Effects of Technology (Smartphones or Smartwatches) on Fitness Choices Among Civil Servants in Ibadan North Local Government Oyo State, Nigeria

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Abstract: **Technology such as Smartwatches and Smartphones are emerging as effective tools to promote exercise and physical activities in the healthcare industry. However, little is known about how smartwatch attributes facilitate exercise and for whom such attributes are more effective for exercise. The purpose of this study is to explore the structural relationship between technology attributes, flow experience, and continued exercise intentions and to examine the moderating role of exercise involvement in the structural relationship. In this research, Data were collected from one hundred and forty civil servants working in Ibadan North LGA. Analysis of data was done using SPSS and Microsoft excel. The data was subjected to descriptive statistics (frequency, percentage and mean) and inferential statistics (Chi-Square test). Statistical difference was determined at a confidence interval of 95% and Pearson's correlation value less than 0.05 (p<0.05) will be considered significant. Results were generated and presented in appropriate tables and charts. Data collected from the interviews revealed some interesting areas of technology applications today. It also presented an insight on how consumers of smartwatch think about the product. Results from this study will be useful for future researchers as well as smartwatch merchants and makers. The world health organisation (WHO) recommends adults aged 18 to 64 years should do at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate and vigorous-intensity activity weekly, in order to improve cardiorespiratory and muscular fitness, bone health and reduce the risk of noncommunicable diseases (NCDs) and depression. This study was conducted to know the effect of technology on fitness choices as technology is known to affect all aspects of human life including physical activity.**

Keywords: **Smartphones, Smartwatches, Physical activities, Fitness choices, Exercise, Prevalence, Technology, Civil servants.**

1. Introduction

The advance of technology in recent times has resulted in the invention of smart wearable devices and a smart environment. Currently, we have technological inventions that are connected to our day-to-day lives, such as smartwatches, driverless vehicles, smart shoes, smart buildings, and smart robots etc., (Milad & Ki, 2019). Our everyday lives, habits, and choices are all evolving because of these smart innovations such as Google glass, smartwatches including Geek Watch, iWatch as well as bracelets (Gao, et al., 2015). The focus of this research is on smartwatches/smartphones and the implications of this technology on human health choices.

WHO defines physical activity as all movements (WHO, 2024). Activities such as walking, cycling, wheeling, sports, active recreation and play can be done at any level of skill and are all part of physical activities. Work such as household chores or jobs requiring physical labour is another way to be physically active. According to the Centre for Disease Control and Prevention, regular physical activity is one of the most important things you can do for your health, and everyone can benefit.

Physical inactivity is an independent modifiable risk factor for common non-communicable diseases (NCDs) which are now the major cause of death and disability worldwide. NCDs caused more than 35 million deaths in 2005. Furthermore, physical inactivity is now estimated to be a major cause of breast and colon cancers, 27% of diabetes and approximately 30% of ischemic heart disease burden (Owoeye et. al, 2013).

In recent times, inactivity has been on the increase, with studies indicating that women are more affected. Eating late and a sedentary working environment of white-collar workers increase the risk of weight gain, and cardiovascular diseases with increased blood cholesterol levels. On the other hand, regular physical activity was associated with lower anxiety levels. In addition, physical activity was shown to protect people from various types of cancer (Burcin et al., 2022).

Civil servants must sit down for long periods of time to enable them to perform their daily tasks. In a recent study by Burcin, 55.5% of white-collar workers were found to be inactive. Furthermore, it is known that the stress experienced in the work environment adversely affects overall health status.

Technology is the application of scientific knowledge to the practical aims of human life or, to the change and manipulation of the human environment according to the encyclopaedia Britannica. Technology is a double-edged sword when it comes

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to lifestyle and healthcare. Whilst technology can lead to sedentary behaviours and weight gain, it also has benefits such as greater accessibility and equity for lifestyle modification and health promotion (Naderpoor et. al, 2022).

