

## ORIGINAL ARTICLE

# Prevalence of physical inactivity among Nigerian women: do socio-demographic characteristics, women's personal attributes and psychosocial factors play any role?

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**Purpose:** Few studies have examined specific women's attributes and factors associated with physical inactivity. This study investigated the prevalence of physical inactivity and its associations with women's personal characteristics and psychosocial factors among Nigerian women.

**Methods:** This cross-sectional survey recruited 1560 women whose ages ranged between 18 and 65 years from Ile - Ife, Osun State, Nigeria. A multi-stage sampling technique was used to recruit the respondents. Data on socio-demographic characteristics, women's personal attributes including parity and menopausal status were obtained. Physical activity was assessed using the International Physical Activity Questionnaire over the last seven days. Psychosocial factors including self-efficacy, social support, and perceived exercise barrier were evaluated using validated questionnaires.

**Results:** Prevalence of physical inactivity among respondents was 32.5%. The results showed that older women (OR=0.49), those with a high income (OR=0.54), post-menopausal (OR=0.34), multiparous women (OR=0.58), those with a high perceived barrier (OR=0.34) were less likely to be physically active. However, women with high educational level (OR=2.16) and those with high self-efficacy (OR=2.12) were more likely to be physically active.

**Conclusion:** The prevalence of physical inactivity among Nigerian women differs across socio-demographic characteristics and women's personal attributes. Multi-parity, menopausal status, and psychosocial factors were significantly associated with physical inactivity.

**Keywords:** Physical inactivity, Women's attribute, Nigerian women.

## Nijerya'lı kadınlarda fiziksel aktivite görülme sıklığı: sosyodemografik özellikler, kişisel tutumlar ve psikososyal faktörler rol oynar mı?

**Amaç:** Fiziksel aktivite yetersizliği ile ilişkili spesifik kadın tutum ve davranışlarını çok az çalışma incelemiştir. Bu çalışmada, Nijerya'lı kadınlarda, fiziksel aktivite yetersizliğinin görülme sıklığı ve kadınların kişisel özellikleri ve psikososyal faktörlerle ilişkisi incelendi.

**Yöntem:** Bu kesitsel anket çalışmasına Nijerya, Osun Eyaleti, Ile-Ife'den 18-65 yaşları arasında 1560 kadın katıldı. Çalışmaya alınmaları belirlemek için çok aşamalı bir örnekleme tekniği kullanıldı. Kadınların sosyo-demografik özellikleri, kişisel tutumları, doğum sayısı ve menopoz durumu hakkında veriler elde edildi. Uluslararası Fiziksel Aktivite Anketi kullanılarak son yedi gündeki fiziksel aktivite seviyeleri değerlendirildi. Öz yeterlik, sosyal destek ve algılanan egzersiz bariyeri gibi psikososyal faktörler geçerliliği onaylanmış anketler kullanılarak değerlendirildi.

**Bulgular:** Görüşülen kişiler arasında fiziksel aktivite yetersizliğinin görülme sıklığı % 32,5 idi. Sonuçlar, yaşlı kadınların (OR=0.49), yüksek geliri kadınların (OR=0.54), menopozdan sonrası dönemdeki kadınların (OR=0.34), birden fazla doğum yapan kadınların (OR=0.58) ve algılanan bariyeri yüksek olan kadınların (OR=0.34) fiziksel olarak aktif olma olasılığının da daha düşük olduğunu gösterdi. Bunun aksine, yüksek eğitim düzeyi (OR=2.16) ve öz yeterliğine sahip olan kadınların ise (OR=2.12) fiziksel olarak daha aktif olduğu kaydedildi.

**Sonuç:** Ankete katılan Nijeryalı kadınlar arasında fiziksel aktivite yetersizliği görülme sıklığı, sosyodemografik özellikler ve kadınların kişisel özelliklerine göre farklılık göstermektedir. Birden fazla doğum yapma, menopozal durum ve psikososyal faktörler fiziksel inaktivite ile anlamlı şekilde ilişkiliydi.

**Anahtar kelimeler:** Fiziksel aktivite yetersizliği, Kadının tutumu, Nijerya'lı kadın.

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**M**orbidity and mortality rate in adults have skewed gender preponderance towards women.<sup>1,2</sup> Many chronic non-communicable diseases such as cardiovascular disease (CVD), type-2 diabetes, metabolic syndrome, cancers, and chronic obstructive pulmonary diseases have been reported to be leading causes of death among women globally.<sup>1,3</sup> Among these, CVD alone is the largest killer of women worldwide, and increasingly impacts on women's health in developing countries.<sup>4</sup> Similarly, the World Health Organization (WHO) ranked physical inactivity as the fourth risk factor among ten leading causes of morbidity and mortality with an estimate of about 2 million deaths globally of which women constituted higher percentage especially in low and middle-income nations.<sup>4,5</sup>

Evidence from epidemiological studies has shown that progressive weight gain in women is not limited to sedentary behavior alone but as a result of childbearing and caring.<sup>6,7</sup> Furthermore, as women grow older ( $\geq 55$  years), cessation of menstrual flow and hormonal changes have detrimental effects on physical, physiological, and psychological functioning.<sup>8</sup> In addition, reports from North America showed that more than half of Canadian women were reported to be physically inactive,<sup>9,10</sup> while 65% of American women were reported to engage in the vigorous physical activity (PA) lasting for less than 10 minutes per day.<sup>11</sup> Hence, women are more likely to face a serious decline in PA participation.

