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# Fear of intimate partner and women's engagement in exercise: insights from a national survey in Kenya

Joshua Okyere<sup>1,2\*</sup>, Abigail Kabukie Dosoo<sup>2,3</sup>, Castro Ayebeng<sup>2,4</sup>, Precious Adade Duodo<sup>5</sup> and Kwamena Sekyi Dickson<sup>2</sup>

## Abstract

**Background** Women in abusive or controlling relationships often experience restrictions on their autonomy, mobility, and decision-making capacity. Furthermore, fear of a husband or partner, whether stemming from psychological abuse, coercive control, or physical violence, may influence a woman's ability to engage in health-promoting activities like exercise. However, the relationship between fear in intimate relationships and exercise remains underexplored. We examined whether there was an association between relational fear and women's engagement in exercise, as well as the direction of this association.

**Methods** We analyzed the data of 5,052 women (15–49 years) who participated in the 2022 Kenya Demographic and Health Survey. We derived the outcome variable from the question: "how many days per week do you exercise?" The responses were recoded as '0 = do not exercise' and '1/7 days = exercises'. All estimates were weighted. Cross-tabulations and two sets of binary logistic regression models were computed in STATA version 18. Statistical significance was set at  $p < 0.05$ .

**Results** Most women exercised three or more days per week (59.6%) while 22.9% did not exercise at all. Women who were most of the time afraid of their partner had a 47% higher likelihood of engaging in exercise compared to those who were never afraid (COR = 1.47, 95%CI: 1.16–1.88). After adjusting for confounders, this association weakened but remained significant (AOR = 1.33, 95%CI: 1.03–1.71). Similarly, women who were sometimes afraid of their partner showed significantly higher odds of engaging in exercise in both crude (COR = 1.30, 95%CI: 1.11–1.53) and adjusted models (AOR = 1.23, 95%CI: 1.04–1.46). Increasing age, higher education levels, rural residency and media exposure were strongly associated with increased exercise engagement.

**Conclusion** This study reveals a positive association between fear in intimate relationships and women's engagement in exercise, suggesting that exercise may serve as a coping mechanism for some women experiencing relational fear. While these results contribute to the limited literature on the intersection of intimate partner dynamics and preventive health behaviors, they remain preliminary. Further research is needed to explore the causal pathways, contextual influences, and potential long-term implications of relational fear on exercise engagement.

\*Correspondence:

Joshua Okyere  
joshuaokyere54@gmail.com; joshua.okyere@hud.ac.uk

Full list of author information is available at the end of the article



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**Keywords** Intimate partner relationship, Fear, Exercise, Public health, Physical activity

## Background

The world is currently experiencing a significant increase in the prevalence of non-communicable diseases (NCDs) including cardiovascular diseases, diabetes, cancers, chronic respiratory diseases, and renal diseases [1]. Sub-Saharan African (SSA) countries are not exempted from this trend. One study has shown that disability adjusted life years (DALYs) lost due to NCDs in SSA increased by 67% between 1990 and 2017 [2]. As such, promoting primary preventive measures is a priority for slowing the NCD rise across the globe and particularly in SSA.

Kenya, like many other countries in the SSA region, faces a dual burden of communicable and NCDs [3]. A cross-sectional national survey revealed that 15.9% of Kenyan women aged 15–49 live with at least one NCD, with hypertension being the most prevalent disease [4]. Studies have attributed the burden of NCDs among Kenyan women to factors such as age, higher wealth index, and being married/previously married [4–6]. Aside these socio-demographic factors, lifestyle factors such as alcohol consumption, dietary habits and being overweight/obese have been reported in the existing literature [6, 7].

Regular physical activity or exercise is another well-documented lifestyle factor that has been to have significant impact on improving mental and physical health outcomes [8]. The WHO recommends that adults (18–64 years) engage in at least 150 min of moderate-intensity physical activity throughout the week [8]. According to Katzmarzyk et al. [9], the “*proportions of NCDs attributable to physical inactivity range from 1.6% for hypertension to 8.1% for dementia*”. Wamai, Kengne and Levitt [6] report that 7.7% of adults in Kenya are physically inactive. Another study [10] from Kenya found age, wealth status, educational level, obesity status, and place of residence to be significant predictors of physical activity/exercise.

