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*Original Paper*

# Prevalence of Tobacco Use and Physical Activity among Adult Sierra Leonean Population

**Samai Mohamed[1*], Bash-Taqi Donald[2], Samai Hajah H[3], Edem-Hotah Joseph[4], Daoh Sheku K[5] and Alemu Wondimagegnehu[6]**

Departments of [1]Pharmacology, [2]Paediatrics, [3]Pharmaceutical Chemistry,[4]Faculty of Nursing, College of Medicine and Allied Health Sciences, University of Sierra Leone, Freetown, Sierra Leone, [5]Ministry of Health and Sanitation and [6]World Health Organisation, Sierra Leone Country Office, Freetown, Sierra Leone

**ABSTRACT**

The current burden of non-communicable diseases (NCDs) and their risk factors such as tobacco use and physical inactivity remain largely unknown in Sierra Leone. Thus, this study was conducted to document the prevalence of tobacco use and physical activity among the adult Sierra Leonean population with a specific objective of determining the sex and age prevalence. A cross sectional population based survey utilising the multi-stage cluster sampling strategy was used. A total of 5,483 individuals aged 25-64 years of both sexes were recruited into the survey. The World Health Organisation (WHO) STEPwise approach to surveillance instrument was adapted and questionnaire was administered to one individual in selected household. The data was analysed and graphed using Epi-Info software version 3.4.3 and graph pad prism version 5.1 respectively. The analyses showed that 34% of the respondents use tobacco products with 26% engaged in smoking tobacco products and 8% were smokeless tobacco users at the time of this study. The average age of commencing tobacco smoking was 21 years; with 92% and 96% of the male and female daily smokers smoking at least six manufactured tobacco respectively. Seventy four percent (74%) and 69% of the non-smoking respondents were exposed to environmental tobacco smoke (ETS) at home and workplace respectively. The study further revealed that 15%, 23% and 87% of the total respondents reported no work-, transport- or recreational- related physical activity respectively; and were therefore classified as physically inactive. The lowest level of physical activity was reported in the recreation domain. Even those who reported moderate physical activity at work or from travel, their median metabolic equivalent (MET) was not sufficient to achieve a level of physical activity that is beneficial to their health. In conclusion, a significant proportion of the population is exposed either directly or indirectly to tobacco smoke, and a large proportion of the adult population is physically inactivity. Thus, NCD prevention policy addressing lifestyle changes such as no smoking should not be limited to work places but should be population based.

**Keywords: Non-communicable diseases, Physical activity, Risk factors, Sierra Leone, Tobacco**

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## INTRODUCTION

The major Non-Communicable diseases (NCDs) in Sierra Leone like most other countries include hypertension, cardiovascular diseases (CVDs), chronic pulmonary diseases, diabetes mellitus, and cancers. These diseases are strongly associated with common lifestyle risk factors such as smoking, alcohol consumption, a diet rich in fats, sugars, and salts; and physical inactivity. They usually appear when a person reaches middle age, after years of living with unhealthy behaviours. These behaviours are often linked to modernisation and urbanisation and result in interrelated conditions like raised blood pressure and obesity. Tobacco use and physical inactivity are two common modifiable risk factors of NCDs.

Tobacco smoking has been associated with a high risk of multiple cancers particularly lung cancer (WHO, 2004a), malnutrition and premature death (Sesma – Vazquez *et al.,* 2002*;* Karki *et al.*, *2003;* WHO, 2004b).

*Corresponding author: Tel: +232 33841262, +232 78841262; E-mail: dhmsamai@yahoo.com

Tobacco smoke also increases the risk of heart disease, stroke and chronic obstructive pulmonary disease (COPD) (Worley, 2010; Siziya *et al*., 2011). Moreover, lip, tongue and mouth cancers are known to be highly prevalent among people who chew tobacco (smokeless tobacco). In addition the risk of acute coronary disease and chronic respiratory disorders is increased by 25-30% in non-smokers exposed to environmental tobacco smoke (ETS) (He *et al*., 1999). Moreover, the risk of contracting lower respiratory tract infections, middle ear infections and sudden infant death syndrome increases in small children whose parents smoke at home (CEPA, 1997).

