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Sedentary Lifestyle Prevalence among Workers in Kenya Agricultural and Livestock Research Organization in Kenya

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ABSTRACT: *People who spend too much time being sedentary are more likely to develop musculoskeletal disorders and other non- communicable diseases (NCDs). This health risk is likely to increase with increasing sedentary office setting and lifestyle. In Kenya, the sedentary lifestyle is on the increase while its baseline data has not been documented appropriately. This study investigated sedentary lifestyle prevalence among workers in seven selected institutes within Kenya Agricultural and Livestock Research Organisation (KALRO). The study concentrated on a population of 820 office and laboratory workers in seven KALRO institutes located in the Nairobi Metropolitan. The sample size (n= 96), was calculated using Daniel's formula for prevalence studies. A Cross-sectional survey was employed on respondents and objective questionnaires administered. Waist to height ratio (WHtR) and waist circumference (WC) was measured using a stretch resistant tape in accordance with WHO, 2008 guidelines. The WHtR (> 0.5) revealed that prevalence of overweight and central obesity was high in females, (92.6%) than in males (88%) while (90.38%) was for combined gender. The WHtR increased with income, ($p = 0.516$) and had an influence on ailments such as fatigue and muscle soreness after a day's work ($p=0.657$). Factors influencing sedentary lifestyle most of which were outside the workplace setting were: use of motorized transport (73%) which increased with earnings and social economic status $p<0.05$ with no output for respondents earning less than Kenya shillings 15,000; screen time (64.7%); reliance on house help for domestic chores (56.5%) and occupational (78.4%) with $p>0.5$ for sitting for office and laboratory workers. The study concluded that there was a high prevalence of sedentary lifestyle among KALRO employees in the selected institutes. These findings provide a basis for management in KALRO to encourage physical activity among its workers by intervening at individual, environmental and policy level.*

KEYWORDS: KALRO, musculosketal,obesity, policies, prevalence, sedentary.

INTRODUCTION

A sedentary job is characterized by one requiring much sitting with little or no exercise[5]. Most of the sedentary jobs are the white collar jobs, a cohort which majority of Kenyans associate with hefty pay checks and prestige [12]. This category of workers is at a greater risk of low occupational physical activity and high sedentary time [61] and are more likely to develop chronic conditions and other non- communicable diseases (NCDs). In Kenya, the fight against these diseases which account for 27% of deaths suffered by those between 30 and 70 years is complicated by cultural factors including the perception of overweight and obesity as a sign of prosperity associated with white collar jobs [54]. Further, the actual burden of these diseases is poorly understood and people don't know that they suffer from the condition and therefore don't seek treatment [60]. This lifestyle among white collar workers both at work and at home has been on the increase while baseline data on sedentary lifestyle has not been documented appropriately and may not be nationally representative or accurate [30]. Consequently, absenteeism, loss of man hours and insurance premiums have increased due to associated lifestyle diseases [38].

Employers should ensure that their workers do not spend significant amount of time sitting as a way of providing a safe system of work [4]. However, the level of implementation of these health services in most of the countries with expanding economy is low [45]. Globally, the content and multidisciplinary nature of occupational health services corresponds to international guidance but the coverage, comprehensiveness and content of services remain largely incomplete due to lack of infrastructure and shortage of multi- professional human resource [50]. In Kenya, the Occupational Health and Safety Act, 2007 is not explicit on duties of the employer in reduction and prevention of sedentary lifestyle described by the World Day of Safety and Health at Work as a new hazard fuelled by the growing use of computers and automated systems. This study was set to investigate sedentary lifestyle prevalence among office and laboratory workers in selected institutes in Kenya Agricultural and Livestock Research Organization (KALRO). The study focused on this cadre of staff because office and laboratory work is characterised by sedentary behaviour. The findings of this study provide a basis for policy makers in KALRO to develop policies and programs for reduced sedentary lifestyle.

Metropolitan or urban setting has an influence on sedentary lifestyle and adolescents from urban settings are more likely to be overweight and obese as advocated by [74]. This coupled with the proximity of the selected institutes informed the decision to choose Nairobi Metropolitan region as the study area. The selected institutes comprised of coffee (Ruiru-Kiambu), horticulture (Thika-Kiambu), veterinary (Muguga-Kiambu), agricultural mechanization (Machakos), genetic research (Muguga-Kiambu), Food crops (Kabete-Nairobi) and veterinary (Muguga- Kiambu).

MATERIALS AND METHODS

The study concentrated on a population of 820 workers in offices and laboratories in seven KALRO institutes located in Nairobi metropolitan which formed the study area. The sample size, n= 96 was calculated using Daniel's formula for prevalence studies. Cross sectional survey was employed and two sets of structured questionnaires were administered. One set gathered workers' data on sedentary lifestyle and parameters influencing occupational sedentary behaviour, while the second assessed the available policies and programs in the selected institutes aimed at mitigating sedentary lifestyle among the workers. The respondent's waist circumference was measured in centimetres at the midpoint between the lower margin of the least palpable rib and the top of the iliac crest using a stretch to resist tape that provides a constant 100gram tension as provided by the WHO, 2008 guidelines. The subjects were requested to wear light loose clothing and stand with feet close together, arms at the sides and body weight evenly distributed. Standing height was measured to the nearest 0.1 centimetre using the same tape for waist circumference. The subjects were requested to remove shoes, slippers and socks before the measurements were taken. The waist to height ratio(WHtR) was calculated and recorded by dividing waist size (cm) by height (cm). Data was processed using statistical package for social sciences (SPSS- Version 20) and MS Excel computer software. Analysis was done using frequencies and statistical tests. The data was also subjected to statistical correlational tests using measure of central tendency to determine relationships between independents variables. Spearman Rho and Kendalltai-b was used to check similarlities in data collected. Data was presented using statistical tables and charts.

RESULTS AND DISCUSSION

The social demographic profile revealed that the respondent's gender was 46.3 % male, 50% female and 3.7% non response while 57.4% were married,33.3% single,5.6% windowed 1.9% separated and 1.9% nonresponse. The respondent's level of education was 92.6% college and over with 55% of them working in the office, 42 % in laboratories, and 3% serving in the field.

Available policies, programs and health facilities

Availability of operational health facility in the study institutes

The results indicated that 43% of the selected institutes had operational health facilities which inferred that only 360 employees out of the total study population of 820 or 44% had access to in house medical services as shown in figure 1.