Studies have shown that PA is capable of preventing or controlling the development of chronic non-communicable diseases among individuals of all ages especially women.<sup>12,13</sup> However, data on the prevalence of physical inactivity in developing African countries are

sparse. In the recent time, data on PA prevalence in many African countries have shown that there was a wide variation in PA participation across the continent. For instance, the prevalence of physical inactivity was reported to be 52.6%, 49.1%, and 44.7% in Mauritania, Swaziland, and South Africa, respectively, but was as low as 7.8%, 8.4%, and 8.8% in Burkina Faso, Malawi, and Ghana, respectively.<sup>14</sup> Although reasons for the differences were not advanced, and there was little or no information about women's physical inactivity.

The PA as a form of health behavior may be explained using the social cognitive theory. Psychosocial factors such as perceived barriers, social support, perceived benefit, and self-efficacy are recognized as the core features that may affect exercise engagement.<sup>15</sup> Furthermore, several factors including environmental, socio-demographic, time constraint, socio-economic status, neighborhood safety and access to recreational facilities have been reported as some of the barriers to PA participation among women.<sup>16-18</sup> Although several studies have focused on factors affecting PA, there seems to be a dearth of information on women's personal attributes such as marital status, parity and menopausal status associated with physical inactivity among Nigerian women. The outcome of this study may help to inform policy formulations for providing a strategic plan for disease prevention, disability and mortality control among women in sub-Saharan Africa. Therefore, the objective of this study was to assess the prevalence of physical inactivity and its associations with socio-demographic, women's personal attributes; parity and menopausal status and as well as psychosocial factors among Nigerian women.

## METHODS

### Respondents and study design

This cross-sectional study recruited 1560 women whose ages ranged between 18 and 65 years using a multi-stage sampling technique. The study was performed in Ile - Ife, the ancestral home of Yoruba ethnic group which is a semi-urban community in Southwest, Nigeria. Data on socio-demographic characteristics which includes age, occupation, and income were recorded. Women's personal attributes including marital, parity and menopausal status were obtained. Psychosocial factors including exercise self-efficacy, social support, and perceived barrier to exercise were assessed using validated questionnaires. The physical inactivity level of the respondents was evaluated by distinguishing those that were physically active from inactive individuals using the International Physical Activity Questionnaire (IPAQ).

The protocol for this study was approved by the Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospitals Complex, Ile - Ife, Nigeria. The guidelines for conducting community survey by the World Health Organization<sup>19</sup> were used in this study. Eight out of 11 political wards in Ife Central Local Government Area were randomly selected. Permission to conduct the study was sought from the traditional chiefs and political leaders in each of the community within the eight political wards. In each ward, three census enumeration areas were randomly selected to include approximately 65 women whose ages ranged between 18 and 65 years old. Houses with odd numbers were selected until 65 eligible and consented women were recruited per enumeration area. The purpose of the study was explained to the respondents and written informed consent was obtained. Information on marital status, parity, and menopausal status was obtained while copies of the IPAQ were administered to the respondents to assess PA level. Upon completion, copies of the questionnaire were collected on the spot. Out of the 1560 copies of the questionnaire that were administered, only 1250 copies were valid for analysis yielding a response rate of 80.1%.

### The International Physical Activity Questionnaire (IPAQ)

The IPAQ, an internationally developed questionnaire was used to assess physical activity of the respondents. The questionnaire sought questions on PA in the last seven days. Respondents were asked the number of days they did vigorous PA, moderate PA (not including walking), and walking, as well as the number of hours and minutes per day they did the three kinds of activities in the last seven days respectively. The PA included any PA that people did: (1) at work, (2) as part of house and yard work, (3) to get from place to place, and (4) in spare time for recreation, exercise or sport, but with no information on frequency and duration for these separate domains. Calculated total hours for vigorous PA, moderate PA, and walking were determined respectively. A MET-hours was derived by multiplying the respective total hours with the metabolic equivalent (MET) value of vigorous PA (MET=8.0), moderate PA (MET=4.0), and walking (MET=3.3), and then adding all three. Then total PA score was calculated and rated as "Low" (<500 MET-min per week), "Moderate" (600-1400 MET-min per week) "High" (>1500 MET-min per week) depending on the total score obtained. It was administered and scored based on stipulated criteria. The questionnaire has been reported to have an acceptable test-retest reliability and criterion validity.<sup>20,21</sup>

The three groups were categorized as sufficiently physically active or physically inactive. The sufficiently physically active group included respondents in the moderate- or high-intensity categories who met the WHO PA recommendation. According to the new WHO global standard, satisfying the recommendations for healthy physical activity was defined as engaging in at least 150 minutes of moderate-intensity activity per week, 75 minutes of vigorous-intensity activity per week, or an equivalent combination of moderate- and vigorous-intensity activity<sup>22</sup>. The IPAQ was translated and culturally adapted to Yoruba language, the local language of the respondents. The test-retest reliability value of IPAQ was found to be moderate with ICC = 0.433 (95% CI = 0.325 - 0.531).

