programs for its female members, provides subsidies for their daughters' school fees, and runs a vocational training program in tailoring for young women who did not complete secondary school. In 2014, at the request of the membership, the project launched a modest four-team adult women's soccer league with assistance from a US-based non-profit established to raise funds for the program and provide guidance in the sport. At the time of this study, the Nikumbuke Project included 702 members, 229 of whom played in its recreational soccer program, the Nikumbuke Soccer League. The teams in the League represent the ten communities in which the Nikumbuke Project members resided at the time of the study. These communities included Lunga Lunga, a market town and the seat of the Kwale County sub-constituency, seven settled rural villages - Godo, Mgombezi, Lunga Lunga, Kidomaya, Juakali, Perani, Mpakani and Jirani, a pastoralist community of Maasai, and Umoja, a mixed pastoralist/settled village. Teams, which reflect a diversity of religions and distinct tribal groups, practice weekly, compete monthly in inter-village competitions during the non-rainy season and participate in a League-wide "World Cup" held each May/June.

All 702 members of the Nikumbuke Project were invited to take part in the study, which included semi-structured interviews containing questions relating to demographics, self-efficacy, health, gender-related norms, and participation in the Nikumbuke Soccer League. In order to participate in the study women had to be at least 18 years old and provide verbal informed consent. Interviews were conducted by a team of 18 female members of the Nikumbuke Project who were elected by their groups to assist in the study and who were trained in research ethics, survey methods, and survey techniques. Trainees received a small stipend for successfully completing the program and for each survey instrument they administered. Women who agreed to participate in the interviews were also given a small stipend in appreciation for their time. Interviews lasted between 35–65 minutes and took place in a private setting either in the Nikumbuke meeting hall in each community or in respondents' homes.

Measures

The primary outcome variables of interest in this analysis were self-efficacy, measured using the General Self-Efficacy (GSE) scale.^{37,38} and participation in the recreational soccer league. The 10-item GSE scale measures perceived coping ability across a wide range of demanding scenarios such as 'I can always manage to solve difficult problems if I try hard enough' and 'I can usually handle whatever comes my way.' Responses to these items range from '1 = not true at all' to '4 = exactly true;' thus, summed scores on the GSE range from 10–40. In this analysis, the scale had an internal consistency of $\alpha = .82$, well within typical ranges reported elsewhere³⁹. For the purposes of bivariate analysis, a dichotomous variable representing self-efficacy was also created from the summed scores on the GSE to reflect 'at or below the GSE mean score' and 'above the mean GSE score'. Socio-demographic variables included age, education, marital status, number of children, work outside the home, self-identification as head of household, and monthly household income. Communities were labelled according to type – 'market town', 'settled village', 'pastoralist' and 'mixed pastoralist/settled village'.

Analysis Strategy

Eighteen of the 702 members in the Nikumbuke Project were excluded from the analytic sample as they participated in the study as field staff responsible for administration of the interviews and therefore, had a different knowledge of the instrument and study than other members of the Nikumbuke Project at the time of survey implementation. The resultant analytic sample included 684 women.

Data analyses were conducted using StataCorp statistical software, Release 16.⁴⁰ Frequencies were run for all socio-demographic variables as well as two outcome variables of interest, i.e. GSE and participation in the recreational soccer program. An item non-response analysis of all variables in this study indicated minimal missing data (3% or less on all variables except age, which had 9.5% missing). Single-imputation was used to approximate responses for missing data.⁴¹ Chi-square and Fischer's exact tests were run to explore bivariate relationships between high self-efficacy (measured as GSE scores above the sample mean), participation in recreational soccer, and the demographic covariates in this study. A two-sample t-test was conducted to compare the mean GSE scores of women who participated in the soccer league and those who did not. Linear and logistic regressions were used to explore the relationship between women's self-efficacy and participation in the recreational soccer program while controlling for a number of socio-demographic covariates. Two regression models were run. Models 1 used linear regression examine the association between women's participation in the soccer program, and GSE scores after controlling for socio-demographic covariates. To consider the question of a bi-directional relationship between GSE and soccer participation, a second model using logistic regression was run to explore the association between GSE scores and women's participation in the league.