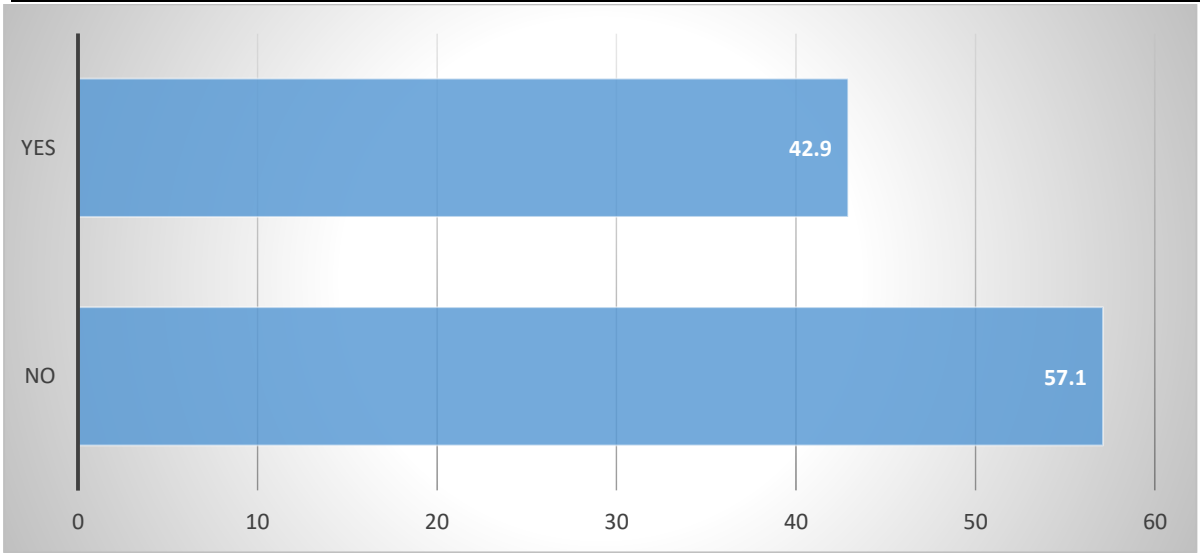

Figure 1. Institutes with operational health facility

Workers spend the better part of their waking hours at the work place and there was no better place to have a medical staff on hand. In addition, treating sore throat, cut fingers, helping employees stay healthy by offering on site preventive tests, screening and healthy coaching to encourage healthful habits were areas of interest [43]. Further, to mitigate sedentary lifestyle in the workplace, it is necessary for the employers to encourage workers to participate in physical activity. However, this may not be possible if the medical condition of the workers is not known and documented. For example, it may not be safe for workers with known high blood pressure or rheumatoid arthritis to join in the physical activity without medical approval. By understanding the workers' health profile, the health provider in the health facility can identify the risk factors within the respective institute and maintain record and follow ups which may provide the required interventions to ensure that all workers can safely participate in more physical activities.

Physical fitness and membership of gym or sports club

None of the selected institutes had any organized programs that encouraged workers to engage in exercise and fitness by allowing for physical activity and membership of a gym or sports club**.** This meant that the management of the sampled institute did not find it necessary to encourage physical activity and a safe system of work among the workers.

Organized quarterly screening programs

The respondents' response to organised screening programs was poor as only 14% of the study institutes posted good response. This was indicative of lack of awareness among the KALRO employees on the importance of lifestyle diseases screening, management and health surveillance. The researcher deduced that the management in the selected KALRO institutes had poor organizational facilitation and approaches to synthesize and encourage their employees to live a non-sedentary lifestyle.

Employer's promotion of workers wellbeing at the work place

The results revealed that all the selected institutes had centralized waste bins to encourage worker to take light exercises by walking to the bins. Among the selected institutes, 42.9% allowed regular breaks from sitting by standing up every 30 minutes and 71.4% provided drinking water in their laboratories and offices so as the employee could take water frequently and have frequent visit to the toilet. Employers should ensure that their workers do not spend significant amount of time sitting, otherwise they could be breaching their health and safety obligation to provide a safe system of work by reducing their workers sedentary time [4]. Of the sampled respondents, 64.8% indicated they had been sitting on the same chair for more than five years as shown in figure 2.

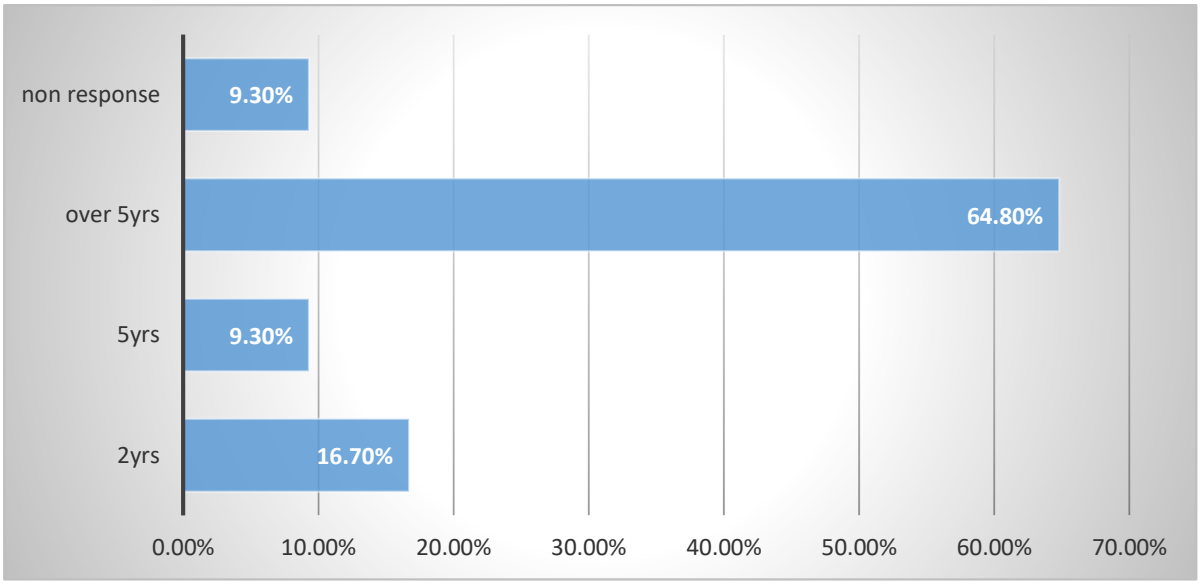

Figure 2. Respondents sitting on the same chair in the office/Laboratory

The observation made by the researcher was that in all the sampled seven institutes, non-had invested in ergonomic chairs. Workers spend more time sitting on an office chair than on anything else often for more than eight hours a day as was evident in our results on occupational sedentary. This then means a well-designed, comfortable sitting option is important for improved posture and performance not to mention keeping back pain, muscle soreness and neck pains at bay [29].

The study argues from these results that due to their work place situation and posture, KALRO employees over time may gradually become unproductive and the selected KALRO institutes may find themselves with large staff turnover coupled with significant health bills occasioned by sitting on worn out non ergonomic chairs.

Available policies to mitigate sedentary lifestyle and work environment

The results indicated that none of the selected institutes had;

a) policy on how to hold walking meetings
b) Policy on how to hold standing meetings

c) Policy on maximum time a normal siting meeting should take

Only one out of the seven sampled institutes had a policy to address ergonomics and work place design. All selected institutes reported that they did not provide electronically adjustable desk with integrated treadmill or a treadmill and a stationary cycle ergometer. The data analysis indicated that none had either an active workstation or work site programs targeting obesity factors such as behaviour change modifications, health education, health risk assessment and appraisal, or weight and stress management. These result allows the study to deduce that KALRO work environment encouraged employee to have a sedentary lifestyle at the work place.

Employees at risk of physical in-activity in various KALRO institutes

Waist to Height Ratio (WHtR)

Results of WHtR by gender were as shown in table 1.

Table 1. WHtR Ratio by Gender

Gender	With WHtR below 0.5	With WHtR above 0.5	Total	% WHtR below 0.5	% WHtR above 0.5
Female	2	25	27	7.41	92.59
Male	3	22	25	12.0	88
Combined	5	47	52	9.62	90.38

The measurement of waist to height ratio (WHtR) and waist circumference (WC) indicated that the prevalence of overweight and obesity was higher in females at (92.6%) than in males at (88%).On prevalence and factors associated with physical inactivity among Malaysian adult females were more likely to be more physically inactive than males [75]. The prevalence for both gender combined was 90.38%. This high percentage of the total staff with WHtR > 0.5 was indicative of a sedentary lifestyle prevalence among the sampled KALRO staff in the selected institutes. Further, the correlations test revealed that WHtR increased with income, ($\tau_b = 0.070$, $p = 0.516$) and had an influence on ailments such as fatigue and muscle soreness after a day's work ($p=0.657$). as shown in the Kendall's tau-b correlation in table 2 below.

Table 2. Correlations between waist to height ratio and monthly income (KES)

			Waist to height raio	Income per month in kenya shillings
Kendall's tau_b	Waist to height ratio	Correlation coefficient	1.000	0.070
		Significance (2-tailed)	.	0.516
		N	52	52
	Income per month in kenya shillings	Correlation coefficient	0.070	1.000
		Significance (2-tailed	0.516	.
		N	52	52

WHtR has been proposed as an alternative measure of obesity [63] and it is a good proxy for central fat which has a greater health risk than fat stored in other parts of the body. The WHtR range of all the participants was as shown in figure 3.