### Psychosocial factors

Psychosocial factors were assessed using the following questionnaires; Exercise Self-Efficacy Scale (ESES); Medical Outcome Study Social Support Questionnaire (MOSSSQ), and Exercise Benefits and Barrier Scale (EBBS). The questionnaires were translated into Yoruba language and back-translated by a team of experts from the Department of Yoruba language, Obafemi Awolowo University, Ile-Ife, Nigeria. The English versions of the questionnaires were first pre-tested in the study area before the translation which was undertaken after noting that there were no ambiguous areas in the questionnaires. Thereafter, a test-retest reliability of these questionnaires was done by the researchers before the use for this study. Forty (40) individuals made up of adult men and women who could read and understand both Yoruba and English languages were recruited for the pre-test and test-retest reliability of the instruments. The English versions of the questionnaires were first administered to the respondents. A week later, the Yoruba versions were administered to the same 40 respondents. The ESES (ICC=0.90, 95% CI=0.68-0.96), MOSSSQ (ICC=0.91, 95% CI=0.86-0.94), and EBBS (ICC=0.80, 95% CI=0.70-0.88) recorded good test-retest reliabilities.

The ESES developed by Bandura<sup>23</sup> was used to assess the physical activity specific exercise self-efficacy of the respondents. The scale is a self-administered questionnaire used as a measure of the confidence in one's ability to persist with exercise in various situations representing the areas of negative effect, resisting relapse, and making time for exercise. The scale asked respondents to rate how certain they were that they could exercise for most days of the week in a range of situations that could likely affect their exercise participation. A response scale of 0 to 3 for each question was used with 0 representing "Not at all true" and 3 "Always true". The amount of social support available to the respondent was measured using the MOSSSQ. The scale is a 19-item scale developed by Sherbourne and Stewart.<sup>24</sup> The instrument consists of four separate social support subscales and an overall functional social support index. A higher score on the scales indicates more

support. Each item is scored on a 5-point Likert scale, and the scores indicate the degree to which the respondent agrees or disagrees with a particular item question (1=none of the time, 5=all of the time). The minimum possible score is 19 which indicate low social support and the maximum possible score is 95.

The barrier component of the EBBS developed by Sechrist et al<sup>25</sup> was used to assess the perceived exercise barrier of respondents. The barrier component of the EBBS, which could be used separately as described by the authors, consists of 14 items which are rated on a 4-point Likert-type scale. The barrier component comprised 14 items categorized into four subscales: exercise milieu; time expenditure; physical exertion; and family discouragement. The minimum score for the barrier scale is 14 indicating less perceived barriers to physical activity while the maximum score is 56. Obtained scores for the ESES and EBBS were divided by the total possible score and multiplied by 100 to obtain a percentage score. The MOSSSQ scale scores were transformed to a 0-100 scale using the following formula:  $100 \times (\text{observed score} - \text{minimum possible score}) / (\text{maximum possible score} - \text{minimum possible score})$ . The 25th, 50th and 75th percentiles were used to label transformed-scores into lower, middle and upper quartiles representing "low", "medium" and "high" levels of self-efficacy, social support or perceived barriers respectively. Socio-demographic and clinical data such as age, gender, occupation, the level of education, marital and menopausal status were also documented for each respondent.

### Statistical analysis

Data were summarized using descriptive statistics of frequency, percentages, mean and standard deviation. Chi-square test was used to compare physically active and inactive groups as well as post and pre-menopausal women. Multinomial logistic regression analysis with adjusted odd ratios (ORs) and 95% CIs was used to evaluate associations of physical inactivity with socio-demographic variables, women's personal attributes including parity and menopausal status, and psychosocial factors of the respondents. ORs with 95% confidence intervals (CIs) were calculated for the reference category of respondents whose ages ranged between 20 and 34 years, pre-

menopausal women, those who were single or never married and no child. Others were those earning less than #50,000 per month, those with primary school education, those who were students, those with low exercise self efficacy, social support, and perceived exercise barrier. The adjustment was made for all studied variables while the alpha level was set at  $p < 0.05$ . Data analysis was conducted using the Statistical Package for Social Science (SPSS), Windows Version 19 (SPSS Inc, Chicago, IL, USA).

## RESULTS

Table 1 shows the socio-demographic characteristics and prevalence of physical activity and inactivity of all respondents. There were 140 (11.4%) post-menopausal and 1110 (88.6%) premenopausal women with a mean age of 38.9 (6.4) years. Prevalence of physical inactivity was 35.2 %, and about two-third of respondents (64.8%) were physically active. Physical inactivity was significantly higher among those who had more than four children, post-menopausal women, low ESE and high PEB ( $p < 0.05$ ). Table 2 shows the prevalence and pattern of physical inactivity between the post and pre-menopausal women across different occupations, marital status, income groups, educational levels, and psychosocial status. There were no clear differences in the patterns of physical inactivity prevalence between the post and pre-menopausal women about education level, parity status, income group, or psychosocial factors ( $p > 0.05$ ). While the prevalence of physical inactivity tended to increase with higher income among both postmenopausal (from 54.1% to 75.0%) and premenopausal women (62.4% to 74.7%), prevalence tended to decrease with higher education (from 77.0% to 55.3% among post-menopausal and from 73.2 % to 60.4% among pre-menopausal women). However, the prevalence of physical inactivity was lower in both groups with high exercise self-efficacy.