Overall, the purpose of this study explores the effect of technology on fitness choices, track exercise intensity, and user concentration. A key focus of this research is physical activities, and this study intends to assess how technology impacts fitness choices among civil servants in Ibadan North Local Government area, Oyo State, Nigeria.

2. Literature Review

Physical activity (PA) is defined as any bodily movement produced by skeletal muscle that requires energy expenditure. Physical inactivity is an independent modifiable risk factor for common non-communicable diseases (NCDs) which are now the major cause of death and disability worldwide. NCDs caused more than 35 million deaths in 2005 (Owoeye et. al 2013). Physical activity and exercise have been known to help in improving mental and physical health. psychological benefits such as a greater sense of well-being, increase self-esteem, and decrease anxiety or depression have all been linked to exercise (Bakinde 2020).

Exercise can reduce the risk of major illness such as heart disease, stroke, diabetes and cancer by up to 50% and lower the risk of early death by up to 30%. Whatever your age, there is strong scientific evidence that being physically active can help you lead a healthier and even happier life. However, recent studies show that the prevalence of inactive adults in Nigeria is 52%.

Sedentary behaviours have wide-ranging adverse impacts on the human body including increased all-cause mortality, cardiovascular disease mortality, cancer risk, and risks of metabolic disorders such as diabetes mellitus, hypertension, and dyslipidemia; musculoskeletal disorders such as arthralgia and osteoporosis; depression; and, cognitive impairment. Therefore, reducing sedentary behaviours and increasing physical activity are both important to promote public health.

Technology has been incorporated into every aspect of our lives with mobile devices and the internet. Technology helps us develop many medical devices, explore better ways for treatments and give us more accurate results in patients' medical examinations. However, technology also allows us to keep track of our health values and encourages us to be more physically active, eat healthier, drink more water, etc. Traditional lifestyle and weight management interventions are often intense and time consuming hence proving difficult to integrate into routine clinical care. The recent Covid-19 pandemic has further revealed the advantage of technology in delivering health interventions especially when face to face interactions had to be limited (Naderpoor, 2022).

A key goal of this present study is to fill in the gaps in existing literature on technology (phones and smart watches) role in fitness choices and healthcare by examining effects and how these technological attributes help individuals engage in exercise by using the theory of flow experience. Flow experience is widely recognized as a significant predictor of physical activity participation. For these objectives, the present study reconceptualized technology attributes because it focused on what features help users engage in exercise and physical activities, some features irrelevant to the research context like price, brand, design aesthetics will be excluded.

The smart watch is an example of a wearable device that helps us keep our hands free while using our smartphones without having to touch them. With the app, you can see how much time you spend staring at your screen and which apps you use most. With Wear Power Supply Stats, you can figure out the drain on your phone battery based on the watch. Wearing Power supply Stats helps you determine how much your battery is being consumed by your phone. The app's watch counterpart provides a bare-bones view of your battery, but you'll want to open it on your phone to get the most details. A smartwatch may give you details into everything you're tracking, including: Your goals for example steps, active zone minutes, calories, sleep, steps, heart rate, stress management score, blood pressure, pulse, track exercise intensity, get movement reminder, test and track heart rhythm etc. Looking at these, the study assumed that all these attributes enhanced flow experience, which is a psychological state involving cognitive absorption and enjoyment, based on the existing literature.

For adults, the World Health Organization suggests 150 minutes per week of moderate-intensity physical activity; for children and adolescents, the recommendation is 60 minutes. Nonetheless, almost 80% of teenagers and 25% of adults fail to meet the suggested Physical Activities targets. Results from the Tromsø Study, the longest running population study in Norway, shows that only 30.4% of women and 22.0% of men reach the recommended targe.