In 1999, Lisk and his colleagues documented the prevalence of some of the risk factors of NCDs such as tobacco use, alcohol consumption and body mass index (BMI) in rural and urban Sierra Leone (Lisk *et al*., 1999). Specifically they reported a prevalence of tobacco smoke (cigarette) and smokeless tobacco to be 21.7 and 17.7% respectively in both sexes; with a significantly higher male preponderance of 40.8% for tobacco smoke and 27.1 for smokeless tobacco. Four years earlier, Bangura and Lisk (1995) in a sub-national survey documented a prevalence of 3.2% for use of tobacco products among secondary school pupils in southern Bo (Bangura and Lisk, 1995).

Physical activity has been described as any bodily movement produced by skeletal muscles that result in increased energy expenditure (Al-Tannir *et al*., 2009). The physical activity of a population can be estimated by determining the mean or median physical activity using a continuous indicator such as metabolic equivalent (MET)-minutes per week or time spent in physical activity. MET is the ratio of a person's working metabolic rate relative to the resting metabolic rate. A MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcal/kg/hour (WHO, 2009). Physical activity can also be estimated by classifying a certain percentage of a population as 'inactive' by setting up a cut-point for a specific amount of physical activity (categorical indicator). The categorical classification of physical activity depends on the total time spent during a typical week, the number of days as well as the intensity of the physical activity. Using these indicators, a population's physical activity can be classified into three levels: high, moderate and low (WHO, 2009).

Globally, physical inactivity causes about 1.9 million avoidable deaths per annum (WHO, 2002) and increases the risk of all-cause mortality by 20-30% (Vuori, 2004). It also serves as a major risk factor in promoting obesity and has also been documented to account for 22% of ischaemic heart diseases, 11% of ischaemic stroke, 14% of diabetes, 16% and 10% respectively of colon and breast cancers worldwide (Vuori, 2004). Currently, the precise burden of the NCDs and their risk factors such as tobacco use and physical inactivity is largely unknown in Sierra Leone. However, anecdotal evidence from medical practitioners suggests that the prevalence of these diseases particularly hypertension, CVDs, stroke, and diabetes mellitus are on the increase. Moreover, if the risk factors of the major NCDs are not prevented and controlled, a double disease burden of communicable and non-communicable diseases may ensue. Therefore, the need to manage these risk factors at the population level becomes necessary. It was against this background that we conducted a nationwide survey to document the prevalence of the common risk factors of NCDs (tobacco use, alcohol consumption, unhealthy diet, physical inactivity, BMI, raised blood pressure and diabetes) among the adult Sierra Leonean population with a specific objective of determining the sex and age-group specific prevalence. The present study is an extract of a wider national survey of all the common risk factors of NCDs.

## METHODOLOGY

### Sampling Frame and Design

The study is a cross - sectional population based survey conducted in November, 2009. Sierra Leone which is administratively divided into 4 regions, 14 districts, 149 chiefdoms, 1,289 chiefdom sections (CSs) and 9,672 enumeration areas (EAs) has a population of over six million. The CSs, EAs and households were used as the primary, secondary and tertiary sampling units respectively. Individuals between the ages of 25-64 years of both sexes who were resident in the study area and willing to participate were recruited into this study.

### Sampling Plan

The multi-stage cluster sampling strategy was used in this study. The CSs as demarcated by Statistics Sierra Leone (SSL) were used as the primary sampling unit (PSU). Hundred CSs were selected using the probability proportionate to size (PPS) sampling method. Five hundred and fifty EAs were selected from within the selected CSs by the PPS sampling method. At the tertiary stage, ten households were randomly selected from each selected EA. One eligible respondent was selected

within a household using the Kish method (WHO, 2009).

**Sample Size Determination**

Since the current national prevalence of tobacco use and physical inactivity are unknown, we assumed within 95% confidence level, that the prevalence of these risk factors is 50%. Taking into cognisance the 10 year age interval (i.e. 25-34, 35-44, 45-55 and 55-64) thereby giving the 8 age-sex estimates and in anticipation of a 10% non-response rate and a design effect of 1.5, the estimated sample size was calculated to be 5,483 using the standard formula as recommended in the WHO STEPwise approach to chronic disease surveillance manual (WHO, 2009).