Table 3 shows ORs, standard error mean (SEMs), and 95% CIs for the association between prevalence of physical inactivity and socio-demographic variables, women's personal attributes, and psychosocial factors. Individuals older than 55 years were less likely

to be physically active (OR=0.49, CI=0.18-0.92) compared with those that were much younger (OR=0.53, 0.25-0.78). However, artisans/traders were more likely to be physically active (OR=2.8, CI=0.21-3.12) than housewives (OR=0.38, CI=0.17-0.86). Contrarily, respondents with higher educational level (OR=2.16, CI=1.12-4.14), and those with one to three children were more likely to be physically active (OR=1.57, CI=0.24-0.60). Women with high psychosocial factors including high self-efficacy were more likely to be physically active (OR=2.12, CI=1.13-4.18) while those with high perceived exercise barrier were less likely to be physically active (OR=0.34, CI=0.11-0.87).

## DISCUSSION

### Socio-demographic factors

This study investigated the prevalence of physical inactivity and its association with socio-demographic characteristics, women's personal attributes (marital, parity and menopausal status) and psychosocial factors among Nigerian women. Findings from our study showed that the prevalence of physical inactivity has varied across age group, socio-demographic characteristics, and among post- and pre-menopausal women. It is consistent with the finding of a previous study that younger women were more likely to be physically active than older women.<sup>26</sup> Many reasons could be responsible for the differences in the physical inactivity between younger and older women including physical strength, challenges of daily activities such as economic struggle and domestic commitments. Furthermore, we found that the prevalence of physical inactivity increases with advancing age among older women. This finding is in line with the results of some previous studies that physical inactivity increases as women grew older.<sup>27,28</sup> The probable reasons for the differences from our study compared with previous findings might be attributed to the reduction in muscular strength and endurance due to the sedentary lifestyle as well as fewer family life commitments such as irregular household chores. Involvement in many household chores such as cooking, fetching water, washing clothes, gardening, and commuting to marketplaces might not be as

regular as that of younger women. As expected

Table 1. Prevalence of physical activity, socio-demographic characteristics and psychosocial factors of all respondents (N=1250).

	Total n (%)	Sufficient PA (N=810) % (95% CI)	Insufficient PA (N=440) % (95% CI)	p
All	1250 (100.0)	64.8 (44.7-82.6)	35.2 (17.2-51.7)	0.345
Age group				
<30 years	727 (58.2)	68.3 (44.9-87.1)	31.7 (16.9-50.1)	0.021*
31-54 years	415 (33.2)	65.0 (44.1-85.2)	35.0 (14.8-55.9)	
>55 years	108 (8.6)	62.4 (33.6-94.9)	37.6 (5.1-66.4)	
Marital status				
Single	639 (51.1)	72.6 (40.7-92.1)	27.4 (7.9-59.3)	0.735
Married	492 (39.4)	69.8 (13.4-97.2)	30.2 (2.8-86.6)	
Divorced/Widow	119 (9.5)	60.9 (34.2-82.3)	39.1 (17.7-65.8)	
Educational level				
Elementary	370 (29.6)	59.6 (29.8-83.6)	40.4 (16.4-70.2)	0.078
Secondary	723 (57.8)	69.7 (46.5-85.9)	30.3 (14.1-53.5)	
Tertiary	157 (12.6)	80.4 (48.2-94.7)	19.6 (5.3-51.8)	
Occupation				
Students	486 (13.6)	70.4 (47.8-86.3)	29.6 (13.7-52.6)	0.352
Civil/Private	258 (15.0)	67.0 (40.9-85.7)	33.0 (14.3-59.1)	
Artisan/Trader	419 (33.5)	57.1 (37.9-74.4)	42.9 (25.6-62.1)	
Housewife	37 (5.5)	67.7 (39.9-87.3)	32.3 (12.7-61.0)	
Income (Monthly)				
<#50,000	608 (48.6)	60.9 (32.8-79.7)	39.1 (20.3-61.8)	0.046*
#50,000-100,000	615 (49.2)	66.5 (44.9-82.9)	33.5 (17.1-55.1)	
>#100,000	27 (2.2)	76.6 (50.1-91.4)	23.4 (8.6-49.9)	
Parity status				
None	258 (20.6)	76.6 (52.2-90.8)	23.4 (9.2-47.8)	0.038*
1-3	774 (61.9)	61.5 (32.7-84.0)	38.5 (16.0-67.3)	
4 and above	218 (17.5)	60.0 (41.7-75.8)	40.0 (24.2-58.3)	
Menopausal status				
Pre	1110 (88.6)	77.9 (51.7-92.1)	22.1 (7.9-48.3)	0.025*
Post	140 (11.4)	57.6 (36.5-76.1)	42.4 (23.9-63.5)	
Exercise self-efficacy				
Low	157 (12.6)	60.3 (46.9-82.4)	39.7 (15.9-51.1)	0.012*
Moderate	185 (14.8)	65.0 (44.7-85.8)	35.0 (14.8-55.9)	
High	908 (72.6)	70.4 (36.4-92.7)	29.6 (8.1-62.6)	
Social support				
Low	265 (21.2)	54.2 (35.6-75.2)	46.8 (27.3-64.7)	0.165
Moderate	682 (54.6)	65.0 (43.1-88.5)	37.0 (16.9-62.4)	
High	303 (24.2)	69.1 (40.2-85.6)	34.8 (15.2-63.5)	
Perceived exercise barrier				
Low	275 (22.0)	65.2 (44.6-89.6)	38.8 (16.6-59.7)	0.015*
Moderate	325 (26.0)	70.4 (49.2-88.4)	36.2 (17.6-59.8)	
High	650 (52.0)	74.6 (36.8-82.5)	29.3 (8.7-69.9)	

\* p<0.05. # = Naira (Nigerian currency).