Results

Descriptive statistics

Descriptive statistics appear in Table 1. The majority of the 684 women included in this analysis had joined the Nikumbuke Project within the previous four years. The average age of respondents was just over 40 years, with women as young as 18 years and as old as 80 years participating in the surveys. Over three-quarters of the

women were married and living with their partners, although close to 42% of respondents considered themselves the head of their households. About 84% of women had three or more children, with close to 20% having seven or more children. Just over 40% of the women had no formal education, and an additional 31% had not completed primary school. The majority of households had monthly incomes under 5,000 KES (about US \$50), which falls well below the Kenyan national poverty line.⁴²

Table 1
Distribution of respondents by demographic characteristics according to self-efficacy and participation in soccer league ($n = 684$)

Attributes	Self-efficacy			χ^2	Participation in recreational soccer			χ^2
	Freq	Low Efficacy ⁱ	High Efficacy ⁱⁱ		Freq	Soccer League	No Soccer	
Self-efficacy (mean 33.9, Std. dev. 5.70)	684	345	339		684			2.37
At or below the mean					345	106	239	
Above the mean					339	123	216	
Participation in recreational soccer league				2.37				
No	455	239	216		455			
Yes	229	106	123		229			
Age				25.55***				54.02***†
18–24 years	63	47	16		63	30	39	
25–34 years	178	99	79		178	82	96	
35–49 years	289	137	152		289	100	189	
50–59 years	96	35	61		96	13	83	
60 years or more	58	27	31		58	4	54	
Education				25.39***				14.24**
None	279	173	106		279	72	207	
Some primary	214	89	125		214	80	134	
Completed primary	130	56	74		130	56	74	
More than primary	61	27	34		61	21	40	
Relationship status				16.64**				11.31**
Married	516	277	239		516	185	331	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † fisher's exact p-value

ⁱ at or below the mean, ⁱⁱ above the sample mean

	Self-efficacy			Participation in recreational soccer		
Regular partner, living apart	31	15	16	31	9	22
Single	39	22	17	39	16	23
Separated, divorced, widowed	98	31	67	98	19	79
Number of children	5.93 [†]			21.92 ^{***}		
None	17	12	5	17	7	10
1–2 children	93	54	39	93	41	52
3–4 children	259	128	131	259	99	160
5–6 children	191	93	98	191	60	131
7 or more children	124	58	66	124	22	102
Respondent works outside home	0.05			1.74		
No	511	259	252	511	164	347
Yes	173	86	87	173	65	108
Years as a member in Nikumbuke Project	7.58 [*]			5.10		
10 or more years	73	27	46	73	33	40
5–9 years	233	129	104	233	76	157
4 years or less	378	189	189	378	120	258
Household monthly income	5.29			0.03		
Less than 5,000 KES	398	214	184	398	134	264
5,000–9999 KES	224	99	125	224	74	150
More than 10,000 KES	62	32	30	62	21	41

*p < 0.05, **p < 0.01, ***p < 0.001, † fisher's exact p-value

ⁱ at or below the mean, ⁱⁱ above the sample mean

Self-efficacy				Participation in recreational soccer		
Aware of household finances			3.32			2.60
No	72	29	43	72	18	54
Yes	612	316	296	612	211	401
Head of household is self			0.18			4.63*
No	400	199	201	400	147	253
Yes	284	146	138	284	82	202
Type of community in which respondent lives			166.08***†			20.05***
Pastoralist	95	92	3	95	21	74
Mixed pastoralist/settled village	47	45	2	47	28	19
Settled village	471	166	305	471	155	316
Market town	71	42	29	71	25	46
*p < 0.05, **p < 0.01, ***p < 0.001, † fisher's exact p-value						
ⁱ at or below the mean, ⁱⁱ above the sample mean						

Table 2

Model 1: Linear regression model reporting standardized beta coefficients (95% confidence intervals) for the association between self-efficacy and participation in a recreational soccer league ($n = 684$)