**Questionnaire Design**

The WHO Stepwise approach to chronic disease survey instrument focusing on the core and expanded modules of tobacco use and physical activity was adapted for this study. Specifically, information on basic demographic data including age, gender, marital, educational and employment status were included in the questionnaire. In addition, the following outcome variables for tobacco use were included in the questionnaire: current tobacco use (smoke and smokeless), daily smoke and smokeless tobacco use among all respondents and current users of smoke and smokeless tobacco, the amount and type of smoke and smokeless tobacco use, and ex-daily users of smoke and smokeless tobacco, age of starting smoking, duration of smoking and exposure to environmental tobacco smoke. For the physical activity the participants were questioned on the frequency and duration of physical activity as part of their work, travel and leisure-time. In the work- and leisure-related physical activity, the respondents were separately questioned on their participation in moderate - and vigorous-intensity activity, whereas in the travel-related activity it was assumed that the activity was of moderate intensity. In addition, the time spent on total physical and recreational activities was captured in the questionnaire. How much of the level of total physical activity of the respondents came from work, transport, or leisure time was also included in the questionnaire. Furthermore, the time spent in sitting or reclining on a typical day excluding sleeping time was also included in the questionnaire.

In the current study, physical inactivity was defined as all those respondents who reported no work, travel or leisure time physical activity in addition to those who did not meet the recommended minimum median MET/minutes/week thought to be beneficial for health.

**Data Collection**

Data was collected by face to face interviews through household visit using the adapted standardized WHO stepwise approach to surveillance software, uploaded into a personal digital assistant (PDA). Prior to the collection of the data, the data collector explained to the interviewee the aim of the survey, his/her individual rights and confidentiality and the benefit of the survey to his/her community and the nation; and requested that he/she signs an informed consent form. In the event that the participant was not available for interview on the first day of visit, the data collector paid two additional visits after consultation with other members of the household before coding it for "non-participant". In order to ensure quality and reproducibility of the survey result, clearly defined standard survey procedures were observed. In addition, random checks by field supervisors and principal investigator, and re-interviewing the important questions from at least 5% of the respondents by different interviewers were done.

**Selection of Interviewers and Supervisors**

A total of 30 interviewers (21 years and above of both sexes) and 10 supervisors were recruited for the study; with an average of 3 interviewers per supervisor. They were college graduates and/or health care workers. In order to standardise the fieldwork, a three day training workshop was conducted to prepare the interviewers and supervisors for their task. During the training they were taught interviewing skills and techniques, and familiarised themselves with the PDA and the question-by-question instruction guide. Specifically they were trained to: conduct interviews in the field and be able to administer the questionnaire appropriately; use the PDAs effectively; learn the skill of approaching the public, gaining consent, contact procedures, handling refusals; learn interviewing techniques like asking questions in a non-judgemental manner, seek clarification, probe when necessary, provide feedback, record information, edit and check the PDA for its completeness; identify and use the interviewer instructions.

**Statistical Analysis**

The data was appropriately coded, edited and entered into the WHO recommended Epi-Data software version 3.1, analysed with Epi-Info

software version 3.4.3 and graphed using graph pad prism version 5.1. The data was weighed to allow the analysis to produce estimates that would have been obtained if the entire population of Sierra Leone had been surveyed. Post-stratification weighting was done to bring the sample data to the 2004 census estimates of the adult population. This weighting also adjusted for certain age/sex stratum being over- or under-represented in the survey data. The results were expressed as either percentage or mean and the *p-value* was set at 0.05. Differences between mean values within the groups were determined using Student's t-test and one way analysis of variance (ANOVA) followed by a Dunnett's test for comparison of multiple means.

## RESULTS

### Demographics

A total number of 5,483 respondents of both sexes aged 25-64 years were recruited into the study. Four thousand nine hundred and ninety seven (4,997) of these respondents completed the questionnaire giving a non response rate of 9%. Of those who responded, 46% were males and 54% females (Table 1). When the respondents were asked about the number of years they spent in full-time education (excluding preschool), a mean of 4.8 years was recorded for both sexes, 4.5 and 3.8 years for males and females respectively (Table 2). Fifty five percent of the respondents had no formal schooling of which 62% were females and 47% males (Figure 1). With regards their marital status, 72% of the respondents were currently married, with 1.2% divorced (Figure 2). Fifty four percent of the respondents were employed of which 5% were government employees, 4% non-government employees and 44% self employed. 46% of the respondents were recorded as unpaid which includes students, homemakers, retirees and unemployed. There was significant gender inequity amongst the employed (at least 2:1 male/female ratio). Of the unpaid respondents, 19% were unemployed with 5% unable to work, 40% business/traders, 35% homemakers, 3% volunteers and 3% retired.