Beyond the widely established predictors of physical activity/exercise, there is limited attention on the role intimate partner relationship characteristics. Prior studies have demonstrated that women in abusive or controlling relationships often experience restrictions on their autonomy, mobility, and decision-making capacity [11, 12]. Furthermore, fear of a husband or partner, whether stemming from psychological abuse, coercive control, or physical violence, may erode women's self-efficacy and motivation to engage in health-promoting activities like exercise. However, the relationship between fear in intimate relationships and exercise remains underexplored. To the best of our knowledge, after an extensive literature review, we found no published study that has attempted to assess the potential association between relational

fear (i.e., fear of a partner) and women's exercising habits. To fill this significant knowledge gap, we examined whether there was an association between relational fear and women's engagement in exercise, as well as the direction of this association. Given the critical role of physical activity in preventing NCDs, understanding how relational fear impacts exercise engagement is essential for informing public health interventions.

## Methods

### Data source and design

This study utilized data from the 2022 Kenya Demographic and Health Survey (KDHS), a nationally representative, cross-sectional survey designed to collect data on a wide range of health and demographic indicators. The KDHS employs a stratified two-stage sampling design to ensure representativeness at the national, regional, and urban-rural levels [13, 14]. In the first stage, enumeration areas (EAs) were selected using probability proportional to size. In the second stage, a systematic random sample of households was drawn from each selected EA [13]. Data were collected through face-to-face interviews using standardized questionnaires, which covered topics such as reproductive health, domestic violence, and health behaviors, including physical activity. For this analysis, we focused on women aged 15–49 years who responded to questions on fear of their husband or partner and engagement in physical activity, resulting in a sample of 5,052 women.

### Study variables

#### Outcome

We derived the outcome variable from the question: “how many days per week do you exercise?” In order to have a binary outcome for the regression, the responses were recoded as ‘0 = do not exercise’ and ‘1/7 days = exercises’. To estimate the frequency of exercise, the variable was recoded again to have three responses: never exercises, <3 days per week, and 3 or more days per week. This threshold was selected in line with other existing epidemiological studies [15, 16].

#### Exposure

The exposure variable was relational fear. We defined this as respondent being afraid of their partner. The KDHS puts the question as, “are you are afraid of your partner?” We maintained the original response categories: never afraid, sometimes afraid, and most of the times afraid.

### Confounders

Informed by previous studies that have investigated the predictors of physical activity/exercise [8–10] as well as the predictors of relational fear [17, 18], we selected the following factors are common to both phenomena as confounders. These included age (categorized into seven groups: 15–49 years), education level (no education, primary, secondary, and higher education), media exposure (whether the respondent had regular access to newspapers, radio, or television), alcohol consumption (whether the respondent reported consuming alcohol), place of residence (urban or rural), and wealth index (poorest, poorer, middle, richer, and richest). We also included whether women had experienced physical, sexual, emotional, or any severe violence from their partner. The DHS categorizes any severe violence as a composite index of ever been kicked or dragged by husband/partner; ever been strangled or burnt by husband/partner; and, ever been threatened with knife/gun or other weapon by husband/partner.

### Statistical analyses

Data analyses were performed in STATA version 18 (StataCorp, College Station, TX, USA). To account for sampling biases, we weighted the data by applying the sample weight v005. Cross-tabulations were computed to show the weighted distribution of women's engagement in exercise across relational fear and the confounding variables. We then performed a bivariable logistic regression to assess the crude association between relational fear and engagement in exercise. The results were presented in crude odds ratios with the corresponding 95% confidence intervals. We then fitted a multivariable logistic regression to examine the adjusted association between fear of a partner and engagement in exercise, controlling for potential confounders. The 'svy' command in STATA was used to account for the complex survey design and clustering within households. This ensured that estimates (e.g., means, proportions, regression coefficients) are representative of the target population and account for the survey's design effects. Multinomial logistic regression model was computed to assess the association between fear of a partner and the number of days exercised. Statistical significance was kept at  $p < 0.05$ .