3. Study Design

This study employs a mixed-methods research design, combining both quantitative (cross-sectional survey) and qualitative (interview) approaches. The choice of a mixed-methods design is supported by the need to gain a comprehensive understanding and also to investigate the effect of Technology on physical activities among civil servants in Ibadan North Local Government Area, Oyo State Nigeria as well as what needs to be conducted to help us better understand the relationship between smartphones or fitness watch use and chronic disease management. As Johnson et al. (2007) suggest, mixed methods allow researchers to triangulate findings, validate results, and provide a more nuanced interpretation of the phenomena under investigation. By integrating quantitative data on screening knowledge, attitudes, and behaviour with qualitative insights into the underlying factors shaping these outcomes, this approach will offer a more holistic understanding of the research topic.

A. Description of Study Site

Ibadan-North local government area in Ibadan, Oyo State, has its headquarters at Agodi and it consists of 12 wards with an area of 27km2 and a population of 306,795 according to the 2006 census. It is an important commercial and administrative area in Ibadan and it comprises a number of institutions which

include the State Secretariat, University of Ibadan, The Polytechnic Ibadan, Nigerian Television Authority (NTA), various banks, churches, mosques, schools, gyms and fitness centres.

Also, Ibadan North is home to people from all walks of life-ranging from the high income and the middle-class areas of Bodija and Ashi to the low-income areas of Yemetu. There is a large number of supermarkets, convenience stores, pharmacies, and the famous Bodija market catering for the daily domestic needs of its residents. The major religions practised are Christianity and Islam although some indigenes do practise traditional religion. The relaxation centres within this Local government area include Agodi gardens, Ventura mall which features a cinema and various fun spots within the mall, the zoological garden in the University of Ibadan and the botanical garden, also situated in the University of Ibadan. Other places of relaxation are various eateries, several night clubs, bars and hangouts.

Ibadan North is a hub of commercial activities and all major banks and finance houses have at least a branch in this Local Government Area. This evidently indicates that there is a substantial number of bank workers in this area. Furthermore, the proximity of a large number of fast-food eateries, food canteens and bars to these fitness centres suggests high patronage from civil servants and sheds some light into the lifestyle of these civil servants. Hence the area is suitable for capturing the effect of Technology (smartphones and watches) on Fitness choices.

A combination of quantitative and qualitative data collection instruments will be used:
1) *Quantitative Survey:* A semi-structured self-administered questionnaire with five sections:
   - *Section A*: Socio-demographic characteristics
   - *Section B*: Knowledge of physical activity, assessed with a 12-point scale (scores: 0–3 = poor, 4–8 = fair, 9–12 = good knowledge)
   - *Section C*: Technology use in fitness choices
   - *Section D*: Impact of technology on physical activity
   - *Section E*: Barriers to using technology for physical activity
2) *Qualitative Interviews:* Selected participants will provide a range of perspectives on their experiences through in-depth interviews.

B. Study Population

The study population consisted of white-collar (professional, administrative, or managerial) employees presently working in the government secretariat and government owned schools, in Ibadan North Local government area at the time of study. All eligible white-collar civil workers working in Ibadan North Local Government Oyo state Nigeria who gave their consent will be included in the study.

C. Sample Size

The sample size for the quantitative component of the study was calculated using the Cochran (1977) formula, with a 95% confidence level and a 5% margin of error. Based on these criteria, the sample size will be 140 adults. Additionally, 10 participants were purposefully chosen for the qualitative component of the study to provide in-depth insights into their experiences and thoughts on the effect of technology on physical activities. This will be accomplished through the use of an In-Depth Interview (IDI) Guide and Focus Group Discussions.

D. Sampling Procedure

A two-stage sampling was employed to select 150 respondents from the civil servants' population in Ibadan North. In the first stage, a sector of civil servants in the local government area was randomly selected. The sectors include different directorates.In the second stage, purposive sampling was used to select available and consented respondents in each of the selected sectors.