### Tobacco Smoke

When the respondents were asked whether they currently smoke any tobacco products such as cigarettes, cigars or pipes of tobacco, 26% of the respondents (n=4987) answered in the affirmative, with a significantly high male preponderance (43% for males and 11% for females; *P<0.05*) (Table 3). Twenty three percent (23%) of the respondents were daily smokers with a significantly high male preponderance (40% vs 8%) (Table 4). In both cases, there was no age group specific significant difference (*P>0.05*). Of the total smoking population, 88% of both sexes were daily smokers (n= 1215), with the male and female smoking populations accounting for 92% and 72% respectively (Table 5). Additionally, 92% and 96% of the male and female daily smokers used manufactured tobacco respectively. The mean amount of manufactured cigarettes smoked daily by the daily smokers was 7.6, 5.6 and 7.2 for males, females and both sexes respectively (Figure 3). The mean age of starting smoking was 21 and 23 years for males and females respectively, and 21 years for both sexes. The mean duration of smoking was 19 years for males, 13 years for females and 18 years for both sexes. The ex-daily smokers among all the respondents was 15% for males, 8% for females and 11% for both sexes; with a mean cessation period of smoking of 19.6, 19 and 19.4 years for males, females and both sexes respectively.

### Smokeless Tobacco Use and Environmental Tobacco Smoke

When the respondents were asked whether they are current users of smokeless tobacco such as snuff or chewing tobacco, 8% of all respondents (n=4987), 3% of males (n=2279) and 12% of females (n=2707) were found to be users of smokeless tobacco (Table 6).

**Table 1: Age and Sex Distribution of all Respondents**

| Age Group (years) | Men | | Women | | Both Sexes | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| 25-34 | 774 | 37.1 | 1310 | 62.9 | 2084 | 41.7 |
| 35-44 | 637 | 47.9 | 694 | 52.1 | 1331 | 26.6 |
| 45-54 | 514 | 54.7 | 425 | 45.3 | 939 | 18.8 |
| 55-64 | 358 | 55.7 | 285 | 44.3 | 643 | 12.9 |
| **25-64** | **2283** | **45.7** | **2714** | **54.3** | **4997** | **100.0** |

Seven percent (7%) of the current users of smokeless tobacco were daily users; with 2% and 11% of the male and female current smokeless tobacco users being daily users respectively (Table 7). The mean number of daily usage of smokeless tobacco by type is shown in figure 4. The ex-daily users of smokeless tobacco among all the respondents were 2% for males, 4% for females and 3% for both sexes. In summary, 34% of the respondents were current tobacco users (both smoke and smokeless) and 29% were daily tobacco users (both smoke and smokeless). When the non-smokers were asked whether they were exposed to environmental tobacco smoke (ETS) in their homes or at workplaces on one or more days in the past 7 days, 74% and 69% of them reported being exposed to ETS at home and workplace respectively.

**Physical Activity**

With regards to the level of physical activity, a significant proportion (75%) of the respondents reported to be engaged in high level physical activity such as lifting or carrying heavy loads, digging and/or construction works for at least 10 minutes continuously. Moderate level of physical activity such as brisk walking or carrying light loads for least 10 minutes continuously was reported by 9% of the respondents; with 16% low level physical activity. In all three categories, there was no sex specific significant difference ($P>0.05$) (Figure 5). In addition, there was a statistical significant difference between the proportion of the 55-64 years old respondents and the younger age groups engaged in both high and low physical activities within each sex ($P<0.05$).

The survey further looked into 'how much of the total physical activity of the population came from work, transport, or leisure time; that is, how much each of these specific activities contributed to the total physical activity of the sampled population. A significant proportion ($P<0.05$) of the total physical activity was derived from work (73% for both sexes), followed by transport-related activity. However, a small but significant ($P<0.05$) proportion of males compared to females were engaged in leisure-related activity (5.3% vs. 2.0%). There was no age group specific difference ($P>0.05$) in all three forms of the physical activity that contributed to the total physical activity (Figure 6).