## Results

### Distribution of study participants' characteristics

Overall, 9.0% of the weighted sample were most of the time afraid of their partners while 19.6% were sometimes afraid (Table 1). Emotional violence was the most reported violence experienced (31.6%) followed by physical violence (27.5%) and sexual violence (10.7%). On the other hand, 15.5% of the participants had experienced severe violence from their partner. Most participants

were aged 25–29 years (22.6%), had primary education (38.4%), resided in rural areas (58.5%), were exposed to media (78.5%), and were in the richest quintile (24.3%). Only 5.2% drank alcohol, and 41.9% of the sample were overweight or obese.

### Proportion of women who exercised

Among the weighted sample of 5,052 women, 77.1% (95% CI: 75.2–78.8%) reported engaging in exercise. Women who were most of the time afraid of their partner had the highest proportion of exercise participation (80.3%, 95% CI: 74.8–84.8%), followed by those sometimes afraid (79.0%, 95% CI: 75.3–82.3%). A significantly higher proportion of women who exercised had experienced emotional violence (80.4%) or physical violence (79.7%), as well as those whose partners exhibited controlling behavior (77.8%). Exercise participation was significantly higher among those aged 40–44 years (84.5%), those with primary education (81.5%), those in rural areas (81.0%), and women in the poorest wealth index (80.4%) (Table 1).

### Distribution of the number of days exercised per week

Regarding the number of days exercised, most women exercised three or more days per week (59.6%) while 22.9% did not exercise at all (Fig. 1).

### Association between relational fear and women's engagement in exercise

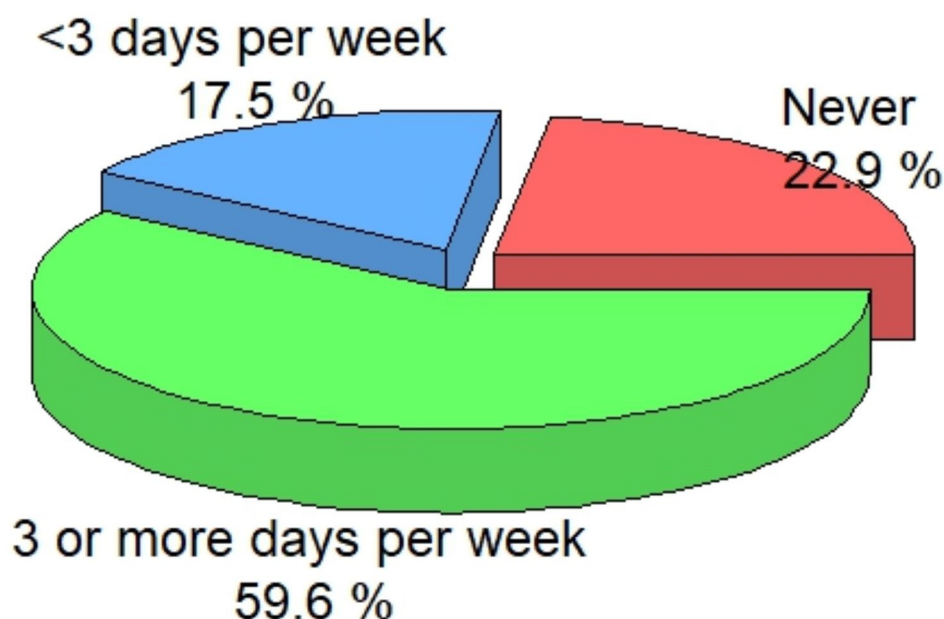
In Model I, women who were most of the time afraid of their partner had a 47% higher likelihood of engaging in exercise compared to those who were never afraid (COR = 1.47, 95%CI: 1.16–1.88,  $p < 0.01$ ) (see Table 2). After adjusting for covariates in Model II, this association weakened but remained significant (AOR = 1.33, 95%CI: 1.03–1.71,  $p < 0.05$ ). Similarly, women who were sometimes afraid of their partner showed significantly higher odds of engaging in exercise in both crude (COR = 1.30, 95%CI: 1.11–1.53,  $p < 0.01$ ) and adjusted models (AOR = 1.23, 95%CI: 1.04–1.46,  $p < 0.05$ ). Increasing age, higher education levels, rural residency and media exposure were strongly associated with increased exercise engagement.