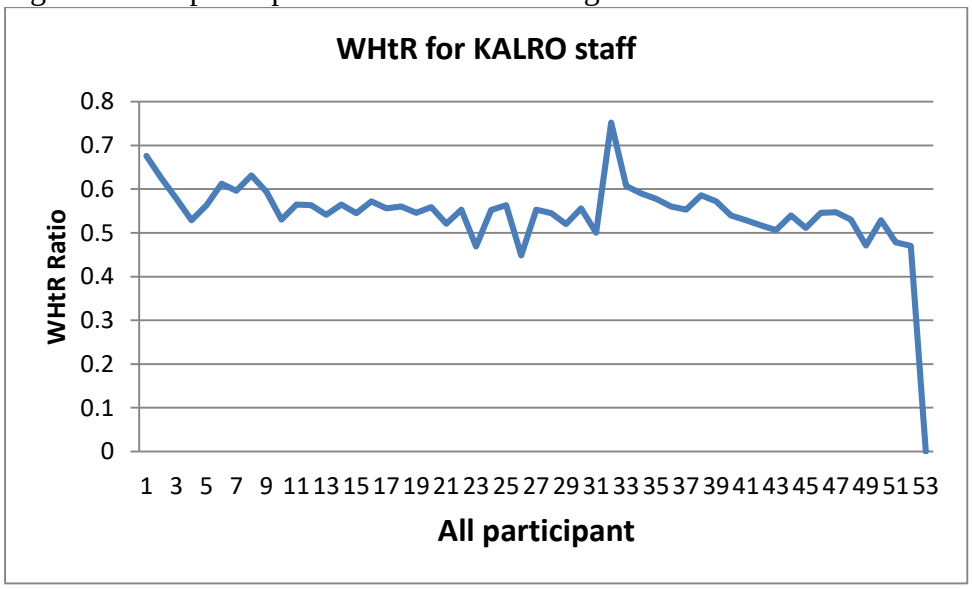

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Figure 3. WHtR for KALRO staff

Central Obesity - Waist Circumference

The recommended waist circumference (WC) by WHO, 2008 is ≤102cm for men and ≤88 cm for women. The WC measurement carried out on respondents of both gender was as shown in the table 3.

Table 3. Waist circumference of participants per gender

Females	Waist below 88.9 cm	Waist above 88.9cm	Total	% WC > recommended waist size
	5	22	27	81.48
Male	Waist below 101.6cm	Waist above 106.1cm	Total	% WC > recommended waist size
	23	2	25	8
Combined	28	24	52	46.15

The waist circumference results indicated that (81.48%) of sampled females had measurements above the recommended 88.9cm while for men only (8%) had measurement above the recommended 101.6cm as shown in table 3 above. This was an indication that more females were obese than males in the selected institutes in KALRO. Both the WHtR and WC results showed that there was significant central obesity among male and female workers. This was indicative that the sampled staff at KALRO were at risk of NCDs and obesity related diseases such as stroke, cardiovascular and diabetes [8] and that individuals with WHtR > 0.5 had a lower life expectancy. Similarly, individuals with WHtR > 0.5 values are overweight and are at risk of metabolic disorders and chronic NCDs [23]. These results further revealed the sampled KALRO staff in the selected institutes had a sedentary lifestyle because significant number of them had high central obesity values. The two measures employed were established anthropometric indices for the prediction of NCDs and according to a study on Taiwanese adults, a WHtR greater than 0.5 is an effective indicator of central obesity [66].

Further, the study sought to establish the statistical correlations between the respondents' age, waist circumference, WHtR, and income per month and the results were as shown in the table 4.

Table 4. Statistical correlations between age, waist circumfrence and monthly income

			Age	Waist circumference in cm	Waist to Height Ratio	Income per month in Kenya Shillings
Kendall's tau_b	Age	Correlation Coefficient	1.000	.100	.102	.396**
		Sig.(2-tailed)	.	.365	.344	.001
		N	53	52	52	53
	Waist circumference in cm	Correlation Coefficient	.100	1.000	.625**	.069
		Sig.(2-tailed)	.365	.	.000	.526
		N	52	52	52	52
	Waist to Height Ratio	Correlation Coefficient	.102	.625**	1.000	.070
		Sig.(2-tailed)	.344	.000	.	.516
		N	52	52	52	52
	Income per month in Kenya Shillings	Correlation Coefficient	.396**	.069	.070	1.000
		Sig.(2-tailed)	.001	.526	.516	.
		N	53	52	52	53

From the analysis it was observed that there was a positive correlation between respondents' age and waist circumference measurements ($\tau_{b=}$ *0.100, p=0.365*). This indicated that the respondent physical activity reduced as they advanced in age and as their earnings per month increased ($\tau_{b=}$ *0.396, p=0.001).*

The WHtR >0.5 had an influence on respondents' ailments related to sedentary lifestyle as recorded in table 5. It was further observed that the correlation between WHtR and fatigue /muscle soreness after a day's work was p=0.657. this indicated that respondents with WHtR >0.5 were likely to complain of fatigue and other related ailments.

Table 5. Statistical correlation between WHtR and fatigue/muscle soreness after a day's work

		WHtR	Muscle soreness afetr days' work
	WHtR correration coefficient Sign. N	 1.000 - 52	 -0.52 0.657 52
Kendall tau-b	Muscle soreness Correlation coefficient Sign. N	 -0.52 0.657 52	 1.000 - 52

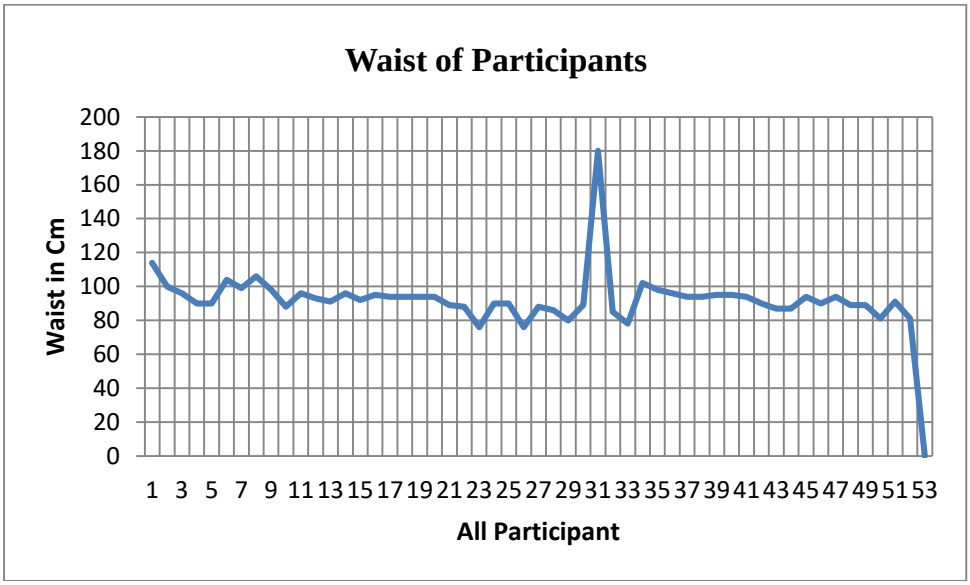

Figure 4: Waist of participants

The waist circumference of all participants is shown in figure 4 above. Notably an isolated case of a male participant with waist size 180 cm and WHtR of 0.7 was observed. This observation points out the need for further research involving a wider population to identify if there are similar cases and underlying reasons for such high WHtR and waist circumference in order to make informed decisions on possible interventions.

Factors influencing sedentary behaviour of the study employees in selected KALRO institutes

Factors influencing sedentary lifestyle according to Sugiyama, *et al*, (2011). includes; individual factors (age, gender, poor health, and education), Occupational factors (type of work and the organisation of the workplace), physical environmental factors (low residual density, poorly connected streets and limited land diversity), and societal trends factors (the move

towards urbanization, car use, mechanization and increasing use of technology for every task that involves sitting). Other factors as enumerated by Lina *et al*, (2016) include leisure and house hold domains. This study focused on these factors and their association with respect to sedentary lifestyle among the respondents.