E. Validity and Reliability

To ensure validity, the questionnaire was designed based on the objectives of the study after extensive literature review on the subject matter was conducted. Furthermore, the draft questionnaire was subjected to peer, public health professionals' and supervisor's review. Reliability of the questionnaire was determined by pre-testing 10% of the sample size amongst civil servants in Ibadan North-West Local Government Area. The data collected was analysed and internal consistency of the instrument was tested using Cronbach's alpha which generated the coefficient of 0.80. This result aids in the modification of the instrument where its deemed necessary before the final administration of the questionnaire.

Internal consistency was assessed using measures such as Cronbach's alpha coefficient to determine the quantitative survey instrument's dependability. This shows excellent internal consistency, implying that the items accurately assess the intended notion. Furthermore, inter-item and item total correlations were investigated to detect any problematic items that may jeopardise the instrument's reliability. By adhering to these rigorous qualitative research practices, the study aims to generate robust and reliable insights into the effect of technology on fitness choices amongst civil servants in Ibadan North LGA.

F. Data Collection Procedure

The questionnaires were administered to a sample (140) of the study population at the selected sectors. The Managers of each selected sector were approached to seek permission to carry out the study in their work environment. The Heads of Operations and Heads of Marketing of the sectors were also informed of the purpose of the study. Respondents were approached daily after close of business and were given an explanation about the aim and objectives of the study and were further asked for their informed consent to participate in the study. Two well-trained research assistants administered the questionnaires under the supervision of the investigator. The investigator participated in the process of data collection. Each interview lasted for about 20 minutes and the data collection process lasted for a period of two (2) weeks.

The challenges faced during the data collection were majorly from the very busy schedule of the workers, they were too tired to participate in the study after working hours. To overcome these challenges, we appealed to the Managers to entreat the consent of workers to create time to fill the questionnaires

G. Data Management

The administered questionnaires were checked for completeness and accuracy after retrieval on the field. Thereafter, serial numbers were assigned to each of the questionnaires to facilitate easy identification and for correct data entry and analysis. A coding guide was developed to code the completed questionnaires, after which they were entered into the computer using google form.

H. Data Analysis

The data was analysed using SPSS and Microsoft excel. The data was subjected to descriptive statistics (frequency, percentage and mean) and inferential statistics (Chi-Square test). Statistical difference was determined at a confidence interval of 95% and Pearson's correlation value less than 0.05 ($p<0.05$) will be considered significant. Results were generated and presented in appropriate tables and charts.

I. Study Limitations and Bias

The study offers valuable insights into the relationship between technological intervention on physical activity and their effect amongst civil servants' settings. However, it is important to acknowledge certain limitations and identify areas for future research. One notable limitation that occurs is the potential for limited generalizability. The study's findings did not fully represent the diversity of workplaces and employee populations, which can vary significantly. Replicating these findings across a range of workplace settings would enhance their applicability. Additionally, it is worth noting that the study did not extensively examine potential interaction effects between gender and other factors such as age, job positions etc on motivation and barriers. Exploring these interactions could provide deeper insights into how various factors intersect to influence the effect of technology interventions of fitness choices. Addressing these limitations and exploring these areas further can refine our understanding on the effect of technology (smartphones and smart watches) on fitness choice.

4. Results

This research involved 140 white-collar (professional, administrative, or managerial) employees presently working in the government secretariat and government-owned schools, in Ibadan North Local government. The socio-demographic profile of participants is shown in Table 1. About 50.7% were from the administrative sector while only 8.6% were from the managerial sector. The mean age of the respondents was 38 years. About 20% were between the ages of 26 and 30. The respondents in this study were male 42.1% and 57.9% female respectively. About 52.9 % of respondents were Graduates with university degrees, 21.4% had Higher National Diplomas, 15.7% were Postgraduates, and 7.1% had National Diplomas.