### Association between relational fear and number of days exercised

Women who reported being afraid most of the time had a 37% higher likelihood of exercising 3 or more days per week compared to those who were never afraid of their partner [RRR = 1.37, 95%CI: 1.06–1.77]. Similarly, those who were sometimes afraid were 23% more likely to exercise 3 or more days per compared to those who were never afraid of their partner [RRR = 1.23, 95%CI: 1.03–1.46] (Table 3).

**Table 1** Sample distribution and proportion of women who exercised

Characteristics	Weighted sample <i>n</i> (%)	Proportion of women who exercised <i>n</i> (%) [95%CI])	<i>p</i> -values
<b>Overall</b>	<b>5052 (100.0)</b>	<b>3893 (77.1 [75.2–78.8])</b>	0.171
<b>Afraid of partner</b>			
Never afraid	3609 (71.4)	2747 (76.1 [73.9–78.2])	
Sometimes afraid	989 (19.6)	782 (79.0 [75.3–82.3])	
Most of the time afraid	453 (9.0)	364 (80.3 [74.8–84.8])	
<b>Physical violence</b>			<b>0.027</b>
No	3661 (72.5)	2784 (76.1 [73.9–78.1])	
Yes	1391 (27.5)	1109 (79.7 [77.0–82.2])	
<b>Emotional violence</b>			<b>0.003</b>
No	3456 (68.4)	2609 (75.5 [73.3–77.6])	
Yes	1596 (31.6)	1284 (80.4 [77.7–82.9])	
<b>Sexual violence</b>			0.087
No	4513 (89.3)	3455 (76.6 [74.7–78.3])	
Yes	539 (10.7)	438 (81.2 [75.8–85.6])	
<b>Any severe violence</b>			0.056
No	4269 (84.5)	3263 (76.4 [74.4–78.3])	
Yes	783 (15.5)	630 (80.4 [76.6–83.8])	
<b>Partner has controlling behavior</b>			0.236
No	1955 (38.7)	1484 (75.9 [73.1–78.5])	
Yes	3096 (61.3)	2409 (77.8 [75.6–79.9])	
<b>Age</b>			<b>&lt; 0.001</b>
15–19 years	319 (6.3)	243 (76.3 [70.5–81.3])	
20–24 years	923 (18.3)	667 (72.2 [68.1–76.0])	
25–29 years	1141 (22.6)	849 (74.4 [70.1–78.3])	
30–34 years	917 (18.1)	707 (77.1 [72.8–80.8])	
35–39 years	783 (15.5)	609 (77.8 [73.0–81.9])	
40–44 years	550 (10.9)	465 (84.5 [79.8–88.3])	
45–49 years	417 (8.3)	352 (84.4 [80.1–87.9])	
<b>Education</b>			<b>&lt; 0.001</b>
No formal education	310 (6.2)	219 (70.7 [66.0–75.0])	
Primary	1943 (38.4)	1582 (81.5 [79.1–83.6])	
Secondary	1799 (35.6)	1365 (75.8 [72.7–78.8])	
Higher	1000 (19.8)	726 (72.7 [67.7–77.1])	
<b>Media exposure</b>			0.057
No	1086 (21.5)	806 (74.2 [70.9–77.3])	
Yes	3966 (78.5)	3086 (77.8 [75.7–79.8])	
<b>Drinks alcohol</b>			0.833
No	4789 (94.8)	3688 (77.0 [75.2–78.8])	
Yes	263 (5.2)	205 (77.8 [69.7–84.3])	
<b>Wealth index</b>			<b>&lt; 0.001</b>
Poorest	816 (16.1)	656 (80.4 [77.5–83.0])	
Poorer	845 (16.7)	695 (82.2 [79.1–84.9])	
Middle	904 (17.9)	716 (79.2 [75.9–82.0])	
Richer	1260 (24.9)	934 (74.1 [70.2–77.7])	
Richest	1227 (24.3)	892 (72.7 [67.7–77.2])	
<b>Overweight/obese</b>			0.756
No	2933 (58.1)	2267 (77.3 [75.0–79.4])	
Yes	2119 (41.9)	1626 (76.8 [74.0–79.3])	
<b>Residence</b>			<b>&lt; 0.001</b>
Urban	2095 (41.5)	1499 (71.6 [67.7–75.2])	
Rural	2957 (58.5)	2394 (81.0 [79.4–82.8])	