The means of communicating to work was one of the factors influencing the sedentary behaviour of the respondents. The study considered this in relation to age, income per month and type of occupation

Respondent's age cross-tabulated against how they commuted to work

The study sought to know how the respondent's age related to how they commuted to and from work. From the results, it was evident that as they advanced in aged (≥ 35 years), the tendency was towards motorized means to and from work as indicated in figure 5.

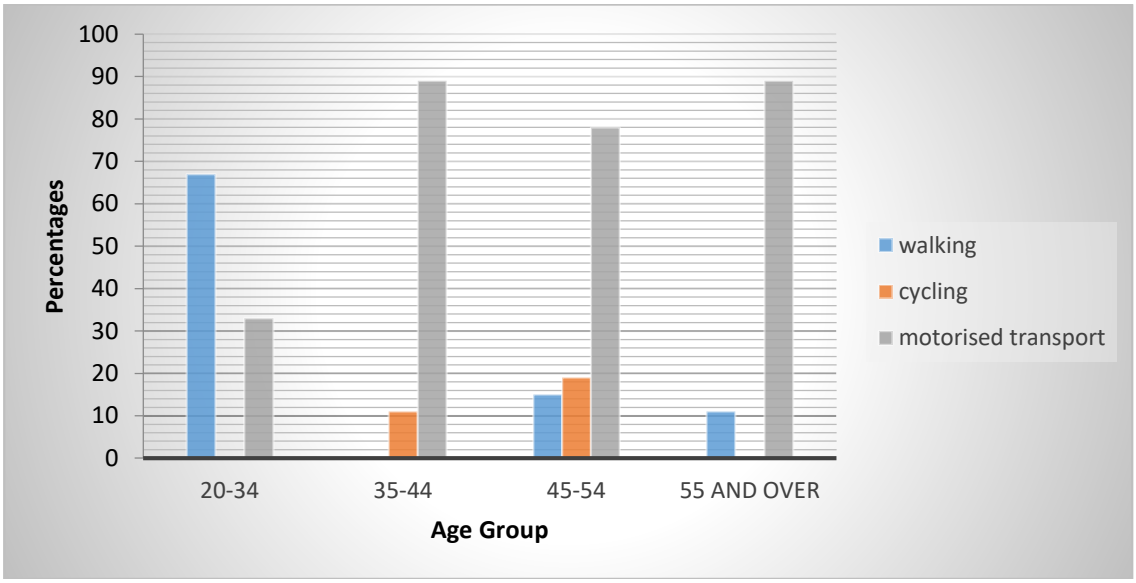

Figure 5. Relation between age and how respondents commuted to and from work

Most (88.8%) of the older respondents (≥ 50years) used motorized transport to and from work. This was indicative that indulgence in physical activity reduced as respondents advanced in age *(p=0.365)*. Studies have shown that in older individuals, increase in body weight is not simply due to increase in energy intake but significant reduction in energy expenditure due to sedentary lifestyle [49]. Further, the results were in agreement with a study on physical inactivity prevalence and trends among Mexican adults by Medina *et al*, (2013) which revealed that adults in obese category, 60-69 age group, and those in highest economic status were more likely to be physically inactive. A study on prevalence and time trends in diabetes and physical inactivity among adults in West African population also found an association between physical inactivity and being older (> or =50 years) and urban residence [1].

It was observed from the results that those aged between 35 and 44 years or the middle age were either cycling or using motorized transport and did not walk to and from work. This was

in agreement with a study by Kelly *et al*, (2018) which stated that physical activity (PA) declines during mid-life were characterised by reduction in light intensity PA with increases in sedentary time. In a study on cycling and walking for individual and population health benefits (Public health England, 2018) it was evident that cycling and walking have the same health outcomes and that the former is a good example of moderate to vigorous PA.

Respondents' Income per month in Kenya shillings cross-tabulated against how they commuted to and from work

The cross tabulation of the respondent's income per month against how they commuted to and from work revealed that most of those earning more than Kenya shillings 46,000 used motorized transport.

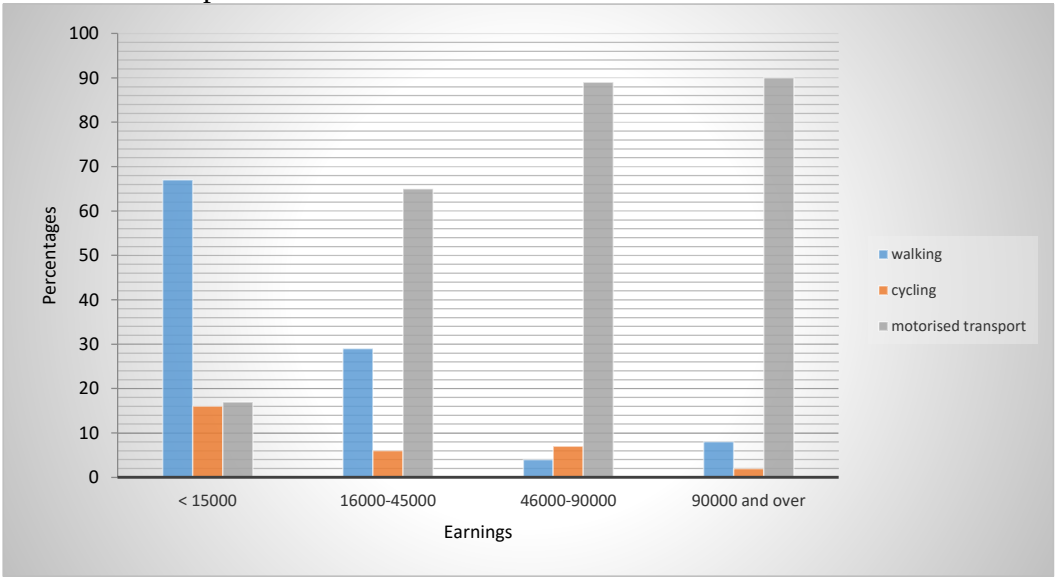

Figure 6. Relation between monthly earning and respondents' mode of commuting

From the data, it was observed that most of those with an income less than 15,000 walked to and from work (66.6%), while most of those with income of, 46,000-90,000 and above used motorized transport as indicated in figure 6. For respondents earning less than Kenya Shillings 15,000 the data was normally distributed about walking which indicated that walking was their preferred means of transport. Those earning from Kenya shillings 16,000-45,000 were negatively skewed toward none- motorized transport as shown in table 6. For all with income above Kenya shillings 46,000, data was skewed toward motorized transport and those with income above Kenya shillings 90,000 all drove their own car to and from work.

Table 6. Skewness and Kurtosis of monthly income against mode of commuting

Income per month in Kenya Shillings		Statistic	Std. Error
Less than 15,000	Skewness	1.537	.845
	Kurtosis	1.429	1.741
16,000-45,000	Skewness	-.438	.550
	Kurtosis	-1.197	1.063
46,000-90,000	Skewness	-1.847	.524
	Kurtosis	2.810	1.014
90,000 and over	Skewness	-1.658	.687
	Kurtosis	2.045	1.334

When tests for normality was done using Shapiro- Wilk test, all *p* values were below 0.05 with no output for respondents earning less than Kshs. 15,000 as shown in table 7 below.

Table 7. Test for normality using Shapilo- Wilk test.

Respondents earnings in Kenya shillings (KES)			
	Statistic	Df	Significance
Less than 15,000	0.566	8	0.000
16,000-45,000	0.763	9	0.008
46,000-90,000	0.796	26	0.005
90,000 and above	0.637	9	0.001

This indicated that use of motorized transport among the respondents increased with earnings and socioeconomic status. The observed excessive use of personal vehicles to and from work among those earning Kenya Shillings ≥ 90,000 could be attributed to personality traits, or respondents may have become habituated to using cars as observed by Juneman and Mohammad, (2015) in a study on use of public transportation in greater Jakarta. Owen, *et al.* (2011) in a study on adults' sedentary behaviour determinants and interventions, add that in suburban areas, the use of cars has lengthened the period of sedentariness among citizens, which in this case refers to the amount of time spent on sitting in the cars to perform a journey to and from their workplaces.