Self-efficacy (mean 33.93, SD 5.70)	β	p-value	95% CI
Participates in recreational soccer league	1.57	0.000	0.759 to 2.380
Age (categorical) (<i>ref: 18–24 years</i>)			
25–34 years	0.040	0.959	-1.502 to 1.582
35–49 years	-0.41	0.612	-1.981 to 1.168
50–59 years	0.98	0.277	-0.787 to 2.746
60 years and over	-0.45	0.659	-2.432 to 1.539
Education (<i>ref: none</i>)			
Some primary	0.07	0.886	-0.871 to 1.008
Completed primary	-0.18	0.751	-1.301 to 0.939
More than primary	-0.542	0.472	-2.021 to 0.938
Relationship status (<i>ref: married</i>)			
Regular partner, live apart	-1.15	0.204	-2.914 to 0.623
Single	-1.2	0.174	-2.990 to 0.541
Separated, divorced, widowed	1.268	0.045	0.028 to 2.507
Number of children (<i>ref: none</i>)			
1–2 children	0.35	0.980	-2.691 to 2.761
3–4 children	0.36	0.979	-2.732 to 2.805
5–6 children	0.03	0.982	-2.801 to 2.865
7 or more children	0.00	1.000	-2.877 to 2.878
Respondent works outside home	0.06	0.891	-0.791 to 0.910
Member of Nikumbuke Project (<i>ref: 5–9 years</i>)			
10 or more years	-0.31	0.631	-1.600 to 0.971
4 years or less	-1.14	0.009	-1.981 to -0.290
Household monthly income (<i>ref: 5,000–9,999 ksh</i>)			
Less than 5,000 ksh	-0.30	0.464	-1.088 to 0.497
More than 10,000 ksh	-0.06	0.932	-1.403 to 1.286
Aware of household finances	0.78	0.200	-0.413 to 1.963

Self-efficacy (mean 33.93, SD 5.70)	β	<i>p</i> -value	95% CI
Head of household is self	-0.71	0.116	-1.590 to 0.174
Type of community (<i>ref: Settled village</i>)			
Pastoral	-8.69	0.000	-9.940 to -7.431
Mixed pastoralist/settled village	-7.44	0.000	-9.000 to -5.878
Market town	-2.89	0.000	-4.199 to -1.582

Bivariate analyses

Results from bivariate tests are also summarized in Table 1. Results of the analysis exploring the relationship between self-efficacy and socio-demographic variables suggest that high self-efficacy was significantly associated with age, level of education, relationship status, number of years in the Nikumbuke Project, and the type of community in which the respondent lives. Women who are younger, have no education, are single or unmarried, and those who joined Nikumbuke more recently had low GSE scores (below the sample median). Additionally, the majority of women from the pastoral or mixed pastoralist/settled communities had GSE scores that were at or below the mean score for the sample.

Age, education, relationship status, number of children, being head of one's own household and type of community in which respondent lives were significantly associated with participation in the recreational soccer league. The majority of women who played recreational soccer were between the ages of 35 and 49 years, had some primary education, were married, and had 3 to 4 children. Approximately 45% of the soccer league members had 5 or more children. The majority of league members were not the reported heads of their households. The difference in mean GSE scores of women who played soccer ($M = 34.78$, $SD = 4.99$) and those who did not ($M = 33.5$, $SD = 5.98$) was statistically different, $t(682) = -2.79$, $p = 0.006$.

Multivariate analyses

A linear regression analysis was performed to investigate whether participation in the soccer program was associated with the self-efficacy of respondents (Table 3). Results suggest that participation in recreational soccer, controlling for other demographic attributes, was associated with a 1.57 increase on the GSE scale, $\beta = 1.57$, $t(672) = 3.80$, $p < 0.001$. Other attributes that were significant factors associated with GSE scores included being separated, divorced or widowed ($\beta = 1.27$, 95% CI 0.03, 2.51), being a recent (joined in 2016 or after) member in the Nikumbuke Project ($\beta = -1.14$, 95% CI -1.98, -0.29), and being from either a pastoral ($\beta = -8.69$, 95% CI -9.94, -7.43), mixed pastoralist/settled village ($\beta = -7.44$, 95% CI -9.00, -5.88), or market town ($\beta = -2.89$, 95% CI -4.20, -1.58) compared to being from a settlement village.