**Fig. 1** Distribution of the number of days exercised per week

## Discussion

The aim of this study was to examine whether relational fear has any association with women's engagement in exercise, as well as understand the direction of the potential association. Our findings show that nearly a quarter of the participants (22.9) did not engage in exercises. This differs from previous studies from Kenya that found that 7.7% were physically inactive [6, 10]. However, a little over half (59.6%) of the participants exercised three or more days a week. A plausible explanation for this difference could be the measurement. While this study measured exercise (i.e., a planned, structured, repetitive, and performed activity with the objective of improving or maintaining physical fitness and overall health), the cited studies [6, 10] measured physical activity which include walking, household chores, occupational tasks, and recreational activities.

Regarding the main hypothesis, we found evidence suggesting a statistically significant association between relational fear and women's engagement in exercises. Previous studies have highlighted how women in abusive or controlling relationships often experience restrictions on their autonomy, mobility, and health decision-making capacity [11, 12]. As such, we expected an inverse association to exist; however, the findings indicate that there is a positive association between relational fear and women's engagement in exercise. The exact pathway of this association is unclear. Nonetheless, we position the results in the perspective of the Stress and Coping Theory [19, 20], which posits that individuals employ various strategies, including health-promoting behaviors like exercise, to cope with stressors. This coping can

be problem-focused (addressing the stressor directly) or emotion-focused (managing the emotional response to the stressor) [19, 21]. Literature suggests that as an emotion-focused strategy, exercise helps to regulate mood, reduce anxiety, and improve self-efficacy [22, 23]. As such, women in fear-driven relationships might turn to exercise to mitigate the psychological toll of their experiences, achieving a temporary sense of peace or empowerment. However, further investigation is required to determine the causal pathway between relational fear and women's exercising habits. Future studies should consider qualitative approaches to gain deeper insights into why women will have an increase in their exercise habits in the face of relational fear.

Higher educational attainment was associated with a higher likelihood to engage in exercise. Our findings corroborate that of Kari et al. [24] whose study revealed that an additional year of education significantly increases the probability of engaging in exercise. Similar findings have been reported by Davies et al. [25]. A plausible explanation for this association could be that women with higher education are more likely to have an enhanced health literacy and awareness of the benefits of exercising, thus, enabling them to make informed choices about their health even in challenging personal circumstances.

Consistent with previous studies [26, 27], we found that women exposed to media have a 47% higher likelihood of exercising than those who lacked such exposure. It must be noted that women's image of a 'perfect' body or healthy woman is shaped by the contents and influencers on the various media platforms. Additionally, the media serves as a conduit for the dissemination of health