3.3.1 Type of occupation cross-tabulated against how the respondents commuted to and from work

The study sought to know how the respondent's type of occupation related to how they commuted to and from work. The data revealed that 94.7% of those in laboratory work and 64.2% of office workers used motorized transport to commute to and from work as shown in figure 7.

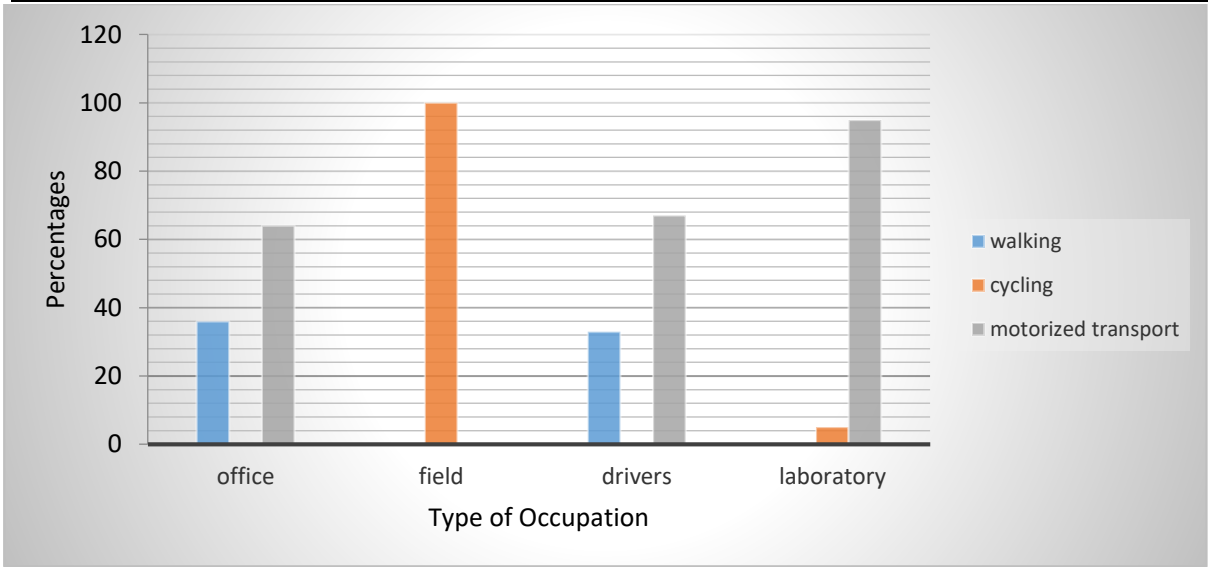

Figure 7. Type of occupation against how respondents commuted to and from work

Further, since laboratory and office work is characterised by much sitting through-out the day, the assessment of occupational sedentary was carried out using the following questions under a section in the questionnaire which sought to know the workplace sitting profile: *"How many hours did you work in the last 7 days?"; "During the last 7 days, how many days were you at work?"; "how would you describe your typical work day in the last 7 days? (This involves only your work day and not travel to and from work, or what you did in your leisure time). "Indicate the percentages for sitting, standing, walking, heavy labour or physical tasks". "Does this form an impression of your monthly daily routine in the last three months?"* The analysis of the hours respondents worked in a week indicated a *mean* of 41.6 hours and a *standard deviation* of 14.5. The data for how many hours per week had a *skewness* of -0.935 and a kurtosis of 4.657 showing that it was not normally distributed but had a kurtosis towards working for 40 hours per week. On how many days per week the respondents worked, the data had a *skewness* of 2.496 and a *kurtosis* of 10.285 which was indicative that the data was not normally distributed but was *kurtotic* around 5 days per week. This indicated that most respondents worked an average of 40 hours in a 5 days' week. The skewness and kurtosis analysis for the hours against the days worked was as shown in table 8.

Table 8. Skewness and Kurtosis analysis of hours against the days worked in a week

	Hours worked for the last 7 days	Days worked for last 7 days
Skewness	-0.935	2.496
Std. error	0.327	0.327
Kurtosis	4.657	10.285
Std. error	0.6644	0.644

The analysis on how respondents described their typical working day in the last 7 days indicated that those who worked in the field did not respond to sitting down and driving option.

They spent most of their time walking. The results using Shapiro- Wilk showed p>*0.5* for sitting for office workers, standing and sitting for laboratory workers as shown in table 9 below.

Table 9. Tests for Normality for sitting for office workers, standing and sitting for laboratory workers

	Occupation	Statistic	Df	Significance	Statistic	Df	Significance
Sitting including driving	Office	.181	28	019	.907	28	.017
	Driving	.314	3	.000	.893	3	.363
	Laboratory	.250	20	.002	.726	20	.000
Standing	Office	.228	28	.001	.892	28	.007
	Field	.260	2	.000	.000	.000	
	Driving	.328	3	.000	.871	3	.298
	Laboratory	.187	20	.066	.893	20	.031
Walking	Office	.146	28	.129	.911	28	.021
	Driving	.253	3	.000	.964	3	.637
	Laboratory	.282	20	.000	.849	20	.005
Heavy labour or physical tasks	Office	.357	28	.000	.524	28	.000
	Field	.260	2	.000	.000	.000	
	Driving	.175	3	.000	1.000	3	1.000
	Laboratory	.495	19	.000	.460	19	.000

On gender basis, the data revealed that male had a *skewness* of 1.905 for hours worked per week and female had -0.782. The data was skewed for male but approximately normally distributed for female. The *kurtosis* of 2.707 for males and 2.321 for female indicated the data was *kurtotic* for both male and female. For the number of days worked in a week, the results revealed female had a *skewness* of 2.602 with a *kurtosis* of 11.75 for male. This was an indication that for both male and female respondents, the data was both skewed and *kurtotic* which further inferred that the data was independent of gender meaning that both male and female worked 40 hours per 5 days' week. By analysing the skewness and kurtosis for gender against the number of days and hours worked, the results were as shown in table 10 below.

Table 10. Kurtosis and skewness analysis: Gender against days worked in a week

	Gender		Statistic	Std. error
Hours worked last 7 days	Male	Skewness	1.905	0.464
		Kurtosis	2.707	0.902
	Female	Skewness	-.782	0.448
		Kurtosis	2.321	0.872
Days at work last 7 days	Male	Skewness	2.485	0.464
		Kurtosis	10.748	0.902
	Female	Skewness	2.602	0.448
		Kurtosis	11.759	0.872

Most respondents spent significant time sitting (78.4%) in the place of work as compared to walking within the office/laboratory (15.6%) or lifting heavy objects (6%). This meant that occupational sedentary was high among the respondents. The results were in agreement with Allan, (2018) who argues that on occupation domain, employers should ensure that their workers do not spend significant amount of time sitting as a way of providing a safe system of work.

Time spent by the respondents while commuting to work

The study sought to establish the time spent sitting in the cars to perform a journey to and from respondents' workplaces while on motorised transport. The results revealed that (44.6 %) spent more than 1 hour in traffic as indicated in table 11. This could be attributed to traffic jams experienced during the peak hours in Nairobi metropolitan region. The long-time taken to commute to and from work added to the respondents' sedentary time. This falls under transportation domain where Owen *et al*, (2011) argues that use of cars in suburban areas has lengthened the period of sedentariness which refers to the amount of time spent in the cars to perform a journey to and from workplaces and short journeys.

Table 11. Motorized transport against time taken to commute to and from work

Time (in minutes)		Frequency	Percentage
	0	1	1.9
	10	1	1.9
	15	1	1.9
	30	5	9.3
	40	2	3.7
	45	1	1.9
	50	3	5.6
	55	2	3.7
	60	21	38.9
	65	1	1.9
	90	1	1.9
	120	1	1.9
	Total	40	74.1
	Did not respond	14	25.9
Total		54	100.0

Statistics for skewness and kurtosis if one used motorized transport and how long they took to commute to and from work revealed a skewness of 0.133 and a Kurtosis of 3.172 showing it was not normally distributed but had significant kurtosis towards spending 60 minutes to and from work as shown in table 12 below.