Table 2. Patterns of physical inactivity prevalence by socio-demographic and psychosocial characteristics between premenopausal and menopausal respondents (N=440).

	Total	Post-menopausal (N=80)	Pre-menopausal (N=360)	p
	n	% (95% CI)	% (95% CI)	
<b>Educational Level</b>				
Elementary	160	77.0 (55.2-78.4)	73.2 (45.9-88.4)	0.081
Secondary	178	66.2 (45.2-78.5)	64.5 (42.4-82.6)	
Tertiary	102	55.3 (36.1-74.3)	60.4 (35.6-79.5)	
<b>Occupation</b>				
Students	94	21.4 (10.2-82.2)	56.6 (55.4-90.3)	0.625
Civil/Private	142	57.4 (36.5-76.1)	64.6(51.8-75.6)	
Artisan/Trader	122	66.5 (47.9-81.1)	52.7 (10.2-91.6)	
Housewife	82	64.6 (51.8-75.6)	58.0 (37.0-76.5)	
<b>Parity status</b>				
None	160	62.6 (21.5-90.4)	54.1 (31.9-83.6)	0.092
1-3	154	51.9 (34.8-68.5)	60.6 (36.2-80.6)	
4 and above	126	79.8 (51.7-89.4)	76.1 (50.2-91.0)	
<b>Income (Monthly)</b>				
<#50,000	197	54.1 (22.1-89.0)	62.4 (21.7-90.9)	0.074
#50,000-100,000	160	72.2 (51.7-86.3)	72.2 (49.5-87.3)	
>#100,000	83	75.0 (51.7-89.4)	74.7 (45.3-88.6)	
<b>Exercise self-efficacy</b>				
Low	117	77.9 (51.7-92.1)	55.9 (30.4-78.6)	0.057
Moderate	135	65.9 (43.4-83.0)	42.4 (23.9-63.5)	
High	188	57.6 (36.5-76.1)	22.1 (7.9-48.3)	
<b>Social support</b>				
Low	145	75.0 (51.7-89.4)	71.7 (45.3-88.6)	0.169
Moderate	102	69.3 (48.9-84.1)	68.0 (44.1-85.2)	
High	193	69.5 (36.4-88.1)	53.6 (31.9-82.8)	
<b>Perceived exercise barrier</b>				
Low	105	68.1 (25.9-90.8)	65.1 (12.2-97.0)	0.238
Moderate	110	75.8 (43.8-93.5)	68.9 (34.8-91.8)	
High	225	76.4 (15.6-98.1)	75.6 (39.8-94.2)	

# = Naira (Nigerian currency).

Table 3. Associations between socio-demographic variables and insufficient physical activity (N=440).

	Odds ratio <sup>a</sup>	Standard error	Odds ratio 95% CI
<b>Age group (years)</b>			
20-34	1.00		
35-44	0.43	1.258	0.31-0.87
45-54	0.53	1.328	0.25-0.78
≥55	0.49	0.799	0.18-0.92*
<b>Marital status</b>			
Single/never married	1.00		
Married	0.60	0.379	0.14-0.97*
Divorced/separated	0.56	0.427	0.39-0.89
<b>Education level</b>			
Elementary	1.00		
Secondary education	1.28	0.416	0.75-2.19
Tertiary education	2.16	0.231	1.12-4.14*
<b>Occupation</b>			
Student	1.00		
Private	0.29	0.393	1.16-4.12
Civil servant	0.36	0.484	0.41-2.78
Artisan/Trader	2.80	0.216	0.21-3.12*
Housewife	0.38	0.328	0.17-0.86*
<b>Monthly Income (Naira)</b>			
<#50,000	1.00		
#50,000-100,000	0.93	0.696	0.55-1.59
>#100,000	0.54	0.391	0.10-0.95*
<b>Parity status</b>			
None	1.00		
1-3	1.57	0.102	0.24-0.60*
4 and above	0.58	0.481	0.14-0.98*
<b>Menopausal status</b>			
Pre	1.00		
Post	0.34	0.371	0.16-0.88*
<b>Exercise self-efficacy</b>			
Low	1.00		
Moderate	0.26	0.282	0.49-1.23
High	2.12	0.359	1.13-4.18*
<b>Social support</b>			
Low	1.00		
Moderate	0.78	0.437	0.53-1.34
High	0.74	0.361	0.28-1.63
<b>Perceived exercise barrier</b>			
Low	1.00		
Moderate	1.36	0.142	0.38-1.66
High	0.34	0.369	0.49-1.23*

\* p&lt;0.05. a: Odds ratios adjusted for all variables in table. # = Naira (Nigerian currency).



in African community setting, many of these responsibilities would have been taken over by the younger women. In addition, findings from our study showed that married women were more likely to be physically inactive. This result is similar to finding of a previous that being married is associated with the decline in PA.<sup>29</sup> The plausible explanation might due to the present status of modern women in the recent time. A majority of our respondents were university undergraduates/ graduates, government workers or working in private establishments. These categories of women enjoy adequate support being provided by many housemaids which might contribute to an increasing level of physical inactivity.