**Table 2** Bivariable and multivariable logistic regression model results

Characteristics	Model I Crude Odds Ratio (95%CI)	Model II Adjusted Odds Ratio (95%CI)
<b>Afraid of partner</b>		
Never afraid	Ref.	Ref.
Sometimes afraid	<b>1.30 [1.11–1.53]**</b>	<b>1.23 [1.04–1.46]*</b>
Most of the time afraid	<b>1.47 [1.16–1.88]**</b>	<b>1.33 [1.03–1.71]*</b>
<b>Physical violence</b>		
No	Ref.	-
Yes	<b>1.26 [1.09–1.45]**</b>	-
<b>Emotional violence</b>		
No	Ref.	-
Yes	<b>1.35 [1.18–1.56]***</b>	-
<b>Sexual violence</b>		
No	Ref.	-
Yes	<b>1.52 [1.20–1.93]***</b>	-
<b>Any severe violence</b>		
No	Ref.	-
Yes	<b>1.33 [1.11–1.59]**</b>	-
<b>Partner has controlling behavior</b>		
No	Ref.	
Yes	<b>1.14 [1.00–1.29]*</b>	
<b>Age</b>		
15–19 years	Ref.	Ref.
20–24 years	0.80 [0.61–1.05]	0.84 [0.64–1.11]
25–29 years	0.95 [0.73–1.24]	1.04 [0.79–1.37]
30–34 years	1.17 [0.89–1.54]	1.29 [0.97–1.71]
35–39 years	<b>1.45 [1.09–1.94]*</b>	<b>1.59 [1.18–2.14]**</b>
40–44 years	<b>1.54 [1.12–2.11]**</b>	<b>1.62 [1.17–2.23]**</b>
45–49 years	<b>1.58 [1.14–2.20]**</b>	<b>1.63 [1.15–2.30]**</b>
<b>Education</b>		
No formal education	Ref.	Ref.
Primary	<b>1.97 [1.64–2.38]***</b>	<b>1.87 [1.51–2.33]***</b>
Secondary	<b>1.55 [1.28–1.87]***</b>	<b>1.83 [1.43–2.33]***</b>
Higher	<b>1.40 [1.13–1.74]**</b>	<b>1.90 [1.43–2.52]***</b>
<b>Media exposure</b>		
No	Ref.	Ref.
Yes	<b>1.44 [1.26–1.65]***</b>	<b>1.47 [1.24–1.73]***</b>
<b>Drinks alcohol</b>		
No	Ref.	-
Yes	0.95 [0.71–1.28]	-
<b>Wealth index</b>		
Poorest	Ref.	Ref.
Poorer	<b>1.43 [1.15–1.77]**</b>	0.98 [0.77–1.25]
Middle	1.13 [0.93–1.38]	0.80 [0.63–1.01]
Richer	0.87 [0.73–1.04]	<b>0.69 [0.53–0.90]**</b>
Richest	<b>0.82 [0.67–0.99]*</b>	<b>0.67 [0.48–0.91]*</b>
<b>Overweight/obese</b>		
No	Ref.	-
Yes	1.01 [0.89–1.15]	-
<b>Residence</b>		
Urban	Ref.	Ref.
Rural	<b>1.60 [1.41–1.81]***</b>	<b>1.39 [1.16–1.66]***</b>
<b>Model fit statistics</b>		



**Table 2** (continued)

Characteristics	Model I Crude Odds Ratio (95%CI)	Model II Adjusted Odds Ratio (95%CI)
AIC	5774.757	5627.693
Prob > chi2	< 0.001	< 0.001

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; (-) variables excluded after backward Stepwise approach

**Table 3** Association between relational fear and number of days exercised

Characteristics	Exercised < 3 days per week Model I RRR (95%CI)	Exercised 3 or more days per week Model II RRR (95%CI)
<b>Afraid of partner</b>		
Never afraid	Ref.	Ref.
Sometimes afraid	1.20 [0.85–1.69]	<b>1.37 [1.06–1.77]*</b>
Most of the time afraid	1.25 [0.99–1.56]	<b>1.23 [1.03–1.46]*</b>

\* $p < 0.05$ ;

**Model I and Model II** adjusted for age, education, media exposure, place of residence, wealth index

messages including campaigns that encourage women to exercise. Hence, those exposed to the media are more likely to gain this knowledge and act on it. Compared to adolescents, women aged 45–49 years were 1.63 times more likely to engage in exercise. This is inconsistent with previous studies that suggest a higher exercise rate among younger women [28, 29]. This age group often coincides with the onset of menopause and increased susceptibility to NCDs such as cardiovascular diseases, cervical and breast cancer, diabetes, and chronic respiratory diseases [4]. Women of this age may be aware of their risk and therefore, prioritize preventive health measures like exercising.