Table 12. Kurtosis and skewness analysis of the time spent using motorised transport.

	Statistic	Standard error
Skewness	0.133	0.374
Kurtosis	3.172	0.733

Lifestyle trends

The part of the questionnaire assessing the respondents' profile on sitting at the workplace indicated that the respondents were spending too much time sitting in the workplace (78.4%) and that they were working for a *mean* of 41.1 hours in a 5 days' week. It was important that the study established whether this sedentary lifestyle followed them at home by assessing how they spent their weekend and leisure time.

The lifestyle trends that influence sedentary behaviour were revealed by the respondents by giving details on how many hours they spent watching television at home after work and how they spent a typical weekend. The study revealed the following:

(a) Most of the respondents spent significant proportion of their weekend watching TV as depicted in figure 8.

(b)

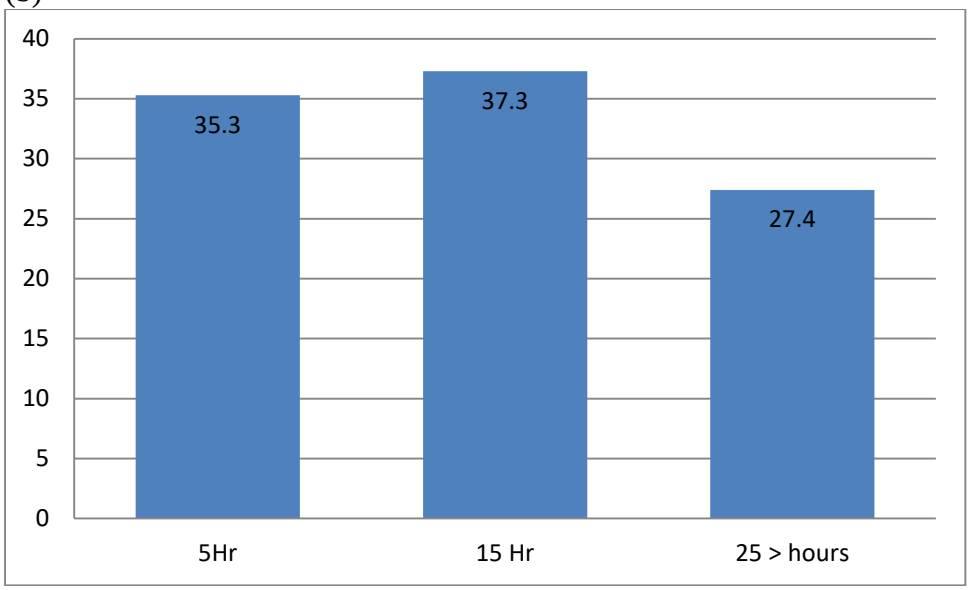

Figure 8. Time spent watching television over the weekend

Notably 64.7% of the respondent spent over 15 hours in front of the TV on weekends.

(c) From the results it was also revealed that 88.5% respondents who spent time watching TV as shown in Figure 9, did so while lying on a couch as opposed to sitting on an arm chair although inactivity is the culprit whether lying or sitting down. According to Thyfault, (2010) the problem is that we don't use our legs when we sit or lie prone. Our legs and backside contain some of the largest muscles in our body. When we sit in a chair or lounge on a couch, these muscles are slack and levels of blood sugar and bad cholesterol rise adversely affecting the health of the culprits.

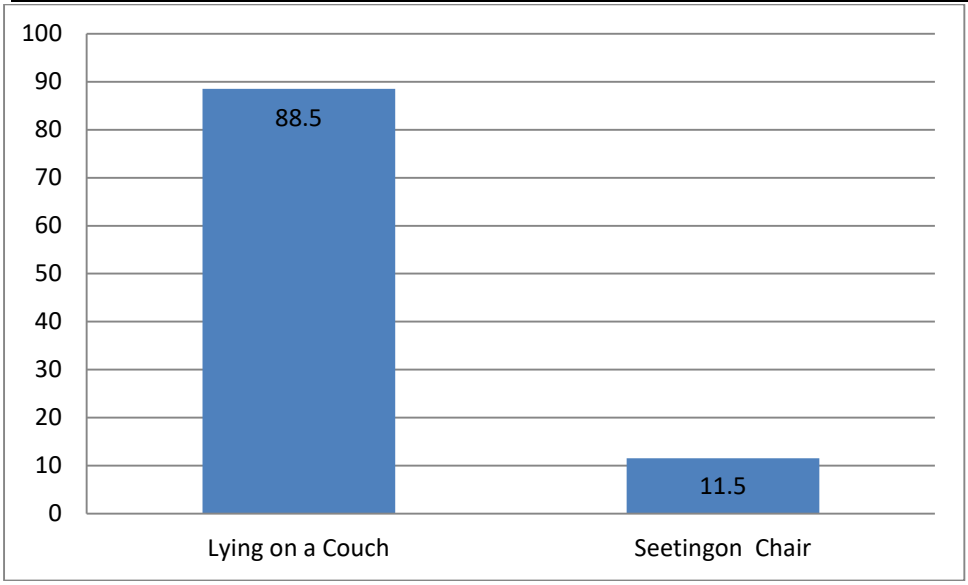

Figure 9. Respondent's sitting mode while watching the TV

(d) Most respondents preferred being indoor, lying on the couch while watching TV. More specifically 68% of respondent confirmed that they preferred to spend most of their weekend at home lying on the couch and only 14% and 18 % as shown in figure 10, preferred being involved in Physical activity and socialising with friends respectively.

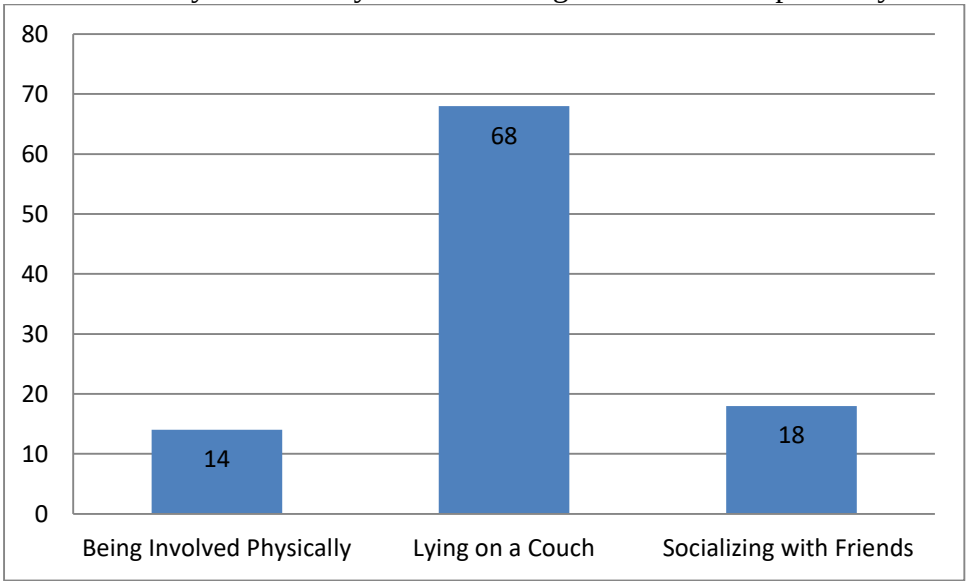

Figure 10. How respondents spent their weekend

(e) Only 23.1 % confirmed that they used dish washer and washing machine at home.The respondents level of mechanization of house chores was low both with low and high income cadres as shown in figure 11.