Table 3

Model 2: Results from logistic regression analyses predicting the effects of self-efficacy on women's soccer participation (N = 684)

Soccer	Odds Ratio	p-value	95% CI
Self-efficacy (mean 33.93, SD 5.70)	1.08	0.000	1.040 to 1.128
Age (<i>ref: 18–24 years</i>)			
25–34 years	0.97	0.939	0.465 to 2.030
35–49 years	0.54	0.119	0.251 to 1.170
50–59 years	0.14	0.000	0.053 to 0.361
60 years and above	0.10	0.000	0.026 to 0.348
Education (<i>ref: none</i>)			
Some primary	1.56	0.069	0.966 to 2.524
Completed primary	2.22	0.005	1.277 to 3.868
More than primary	1.32	0.463	0.626 to 2.794
Relationship status (<i>ref: married</i>)			
Regular partner, living apart	0.69	0.406	0.285 to 1.662
Single	1.14	0.775	0.475 to 2.714
Separated, divorced, widowed	0.52	0.056	0.265 to 1.016
Number of children (<i>ref: none</i>)			
1–2 children	1.39	0.626	0.368 to 5.262
3–4 children	1.15	0.840	0.292 to 4.544
5–6 children	1.08	0.918	0.262 to 4.426
7 or more children	0.60	0.490	0.138 to 2.581
Respondent works outside home	0.71	0.111	0.465 to 1.082
Member of Nikumbuke Project (<i>ref: 5–9 years</i>)			
10 years or more	1.87	0.047	1.008 to 3.465
4 years or less	0.737	0.170	0.477 to 1.140
Household monthly income (<i>ref: 5,000–9,999 ksh</i>)			
Less than 5,000 ksh	1.14	0.526	0.763 to 1.698
More than 10,000 ksh	1.08	0.832	0.548 to 2.113
Aware of household finances	0.86	0.635	0.459 to 1.609

Soccer	Odds Ratio	p-value	95% CI
Head of household is self	1.04	0.871	0.666 to 1.615
Type of community in which respondent lives (<i>ref: settled village</i>)			
Pastoralist	0.93	0.838	0.438 to 1.952
Mixed pastoralist/settle village	6.61	0.000	2.888 to 15.133
Market town	1.02	0.952	0.526 to 1.978

Discussion

This study is the first of its kind in Kenya to examine the factors that may be associated with adult women's participation in sports, particularly the potential role played by self-efficacy. Its findings suggest a bi-directional relationship between self-efficacy and women's participation in a recreational sports program. While it is beyond the scope of this cross-sectional study to determine the presence of a causal or temporal relationship between the two phenomena, it does provide strong evidence that women who play soccer have higher levels of self-efficacy on average compared to women who do not and that women who have higher GSE scores have greater odds of being members of the soccer league. These findings align with previous work on self-efficacy and physical activity conducted by McAuley and Blissmer⁹ and provide a case for further exploration of self-efficacy in this population, optimally in longitudinal studies of new community teams as they form in the future.

Sports have come to be seen as a tool to promote gender equity, giving women voice and empowering women to assume a greater role in the social worlds of home, community, and the political economy.^{43–45} Although there has been a substantial increase in the availability and number of sports programs for girls and women in Sub-Saharan Africa, some sports, notably soccer, remain traditionally male, particularly among adults.⁴⁶ In poor rural areas in the region, social space rarely exists for organized women's sports; the sphere of women's activities revolves around largely domestic activities, and little time, resources, or community support is available to women to enter the social and physical domain of organized 'play'.

To the best of our knowledge, the Nikumbuke Soccer League is unique in Kenya and may well be the only recreational soccer program for non-professional adult women in Sub-Saharan Africa. Girls play soccer in primary and secondary school, and recent programs like Safaricom's 'Chapa Dimba' and the Uweza Soccer Academy in Kenya that promote grassroots soccer for both adolescents boys and girls are contributing to an emerging pipeline from school sports to professional soccer.^{47,48} The emphasis on these programs, however, is on school-aged girls and young women, ages 18–25 years. The recreational Nikumbuke Soccer League is composed of *adult* women, the majority of whom are between the ages of 25 and 49 years and married with 3 or more children, and operates outside of the educational system and Kenyan soccer authorities.