Most of the respondents, 60.7%, were married while 39.3% were single. Most of the respondents 95.0% were predominantly from the Yorubas ethnicity group. About 75% practice Christianity while 25% practice Islam. More than half 54.3% of the respondents were mid-level while a few 18.6% were top-level senior staff. About 50% function in the operating units of different parastatals, 40% of the respondents' function in the administrative unit, and 5.7% work in the marketing unit.

Table 1
Demographic variables

Socio-demographic profile of respondents (n = 140)				
Variables	**Frequency**	**Percent**	**Chi-Square**	**Asymp. Sig**
Work sector				
Administrative	57	40.7		
Managerial	12	8.6	5.050ᵃ	0.080
Professional	71	50.7		
Work experience (in years)				
<10	79	56.4		
10-19	32	22.9	1.347ᵃ	.510
20+	29	20.7		
Age (in years)				
21-25	16	11.4		0.219
26-30	28	20.0		
31-35	15	10.7	8.271ᵃ	
36-40	27	19.3		
41-45	12	8.6		
46-50	23	16.4		
51+	19	13.6		
Gender				
Male	59	42.1	.644ᵃ	0.422
Female	81	57.9		
Highest level of education				
National Diploma	10	7.1		
Higher National Diploma	30	21.4		
			4.277ᵃ	0.370
University Degree	74	52.9		
Master's degree	22	15.7		
Others	4	2.9		
Marital Status				
Single	55	39.3	1.654ᵃ	0.198
Married	85	60.7		
Ethnic group				
Yoruba	133	95.0		
Igbo	5	3.6	2.276ᵃ	0.517
Hausa	1	0.7		
Others	1	0.7		
Religion				
Christian	105	75.0	1.373ᵃ	0.241
Muslim	35	25.0		
Level of job(management)				
Top-level	26	18.6		
Mid-level	76	54.3	3.030ᵃ	0.220
Low level	38	27.1		
Job Function				
Operations	70	50.0		
Marketing	8	5.7	1.339ᵃ	0.720
Administrative	56	40.0		
Other	6	4.3		

Table 2
Knowledge about the effects of physical activities on health

Variables	Frequency	Percent
Level of Knowledge		
0≤3 (poor)	0	0.0
>3≤8 (fair)	37	26.4
>8≤12 (good)	103	73.6

Table 3
Duration of physical activities using descriptive statistics

Variables	Median	Mean	Minimum: Maximum	Standard Deviation
Time spent exercising in a week (Hours)	3.4	2.0	0.5:20	0.22

Table 4
Distribution of respondents' attitudes to physical activities

Statements	SD		D		A		SA	
	n	%	n	%	n	%	n	%
People who exercise are healthier and stronger	7	5.0	1	0.7	53	37.9	79	56.4
Exercise is only for sick people	87	62.1	42	30.0	4	2.9	7	5.0
Physical exercise is for young individuals only	66	47.1	54	38.6	8	5.7	12	8.6
Physical exercise is for both young and elderly	15	10.7	3	2.1	52	37.1	70	50.0
Regular exercise is a waste of one's time	86	61.4	47	33.6	1	0.7	6	4.3
Regular exercise is for fat people only	78	55.7	49	35.0	4	2.9	9	6.4
My regular work is an adequate substitute for regular exercise	9	6.4	50	35.7	67	47.9	14	10
Exercise schedule is difficult for me to maintain due to my busy work schedule	15	10.7	53	37.9	57	40.7	15	10.7
I feel exercise is not beneficial and important for me	74	52.9	54	38.6	10	7.1	2	1.4

Table 2 above shows that the majority (73.6%) of the respondents had good knowledge about the effects of physical activities on health while only (26.4%) had poor knowledge.