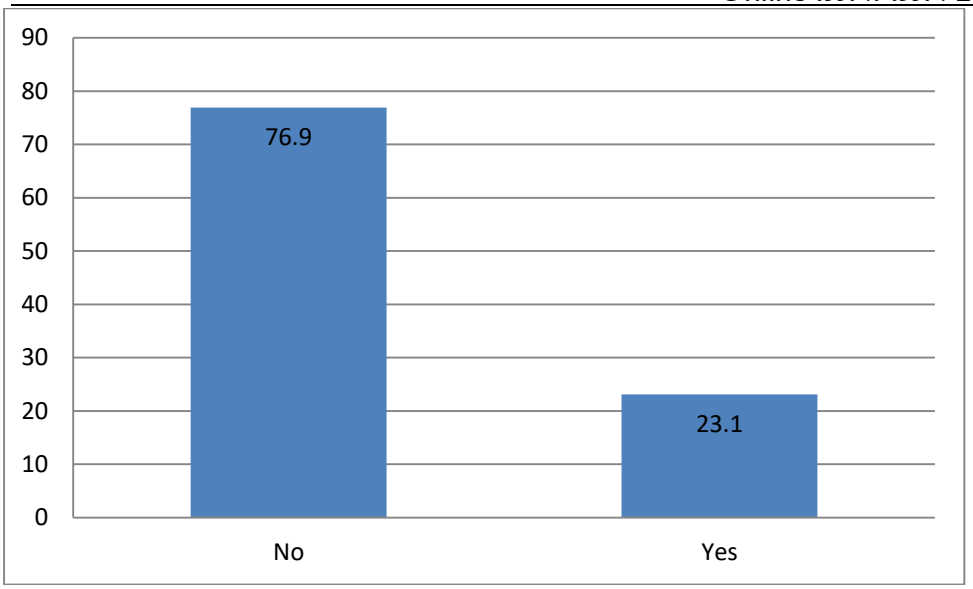

Figure 11. Respondents with dish washer or washing machine at home

(e) on housework domain, the results were as shown in figure 12.

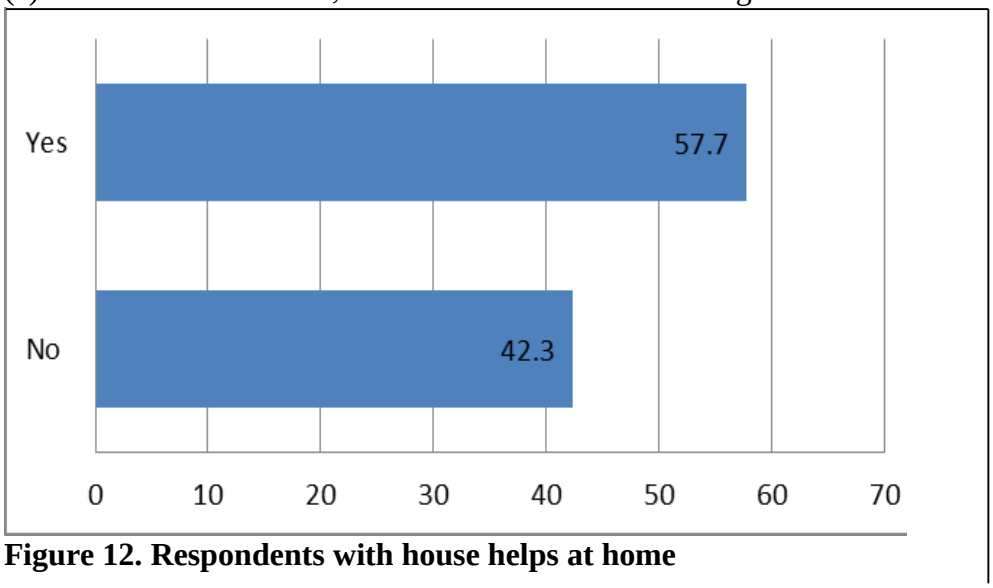

Figure 12. Respondents with house helps at home

In physical activity domains, house chores fall under the four major domains category which includes transportation, occupational and leisure. Kindula, (2014) stated that in Kenya, nearly everyone, except the very poor, hires domestic help. A study by Alex *et al*, (2006) on practice of physical activities and associated factors in adults in Brazil found out that the proportions of active individuals were, (14.8%) leisure, (38.2%) occupational, (11.7%) transportation, and (48.5%) household chores. This was in agreement with the results of this study as it was observed that, 57.7% of the respondents delegated all their house chores to house helps after spending significant time (78.4%) sitting in the office and (44.6%) in the traffic for more than 60 minutes. Kirigo, (2012) confirms such lifestyle reduces use of their large muscles, back trunk and legs hence reduction of the body intake of sugar and fats thus increasing their health risk and tendency to develop obesity. Kirigo, (2012) further argues that those who spend a lot

of time sitting down have a predisposition of having blood clots, developing a bad posture and frequent fatigue and muscle soreness. Further, the researcher deduced that KALRO employees in the selected institutes were sedentary and were at risk of developing type 2 diabetes and cardiovascular disease.

Spearman (-0.451) revealed that there was a negative correlation at (p= - 0.01) significant level. This indicated that those respondent who earned higher income were the ones who had dish washers and washing machines. However, among the respondents, spearman p value of (-0.659) revealed significant negative correlations among the respondent as shown in table 13 below.

Table 13. Statistical correlation between the respondents' earning against those that had dish washers/ washing machines and house helps

			Income per month in Kenya shillings	Respondents with dishwashing machines at home	Respondents with hose helps who handles all chores at home
	Income per month in Kenya shillings	Correlation coefficient Sig.(2 tailed) N	1.000 - 53	0.541 0.001 53	-0.659 - 53
Spearman's	Respondents with dish washing machines at home	Correlation coefficient Sig.(2tailed) N	0.541 0.001 53	1.000 - 53	.0466 - 53
	Respondents with househelps	Correlation coefficient Sig.(2tailed) N	-0.659 - 53	0.466 - 53	1.000 - 53

This indicated that as the respondents earned more they acquired house help to do all their house chores. The research showed that KALRO employees in the selected institutes used house help as compared to using mechanized methods of cleaning clothes and dishes and the ones who had high income (> 46000 making up 56.5%) were the ones who employed house help to perform their house chores as shown in figure 13.

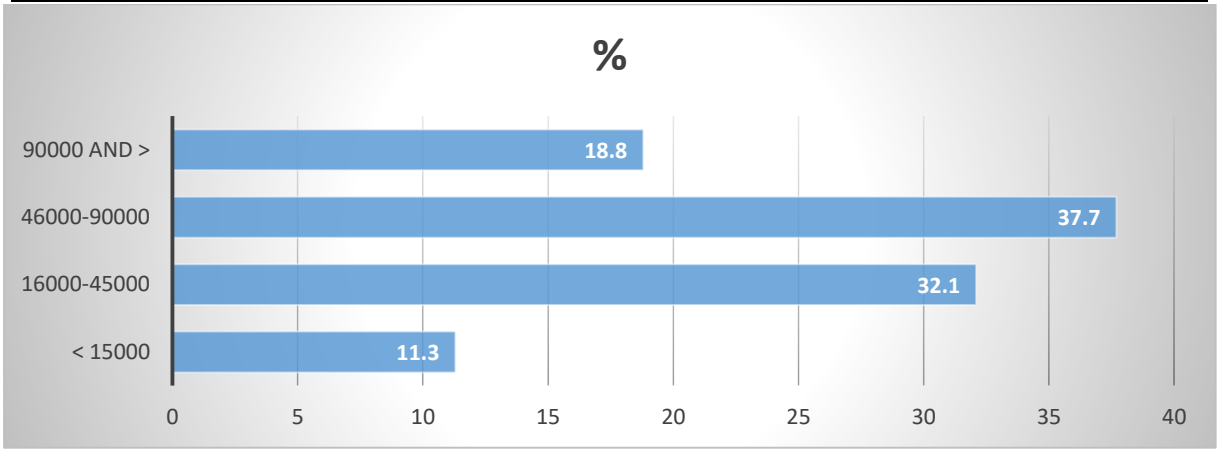

Figure 13. Cross tabulation of respondents using househelp against earnings

Medical history and work influence trends

The study sought to know the respondent's medical history and whether they had ailments related to sedentary lifestyle. The analysed data indicated that respondents suffering from chronic low back pain (LBP) after a day's work in the office or laboratory were 52%. Respondents suffering from fatigue and muscle soreness after a day's work were 72.5% while 15.7% reported they suffered from high blood pressure and 45% suffered from neck and shoulder pain (NSP). Neck and shoulder pain and low back pain have recently been identified as problems in many countries. The use of new technology has led to high rates of computer, mobile phone and other electronic products. These factors lead to lack of exercise and skeletal – muscle dysfunction (Zhi *et al*, 2013). The assessment of NSP and LBP were carried out using the following questions under the section on medical history and work influences trends in the questionnaire: *"For the past three months, have you suffered from chronic low back pain after a long day's work". The options provided in the answers were: "occasionally (in a period of 1 to 3 times a month); "often (in a period of 1 to 3 times a week)"; "always (more than 3 times a month)".* The given answers with often and always indicated presence of NSP and LBP. This was not without the consideration of the pre-existing musculoskeletal conditions. The results revealed that 5.4% of the respondents indicated they suffered from diabetes. None of the respondents indicated that they suffered from any form of cancer as shown in figure 14.