Nature of occupation, income level, and educational attainment are important socio-economic indicators and determinants of PA participation.<sup>30</sup> Our study showed that women that are artisans or traders were more likely to be physically active. This finding might not be entirely surprising as many artisans or traders engage in several activities that encourage bodily movements which may reduce the prevalence of physical inactivity among them. However, housewives, on the contrary, were more likely to be physically inactive due to sedentary behavior. Sugiyama et al,<sup>31</sup> was of the opinion that extended period of television viewing among women was associated with high level of physical inactivity. We also observed that women with high income were less likely to be physically active. This result was contrary to findings of some previous studies that high income is associated increased level of PA.<sup>32</sup> Although many individuals with high income usually have better health probably due to better access to health care services, wealthy lifestyle in African setting including possession of vehicles might limit regular and active commuting such as walking, thus increasing high level of physical inactivity. Many studies have reported a significant positive association between higher educational attainment and PA.<sup>33,34</sup> Our study corroborates findings of previous studies that education is an essential element in PA participation.<sup>35</sup> Individuals with higher educational levels are more likely to be highly informed about PA health benefit, stronger

problem-solving and coping capacities arising from educational experience, and a greater ability to seek, understand, and act on health messages that promote PA.<sup>36</sup>

#### **Women's personal attributes**

Our study found that multiparous women were more likely to be physically inactive. This result was in agreement with findings of a previous study that women with the higher number of children have less time for leisure PA.<sup>37</sup> It is possible that increasing number of children encourages the sedentary behavior. Although women with 1 to 3 children in our study appeared to be physically active, routine domestic activities might have contributed to an increased PA level. However, multiparous women who have four or more children were more likely to be physically inactive. It is possible that older children are now becoming adolescents and capable enough to support their mothers in the main household chores and other domestic activities leading to mothers' increasing physical inactivity. Jones et al,<sup>38</sup> described PA level among women as gradual shifts from being structured and intense to incidental and less intense during child care leading to overweight and obesity. Similarly, during the lactating period, mothers are usually encouraged to feed well to provide enough breast milk for their babies which frequently lead to overweight or obesity. Furthermore, there is evidence that as women approaching menopause, the rate of body weight gain becomes rapidly increasing due to hormonal changes.<sup>39,40</sup> Perhaps the carryover effects of childbearing and caring may be associated with obesity as women advances in age.

Findings from the study showed that postmenopausal women were more likely to be physically inactive. It has been known from the previous studies that menopause contributes to the feeling of depression and reduction in PA among postmenopausal women.<sup>41,42</sup> It is well-known that aging is associated with menopausal status and as women advances in age, the cessation of menstrual flow and estrogen withdrawal has a negative impact on physical and physiological functioning resulting to progressive decrease in muscular strength and endurance for which might be

responsible for increasing physical inactivity.<sup>43,44</sup> Furthermore, the psychological disturbance of menstrual cessation might contribute to the feeling of isolation and inactivity. Perhaps it might also be attributed to the emerging symptoms of menopause including fatigue, hot flash and blushing thus leading to poor attitude towards regular participation in PA. It may be an explanation for the reason why women are at higher risk of chronic non-communicable diseases such as CVD, type-2 diabetes, metabolic syndrome, some cancers and musculoskeletal systems degeneration than men of the same age category.

#### **Psychosocial factors**

Our results showed that women with high self-efficacy were more likely to be physically active. Exercise self-efficacy is a strong determinant of PA participation.<sup>45,46</sup> On the contrary, it implies that individuals with low self-efficacy are more likely to be physically inactive. Although others psychosocial factors might not necessarily predict exercise participation and adherence, it is possible that individuals with high exercise self-efficacy can quickly initiate and sustain activity due to a basic self-regulatory mechanism to overcome particular task including health behavior such as regular PA participation.<sup>47</sup> Furthermore, a study by Cohen-Mansfield et al,<sup>48</sup> identified some key determinants of exercise participation and grouped them into two broad categories as either increase adherence to exercise (motivators) or decrease adherence to exercise (barriers). Literature is replete of studies reporting exercise self-efficacy of women to be in the lower category compared to men.<sup>49,50</sup> Nonetheless, we observed in our study that some of our respondents reported high self-efficacy. It might be attributed to the higher educational attainment among our respondents. Women with high perceived exercise barrier were found less likely to be physically active. In line with findings of previous studies, our study showed that perceived exercise barrier is more common with women. Perhaps it could be a reflection of several activities that are associated with women's daily life including being workers, mothers, and wives. We also observed that social support was not significantly associated with physical inactivity. Although these factors

are not mutually exclusive, they are interwoven with women's day to day activities.