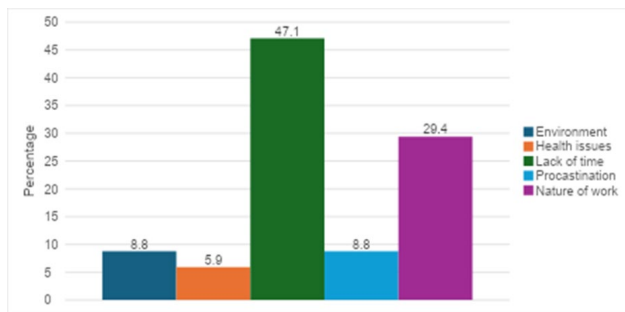The average hours spent by the respondents exercising in a week was 2 hours.

Fig. 1.

Fig. 1 shows that 47.1% of the respondents said lack of time was the major reason that prevented them from engaging in exercising (physical activities).

(56%) of the respondents strongly agreed with the reality that people who exercise are healthier and stronger. Also, (62%) strongly disagreed with the statement that exercise is only for sick people. More than half (52.9%) strongly disagreed with the statement that exercise is not beneficial and important (Table 4)

Table 5
Attitude to physical activities scores using descriptive analysis

Variables	Mean	Standard Deviation	Minimum: Maximum score
Attitude	36.4	4.5	25:45

Table 6
Classification of attitude to physical activities. rating scores

Variables	Scores	Frequency	Percent	Level
Attitude	<36	56	40.0	Poor
	≥36	84	60.0	Good

The mean score of respondents' attitudes to physical activity was 36.4. Therefore, respondents who scored below 36 were classified as having a poor attitude towards physical activity while those who scored 36 and above were classified as having a good attitude towards physical activity respectively (Table 5 and 7).

Fifty-one percent of respondents have been using technology for the past 3 to almost 4 years. (average value).

Table 7
The duration (in years) of using technology to facilitate physical activities descriptive statistics

Variables	Mean	Standard Deviation
Duration (Years)	3.8	0.4

About 33.6% of the respondents strongly agree that Smartphones and/or smart watches promote physical activities. Also, 46.4% of respondents agreed that phones and/or smart watches help to facilitate and monitor vital signs such as heart rate, no of daily steps taken, Blood oxygen, Respiratory rate, pressure, calorie burnout, and sleep pattern. Furthermore, 56.4 % agreed that Smartphones and/or smart watches also facilitate the tracking of their fitness progress and increase productivity.

About 52.95% disagree with the statement that Smartphones and smartwatches give inaccurate data (Table 8).

The table above shows that 75.3% of the respondents with National Diploma had a good attitude toward physical activity compared to 7.1% of those who had a poor attitude. Furthermore, 56% of those who were University graduates had good knowledge. Thus, the p-value is > 0.05. This indicates that there was no statistically significant relationship between Educational Qualifications and Attitude towards Physical Activity.
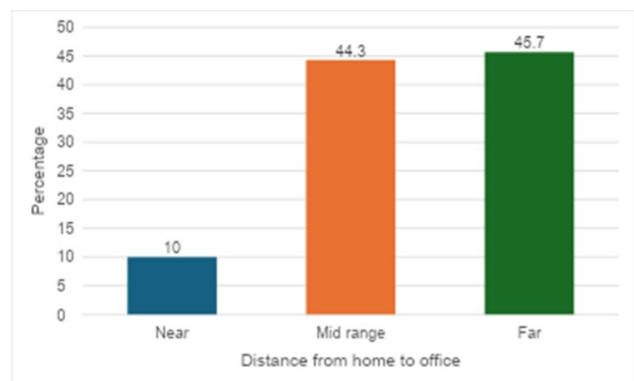

Fig. 2. Distance from the respondents' home to office

5. Discussion of Findings

This study aimed at exploring how technology impacts fitness choices among civil servants. The study showed that the