Importantly, the Nikumbuke Soccer League provides adult women who generally have limited, if any, leisure time the opportunity to engage in recreational physical activity. The 2016 STEPwise Survey conducted by the

Kenya Ministry of Health reported the median number of minutes in which women in Kenya engage in physical activity to be 231 minutes, well above the WHO recommendation of 150 minutes daily, but, of this total, only 5.5 minutes were expended during recreational activity.⁴⁹ In addition, slightly more than half of women surveyed did not engage in any strenuous physical activity of any kind. In the Nikumbuke soccer program, women engage in weekly three-hour practices and monthly inter-village matches during the soccer 'season' that provide team members with both a venue and an occasion to engage in leisure sport.

In addition to the weakness of cross-sectional data in determining the causal and temporal relationship between self-efficacy and sports participation, as well as the extent to which the relationship may be bi-directional, this study had several other limitations. Almost 3% of respondents reported that they did not know their age (not a surprising result in an environment with limited birth registries) and were coded as missing. Doing so raised the number of missing values for age to 9.5%, reducing our confidence in the imputation of this one variable. Importantly, while Kiswahili translations on the GSE scale have been previously shown to have acceptable values of Cronbach's alpha and test-retest reliability,⁵⁰ it has not been validated in a sample as richly diverse in tribal membership, religions, and cultural norms as the present one. Future studies would be improved by the use of a task-specific self-efficacy scale such as those previously used to examine physical activity elsewhere;⁵¹ such a scale should be validated in this particular setting and population.

Conclusions

Included in the Sustainable Development Goals is a call to reduce mortality from NCDs by one third within the next decade.⁵² Epidemiologic data suggests that this target is attainable only if major reductions in NCD-related mortality in low- and middle-income countries, where as much as 80% of the NCD burden occurs, are achieved.⁵³ While rates of key NCD-risk behaviors such as tobacco and harmful alcohol use are higher in males than females, women are at greater risk of overweight/obesity and, in LMIC countries, the rate of obesity is increasing at a faster rate in rural areas than urban ones.⁵⁴ In Kenya, where 38.5% of women ages 18–44 years are estimated to have BMIs in excess of 25 (overweight), and rates of obesity increase across the lifespan,⁴⁹ programs that provide opportunities for adult women to improve their health through physical activity should be encouraged. Programs that enhance self-efficacy in women generally would also be beneficial in this and similar settings where women are constrained by gender and cultural norms that may prevent them from engaging in health-promoting leisure time physical activity.

List Of Abbreviations

BMI Body mass index

GSE General Self-Efficacy

KES Kenyan shilling

LMIC Low- and middle-income countries

M Mean

NACOSTI National Commission for Science, Technology, and Innovation

NCD Non-communicable disease

SD Standard deviation

SDG Sustainable Development Goal

US United States

USD United States dollar

WHO World Health Organization

Declarations

Ethics approval and consent to participate

This study received approval from the Institutional Review Board at [Home institution of the first author] and the National Commission for Science, Technology, and Innovation (NACOSTI) in Kenya. As the only document linking the respondents to study participation would have been a signed informed consent document, all 702 women who participated in this study provided verbal consent as stipulated by the approved study protocol.

Consent for publication

Consent was provided orally by respondents as signed documentation would have provided the only link between respondents and their participation in the study. No personal identifiers were collected as part of the interview in order to reduce the likelihood that an individual would be linked to specific responses.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Role of funding sources

The study sponsors were not involved in study design; the collection, analysis, and interpretation of data; the writing of the manuscript; and in the decision to submit the paper for publication. The corresponding author had full access to data in the study and had final responsibility for the decision to submit for publication.

Authors' contributions

FB and SCW were responsible for the conceptualization, design, and implementation of this study and for the preparation of a draft manuscript. BA, DM, and BT were instrumental at all stages of implementation. All authors read and approved the final version of this manuscript.

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