Physical inactivity is a modifiable risk factor for CVD and an array of chronic diseases including bone and joint diseases including osteoporosis and osteoarthritis, some cancers (colon and breast), type - 2 diabetes, and depression. There are emerging evidence that individuals who participate in regular moderate-intensity PA as part of a healthy lifestyle can significantly reduce chronic non-communicable diseases.<sup>12,13</sup> Although many household chores may make a significant contribution to PA level due to increased bodily movement, an avenue must be created to encourage leisure time PA to improve overall health well-being and disease prevention among women of all age categories. There is an urgent need to promote leisure time PA participation among women at an early stage in life to prevent future ill-health challenges. Efforts should also be made to create an avenue for menopausal women to engage in regular PA for the relief of menopausal symptoms and associated morbidity and mortality.

#### **Study limitations**

It is noteworthy to mention some of the limitations inherent in our study to prevent misinterpretation of our findings. This study design was a cross-sectional in nature, and causal inference cannot be made, thus limiting its generalizability to the entire Nigerian women. Furthermore, PA / physical inactivity was assessed using a self-reported method and may be prone to overestimation or underestimation. However, the strength of this study lies in the process of selection of respondent using multi-stage sampling thus reducing bias. We suggest that future study should include an objective measure of PA such as pedometer-determined PA assessment to validate findings of this study.

#### **Conclusion**

In conclusion, the prevalence of physical inactivity among surveyed Nigeria women differs across socio-demographic characteristics, women's personal attributes, and psychosocial factors. Being married, having more than three children, post-menopausal status, and high perceived barrier were significantly associated with physical inactivity while higher educational level and high exercise self-efficacy were associated with

regular physical activity. Regular physical activity enlightenment programs to reduce increasing prevalence of physical inactivity are recommended for women of all ages for the prevention and control of chronic non-communicable diseases.

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## REFERENCES

1. Mathers CD, Lopez AD and Murray CJL. The Burden of Disease and Mortality by Condition: Data, Methods, and Results for 2001. Chapter 3. In: Global Burden of Disease and Risk Factors. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, eds. Washington (DC): World Bank; 2006.
2. Trends in Maternal Mortality: 1990 to 2008. Estimates Developed by WHO, UNICEF, UNFPA and the World Bank. Geneva: WHO, 2010.
3. Lloyd-Jones D, Adams RJ, Brown TM, et al. On Behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics- 2010 Update. A Report from the American Heart Association. *Circulation*. 2010;121:e1-170.
4. BeLue R, Okoror TA, Iwelunmor J, et al. An overview of cardiovascular risk factor burden in sub-Saharan African countries: a socio-cultural perspective. *Global Health*. 2009;5:10. doi: 10.1186/1744-8603-5-10.
5. Global health risks. Mortality and burden of disease attributable to selected major risks. 2009. [http://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf) (accessed August 18, 2013).
6. Schmitt NM, Nicholson WK, Schmitt J. The association of pregnancy and the development of obesity - results of a systematic review and meta-analysis on the natural history of postpartum weight retention. *Int J Obes*. 2007;11:1642-1651.
7. Ohlin A, Rossner S. Factors related to body weight changes during and after weight development study. *Obes Res*. 1996;4:271-276.
8. Awotidebe TO, Adedoyin RA, Olola IL, et al. Cardiovascular risk profile of post-menopausal women in a semi-urban community in Nigeria. *Br J Med Res*. 2014;4:4780-4790.
9. Canadian Fitness and Lifestyle Research Institute. National Population Health Survey Ottawa (ON): Canadian Fitness and Lifestyle Research Institute, 1999.
10. Warburton DER, Nicol CW, Bredin SSD. Health benefits of physical activity: the evidence *CMAJ*. 2006;174:801-809.
11. Lucas JW, Schiller JS, Benson V. Summary health statistics for U.S. adults: National Health Interview Survey, 2001. *Vital Health Stat* 10. 2004;(218):1-134
12. Bassuk SS, Manson JE. Physical activity and cardiovascular disease prevention in women: a review of the epidemiologic evidence. *Nutr Metab Cardiovasc Dis*. 2010;20:467-473.
13. Hallal PC, Wells JC, Eichert FF, et al. Early determinants of physical activity in adolescence: prospective birth cohort study. *BMJ*. 2006;10:1002-1007.
14. Guthold R, Louazani SA, Riley LM, et al. Physical activity in 22 African countries: results from the World Health Organization STEPwise approach to chronic disease risk factor surveillance. *Am J Prev Med*. 2011;41:52-60.
15. Awotidebe TO, Adedoyin RA, Adegbesan OA, et al. Psychosocial correlates of physical activity participation among Nigerian university students. *Int J Sports Sci*. 2014;4:205-211.
16. Bandura A. Health Promotion by Social Cognitive Means. *Health Edu Behav* 2004;31:143-164.
17. Wolin KY, Bennett GG, McNeill LH, et al. Low discretionary time as a barrier to physical activity and intervention uptake. *Am J Health Behav*. 2008;32:563-569.
18. Saligheh M, McNamara B, Rooney R. Perceived barriers and enablers of physical activity in postpartum women: a qualitative approach. *BMC Pregnancy Childbirth*. 2016;16:131.
19. Adedoyin RA, Mbada CE, Bisiriyu LA, et al. Relationship of anthropometric indicators with blood pressure levels and the risk of hypertension in Nigeria adults. *Int J Gen Med*. 2008;1:33-40.
20. Craig CL, Marshall AL, Sjörström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc*. 2003;35:1381-1395.