Table 8
Technology a facilitator or barrier to physical activities

	SD		D		A		SA	
	n	%	n	%	n	%	n	%
Smartphones and/or smart watches promote physical activities	7	5.0	19	13.6	67	47.9	47	33.6
Smartphones and/or smart watches help/can help me keep track of and monitor my heart rate, no of daily steps taken, Blood oxygen, Respiratory rate, pressure, calorie burnout, and sleep pattern.	5	3.6	28	20.0	65	46.4	42	30.0
Smartphones and/or smart watches remind me of my goals and motivate me to exercise	9	6.4	25	17.9	68	48.6	38	27.1
Smartphones and/or smart watches offer a convenient way to track my fitness progress and increase productivity	6	4.3	24	17.1	79	56.4	31	22.1
Smartphones and/or smart watches may affect health negatively	31	22.1	58	41.4	43	30.7	8	5.7
Smartphones and/or smart watches as greatly improved my fitness journey and changed my sleeping pattern	17	12.1	22	15.7	68	48.6	33	23.6
I have the technologies, but I don't know how to use them or operate them.	36	25.7	75	53.6	22	15.7	7	5.0
Having and using a smartphone and/or smartwatch has helped me set daily steps and goals that can reduce the risk of heart disease and early death	10	7.1	37	26.4	68	48.6	25	17.9
Excessive use of smartphones and smartwatches can have some side effects such as radiation, and eye strain; disrupt sleep patterns and negatively affect memory and mood.	14	10.0	28	20.0	84	60.0	14	10.0
Smartphones and smartwatches can be distracting, especially if you're constantly receiving notifications or alerts during physical activities.	13	9.3	35	25.0	74	52.9	18	12.9
I believe I should take a break from wearing my smartwatch throughout the day to give my wrist a rest, adjust the screen brightness, and manage notifications	10	7.1	35	25.0	86	61.4	9	6.4
Smartphones and smartwatches give inaccurate data	20	14.3	74	52.9	44	31.4	2	1.4
Smartphones and smartwatches are way too expensive, I can't afford it	20	14.3	90	64.3	21	15.0	9	6.4
Technology such as smartphones and smartwatches can spiral you into a world of obsessive checking of body metrics and health anxiety hence it has caused me more harm than good	21	15.0	66	47.1	45	32.1	8	5.7

Table 9
Association between educational qualifications and attitude towards physical activity using chi-square test analyses

Variable	Level of Attitude towards Physical Activity		Total	χ^2	p-value
Highest level of education	Poor	Good			
National Diploma	4(7.1%)	67(75.3%)	10	2.013	0.733
Higher National Diploma	15(26.8%)	10(11.2%)	30		
University Degree	27(48.2%)	47(56.0%)	74		
Master's degree	9(16.1%)	13(15.5%)	22		
Others	1(1.8%)	3(5.6%)	4		

majority of the respondents (73.6%) had good knowledge about the effects of physical activity on health. Nonetheless, the average time the respondents spend on exercise per week is 2 hours which is rather low when compared to the recommended hours which are at least 150 minutes of moderate intensity physical activity a week. Majority of the respondents chose lack of time as the reason for not exercising enough. Other reasons include the nature of work, environment, procrastination, and a few health reasons.

The age of the respondents in this study ranged from 21 to 55 years with a mean age of 37.85± 5.0 years and this revealed that civil services cuts across all age groups of adults. This is dissimilar to the findings of Akarolo and Adebamowo (2014) who reported the mean age of their study population to be 42 ± 9.3 years. Majority of the participants were of Yoruba ethnicity, this is because the study was conducted in Ibadan, Southwest Nigeria, where there are predominantly Yoruba people. As regards hierarchical level at work, some of the respondents were at the managerial level, others were at the administrative level, and majority of the respondents operated at the professional level management. About two thirds of the respondents were reported to be married, which could serve as social support to promote exercise and physical activities.