The findings of this study indicate that women in the wealthier index are less likely to engage in exercise – a result that is similar to Girchu et al.'s study [10]. It must be noted that despite the high access to resources like gyms, personal trainers, or recreational facilities, wealthier women are likely to have more sedentary occupations, greater reliance on vehicles, or reduced need for physically demanding daily activities. Thus, reducing their opportunity to exercise. Moreover, the busy work schedule of wealthier individuals limits their opportunity to make time to exercise. We are not surprised that rural residents engaged more in exercise than their urban counterparts. Urban areas harbor many affluent women who due to the heavy professional demands of city life, will lack the opportunity to exercise.

### Strengths and limitations

The cross-sectional nature of the data prevents causal inferences; thus, we are unable to claim causality. Additionally, the self-reported nature of the data may introduce social desirability bias, particularly in reporting

fear or exercise behaviors. Since we relied on secondary data, it meant that we were restricted to only variables within the dataset. Hence, we were unable to control for some key confounders such as availability of social support, and content of programs assessed on media platforms, among others. The findings may not apply to older women (50 years and above) since the data used did not cover that age group. The KDHS did not also disaggregate the type of relational fear. So, it is unclear whether this fear is physical fear, emotional, or any other nomenclature. Nevertheless, this study is the first of its kind in SSA to investigate whether relational fear is associated with exercise behavior. As such, it contributes significantly to what is already known about exercise among women of reproductive age. Also, the multi-stage sampling technique of the KDHS together with the sample weights ensure that all estimates are representative of the population of women aged 15–49 years in Kenya.

### Conclusion

This study reveals a positive association between fear in intimate relationships and women's engagement in exercise. Contrary to the expectation that relational fear may restrict autonomy and limit health-promoting behaviors, the findings suggest that women experiencing relational fear might use exercise as a coping mechanism. While these results contribute to the limited literature on the intersection of intimate partner dynamics and preventive health behaviors, they remain preliminary. Further research is needed to access the causal pathways, contextual influences (e.g., social support, cultural norms, and access to safe exercise spaces), and potential long-term implications of relational fear on exercise engagement. These insights could guide targeted interventions that address both psychological well-being and physical activity within the context of intimate partner relationships.

### Abbreviations

AIC	Akaike Information Criterion
AOR	Adjusted Odds Ratio
COR	Crude Odds Ratio
CI	Confidence Interval
NCDs	Non-communicable Diseases
SSA	Sub-Saharan Africa
VIF	Variance Inflation Factor

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### Author contributions

JO conceived and designed the study. JO and CA contributed to the design of the analysis. JO performed the formal analysis and provided methodological insights. JO, AKD, CA, PAD, and KSD drafted the initial manuscript. All authors read, revised and approved the final manuscript for submission. JO had the responsibility of submitting the manuscript.

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We had no funding.

### Data availability

The datasets generated and/or analysed during the current study are available in the Measure DHS repository: <http://dhsprogram.com/data/available-datasets.cfm>.

### Declarations

#### Ethical approval and consent to participate

We did not need to seek ethical clearance because the KDHS dataset is publicly available. We obtained the datasets from the KDHS Program after completing the necessary registration and getting approval for their use. We followed all the ethical guidelines that pertain to using secondary datasets in research publications. Details of KDHS data and ethical standards followed can be found here: <http://goo.gl/ny8T6X>.

#### Consent for publication

None declared.

#### Competing interests

The authors declare no competing interests.

#### Author details

<sup>1</sup>School of Human and Health Sciences, University of Huddersfield, Queensgate, Huddersfield, England, United Kingdom

<sup>2</sup>Department of Population and Health, University of Cape Coast, Cape Coast, Ghana

<sup>3</sup>International Federation of Women Lawyers, FIDA-Ghana, Accra North, Ghana

<sup>4</sup>School of Demography, Australian National University, Canberra, Australia

<sup>5</sup>Department of Nursing, School of Human and Health Sciences, University of Huddersfield, Queensgate, Huddersfield, England, United Kingdom

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