21. Oyeyemi AL, Oyeyemi AY, Adegoke BO, et al. Cross cultural adaptation of the International Physical Activity Questionnaire: Reliability and validity of the Hausa version in Nigeria. *BMC Med Res Methodol* 2011;11:156.
22. Global recommendations on physical activity for health. 2010. [http://whqlibdoc.who.int/publications/2010/9789241599979\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf). 2010. (Accessed July 14, 2012).
23. Bandura A. *Self-efficacy: the exercise of control*. New York, NY: Freeman; 1997.
24. Sherbourne CD, Stewart AL. The Medical Outcomes Survey Social Support Survey. *Soc Sci Med*. 1991;32:705-714.
25. Sechrist KR, Walker SN, Pender NJ. Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. *Res Nurs Health*. 1987;10:357-365.
26. Bergman P, Grjibovski AM, Hagströmer M, et al. Adherence to physical activity recommendations and the influence of socio-demographic correlates-a population-based cross-sectional study. *BMC Public Health*. 2008;8:367.
27. Zhang J, Feldblum PJ, Fortney JA. Moderate physical activity and bone density among perimenopausal women. *Am J Public Health*. 1992;82:736-738.
28. Bauman A, Bull F, Chey T, et al; IPS Group. The International Prevalence Study on Physical Activity: Results from 20 countries. *Int J Behav Nutr Phys Act*. 2009;6:21.
29. Al-Tannir M, Kobrosly S, Itani T, et al. Prevalence of physical activity among Lebanese Adults: A cross-sectional study. *J Phys Act Health*. 2009;6:315-320.
30. Pan SY, Cameron C, DesMeules M, et al. Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: A cross-sectional study. *BMC Public Health*. 2009;9:21-29.
31. Sugiyama T, Salmon J, Dunstan DW, et al. Neighborhood walkability and TV viewing time among Australian adults. *Am J Prev Med*. 2007;33(6):444-449.
32. Baker EA, Brennan LK, Brownson RC, et al. Measuring the determinants of physical activity in the community: current and future directions. *Res Q Exerc Sport*. 2000;71:146-158.
33. Miller Y, Trost S, Brown W. Mediators of physical activity behavior change among women with young children. *Am J Prev Med* 2002;23(Suppl 1):98-103.
34. Manios Y, Panagiotakos DB, Pitsavos C, et al. Implication of socio-economic status on the prevalence of overweight and obesity in Greek adults: the ATTICA study. *Health Policy*. 2005;74:224-232.
35. Cerin E, Leslie E. How Socio-economic status contributes to participation in leisure-time physical activity. *Soc Sci Med*. 2008; 66:2596-2609.
36. Winkleby MA, Jatulis SE, Frank E, et al. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. *Am J Public Health*. 1992; 82:816-820.
37. Bell S, Lee C. Emerging adulthood and patterns of physical activity among young Australian women. *Int J Behav Med*. 2005;12(4):227-235.
38. Jones C, Burns S, Howat P, et al. Playgroups as a setting for nutrition and physical activity interventions for mothers with young children: exploratory qualitative findings. *Health Promot J Aust*. 2010;21:92-98.
39. Smith D, Lewis CJ, Carvery J, et al. Longitudinal changes in adiposity association with pregnancy. The CARDIA study. *JAMA*. 1994;271:1747-1751.
40. Kanaya AM, Vittinghoff E, Shlipak MG, et al. Association of total and central obesity with mortality in postmenopausal women with coronary heart disease. *Am J Epidemiol*. 2003;158:1161-1170.
41. Matthews KA, Schott LL, Brockwell S, et al. Depressive symptoms during the menopausal transition: the study of women's health across the nation (SWAN). *J Affect Disord*. 2007;103:267-272.
42. Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion: US Physical Activity Statistics. <http://apps.nccd.cdc.gov/PASurveillance/DemoCompareResultV.asp#result>, 2011.
43. Bush TL. The epidemiology of cardiovascular disease in postmenopausal women. *Ann N Y Acad Sci*. 1990;592:263-271.
44. Crawford SB, Johannes CB. The epidemiology of cardiovascular disease in postmenopausal women. *J Clin Endocrinol Metab*. 1999;84:1803-1806.
45. Hinton PS, Olson CM. Postpartum exercise and food intake: the importance of behavior-specific self-efficacy. *J Am Diet Assoc*. 2001;101:1430-1437.
46. Manson JE, Greenland P, La Croix AZ, et al. Walking compared with vigorous exercise for the prevention of cardiovascular events in women. *N Engl J Med*. 2002;347:716-725.
47. McAuley E, Mullen SP, Szabo AN, et al. Self-regulatory processes and exercise adherence in older adults: executive function and self-efficacy effects. *Am J Prev Med*. 2011;41:284-290.
48. Cohen-Mansfield J, Marx MS, Guralnik JM. Motivators and barriers to exercise in an older

- community-dwelling population. *J Aging Phys Act.* 2003;2:242-253.
49. McAuley E, Jacobson L. Self-efficacy and exercise participation in sedentary adult female. *Am J Health Prom.* 1991;5:185-191.
50. Lirgg CA. Gender differences in self-confidence in physical activity: A meta-analysis of recent studies. *J Sport Exerc Psych.* 1991;18:294-310.