The majority (73.6%) of the respondents had good knowledge about the effects of physical activities on health while only 26.4% had fair knowledge. They understood what was meant by physical activities and the effect it has on the health of those who engage in them. Up to fifty-six percent (56%) of the respondents strongly agreed with the reality that

people who exercise are healthier and stronger. Majority also understand that physical activity and exercise is beneficial to all age groups and genders. This shows that lack of knowledge is not the major predictor of suboptimal physical activity and exercise among the respondents. Rather other environmental variables should be considered. Evidently, civil servants are quite familiar with the health symptoms of not having enough exercise and these symptoms can serve as cue to action for them to exercise more. The study however revealed that the inadequate level of physical activity was not influenced by their level of knowledge. This suggests a gap in their ability to successfully engage in more exercise based on their knowledge, however, this may be due to perceived barriers in the work environment.

The major barrier to physical activity and exercise observed among the respondents is "lack of time" which accounts for up to 46% of the reason people do not engage in physical activities. The "nature of work" was the next major barrier for people not the engage in physical activity or exercise adequately. This calls for an intervention that targets civil servants, especially senior cadre. As observed in the study conducted by Oyeyemi et al. (2013), high socioeconomic groups in Nigeria tend to be senior civil servants, bureaucrats, technocrats, professionals and business executives. In developed countries, the leisure and vacation activities of individuals of high socioeconomic status tend to include sports and games; however, for Nigerians of high socioeconomic status, leisure and vacation tend to be passive, with little physical activity.

Generally, respondents showed a positive attitude towards

exercise and physical activity, however enabling-environment seems to be a major factor inhibiting respondents from incorporating exercise into their daily lives. Distance from house to office and long working hours are major contributors to physical inactivity. The average time of engagement in physical activity by respondents is two hours per week which is less than the CDC recommended time of exercise which is at least 150 minutes of moderate-intensity physical activity a week, such as 30 minutes a day, 5 days a week (CDC 2023). These findings correlate with the findings of Akarolo and Adebamowo (2014) which states that more than 80% of urban, professional Nigerian adults do not meet the WHO recommendations of physical activity. Urbanized Africans in this study population had low levels of leisure-time physical activity, independent of age, sex and body-mass index. This has major implications for the prevalence of non-communicable diseases in this population.

The level of educational qualification of respondents who participated in the study however did not affect their attitude towards physical activities. This shows that educational attainment has no noticeable effect on fitness choices and physical activity among the selected population. This may be an indication that health education interventions and sensitization programs among civil servants on the effects of physical inactivity should be advocated.

The knowledge of smart devices (phones and watches) as a potential enabler to physical activity is high among respondents as more than half (51%) of them agreed that these devices help to facilitate physical activities. More than half (56%) agree that smart watches and devices help track their fitness progress and increase productivity. They also state that smart watches and devices help them monitor vital signs and track levels of activity and inactivity. Furthermore, 46.4% of respondents agreed that phones and/or smart watches help to facilitate and monitor vital signs such as heart rate, no of daily steps taken, Blood oxygen, Respiratory rate, pressure, calorie burnout, and sleep pattern. This is a pointer that with more awareness and training, more people can take advantage of their smart devices in terms of monitoring their physical activity.

6. Conclusion

In this study, the proportion of the population that utilise technology as an aid to physical activity is low, however most of the respondents showed positive attitudes towards exercising and physical activity. This has major consequences on the prevalence of non-communicable diseases (NCDs) associated with physical inactivity in this population. Also, long working hours and distance from work to their homes is a barrier to exercising among most of the population. The lack of enabling environment such as absence of recreational centres within the workplace of most civil servants also poses a barrier to physical exercise even with aid of available technology. The lack of necessary training on the use of applications on smartphones and other smart devices may also contribute to the low proportion of the population using technology to aid exercises and make positive fitness choices.

Future intervention studies may be conducted to assess the effect of training of civil servants on the use of technology to improve their self-efficacy in planning and engaging in physical activities. Results from such studies may help promote engagement in physical activity and support policy adoptions that can effectively prevent NCDs among civil servants' populations in Nigeria.

Conflict of Interest

I declare that there is no conflict of interest regarding the study.

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