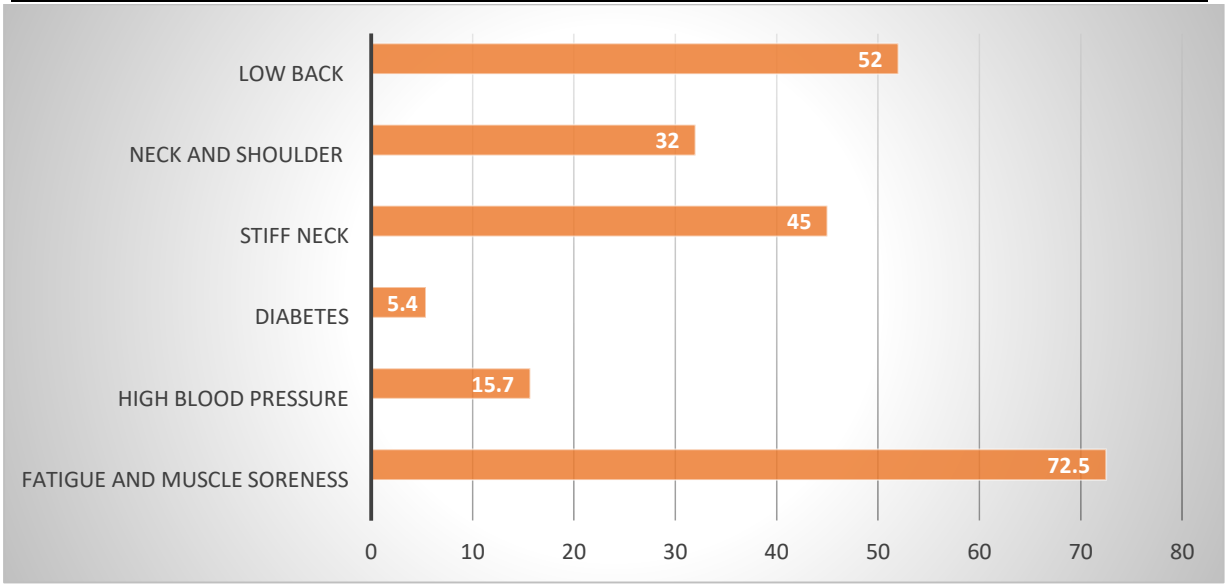

Figure 14. Respondents suffering from ailments related to sedentary lifestyle

From the results, it was observed that (84.3%) had indicated no to high blood pressure, (94.1%) no to diabetes and (100%) no to cancer. This was in tandem with findings of Stauart Ali and Fransecs Xavier (2017) who stated that the actual burden of the disease (NCDs) is poorly understood and people don't know that they suffer from the condition and therefore don't seek treatment as shown in figure 15.

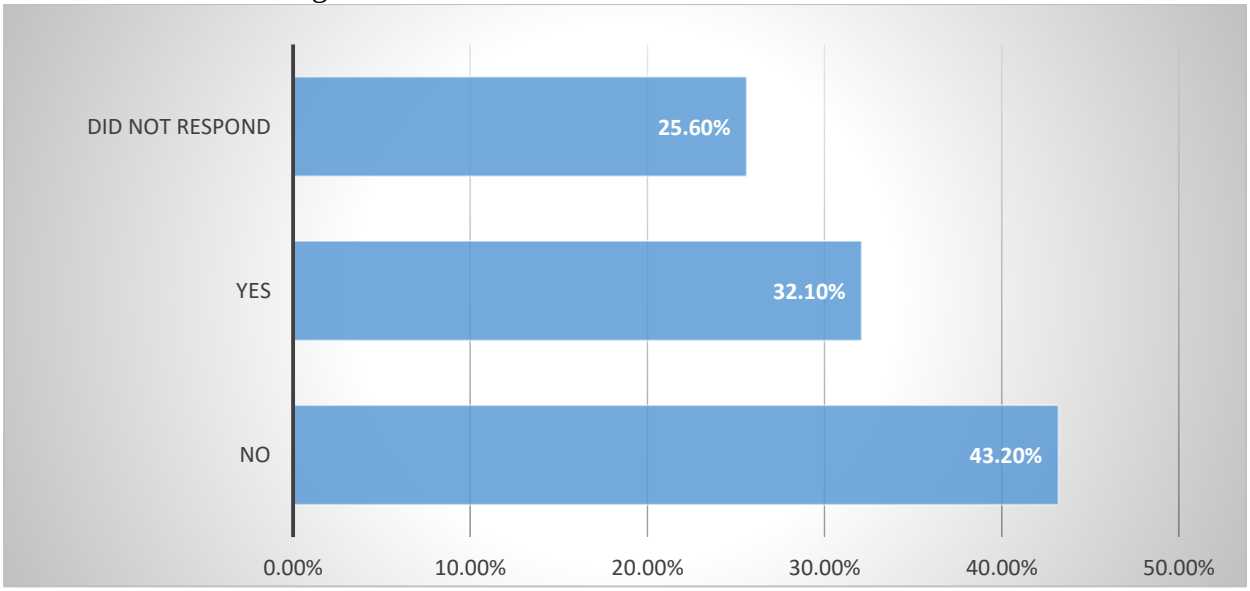

Figure 15. Respondents who had sought for medication.

A total of 43.2% did not seek medical attention despite having a medical condition and 25.6% did not respond. The study observed that most respondent did not do frequent medical check-up even when in pain. This was indicative of lack of awareness on the importance of having frequent medical check-ups. On gender basis, the respondents who suffered fatigue and muscle

soreness after a long day's work and had not sought for medical attention were 31.5% male and 68.5 % female. The cross tabulation of cases of high blood pressure against whether the affected had sought for medical attention revealed that 70% male and 30% female had not, while for those who suffered from stiff neck and shoulder pain the result revealed 76.4% female and 23.5% male had not sought for medical attention. Respondents suffering from fatigue and muscle soreness after a day's work were (72.5%). This could have been as a result of absence of ergonomic chairs in the selected institutes and respondents' sitting on one chair for more than 5 years (64.80%) as reported in section under workers wellbeing at the work place.

CONCLUSION

There was high prevalence of sedentary lifestyle among KALRO employees in the selected institutes. **Employees at Risk of Physical Inactivity**
The high number of respondents of both gender with WHtR above 0.5 and WC above the recommended 88.9 cm for females and 101.6 cm for males was indicative of sedentary prevalence among KALRO employees. Female employees were considered to have higher sedentary prevalence.

Factors Influencing Sedentary Behaviour
Use of motorized transport, screen time and delegation of house chores to house helps played a significant role in the prevalence of sedentary lifestyle among KALRO employees in selected institutes. These factors increased with earnings, social economic status and age.

Policies and Programs Available to Mitigate Effects of Sedentary Lifestyle
There was no advocacy on the part of the management on the importance of policies and programs to mitigate effects of sedentary lifestyle among the employees in selected KALRO institutes.

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2. Conflict of interest disclosure
The authors wish to declare that there is conflict of interest from any quarter.

3. Data availability
Data are available on request via njuerichm@yahoo.co.uk

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