Furthermore, there was no significant difference in the median duration of time spent in the total physical activity by both sexes (Table 8a). In the recreational-related activity domain the median duration of activity was 0 metmins/day for both males and females, although the higher 75th percentile for males aged 25-34 years was higher than females in the same age group (17metmins/day vs 0 metmins/day for females) (Table 8b). This further indicates a slightly higher younger male participation in this type of activity than younger females.

**Table 2: Mean Number of Years of Education among all Respondents**

| Age Group (years) | Men | | Women | | Both Sexes | |
|---|---|---|---|---|---|---|
| | n | Mean | n | Mean | n | Mean |
| 25-34 | 701 | 6.5 | 1137 | 4.2 | 1838 | 5.1 |
| 35-44 | 565 | 6.1 | 576 | 3.8 | 1141 | 5.0 |
| 45-54 | 433 | 5.5 | 355 | 3.4 | 788 | 4.5 |
| 55-64 | 297 | 5.3 | 243 | 2.2 | 540 | 3.9 |
| **25-64** | 1996 | 4.5 | 2311 | 3.8 | 4307 | 4.8 |

**Table 3: Proportion Current Smokers among the Study Population**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % Current smoker | 95% CI | n | % Current smoker | 95% CI | n | % Current smoker | 95% CI |
| 25-34 | 774 | **41.0** | 34.7-47.3 | 1307 | **10.3*** | 8.2-12.5 | 2081 | **22.1** | 18.8-25.4 |
| 35-44 | 637 | **48.3** | 41.4-55.2 | 692 | **12.2*** | 8.3-16.1 | 1329 | **29.3** | 25.1-33.6 |
| 45-54 | 511 | **42.9** | 35.3-50.5 | 425 | **10.0*** | 5.9-14.1 | 936 | **28.3** | 24.3-32.4 |
| 55-64 | 357 | **39.2** | 28.2-50.2 | 284 | **7.5*** | 3.4-11.5 | 641 | **26.1** | 20.4-31.8 |
| **25-64** | **2279** | **43.1** | **38.0-48.2** | **2708** | **10.5*** | **8.4-12.5** | **4987** | **25.8** | **23.4-28.2** |

***P<0.05 vs. Corresponding male age group***

| Table 4: Distribution of Daily Smokers among Current Smokers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % daily smoker | 95% CI | n | % daily smoker | 95% CI | n | % daily smoker | 95% CI |
| 25-34 | 774 | **37.8** | 31.6-44.0 | 1307 | **8.3*** | 6.2-10.4 | 2081 | **19.6** | 16.6-22.7 |
| 35-44 | 637 | **44.4** | 37.5-51.2 | 692 | **7.3*** | 4.5-10.1 | 1329 | **24.9** | 21.0-28.8 |
| 45-54 | 511 | **40.4** | 33.3-47.6 | 425 | **7.5*** | 4.2-10.9 | 936 | **25.8** | 21.7-29.9 |
| 55-64 | 357 | **34.3** | 24.2-44.4 | 284 | **4.5*** | 1.6-7.4 | 641 | **21.9** | 16.3-27.5 |
| **25-64** | **2279** | **39.5** | **34.5-44.5** | **2708** | **7.5*** | **5.8-9.2** | **4987** | **22.5** | **20.2-24.9** |

***P<0.05 vs. Corresponding male age group***

| Table 5: Proportion of Current Daily Smokers among Smoking Group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % daily smoker | 95% CI | n | % daily smoker | 95% CI | n | % daily smoker | 95% CI |
| 25-34 | 277 | 92.3 | 88.2-96.4 | 140 | 80.0 | 69.8-90.3 | 417 | 88.8 | 84.7-92.8 |
| 35-44 | 293 | 91.8 | 87.5-96.1 | 90 | 59.7 | 45.7-73.7 | 383 | 84.8 | 79.9-89.6 |
| 45-54 | 210 | 94.2 | 90.9-97.5 | 53 | 75.1 | 56.5-93.8 | 263 | 91.2 | 86.8-95.5 |
| 55-64 | 130 | 87.5 | 79.9-95.0 | 22 | 59.9 | 30.3-89.5 | 152 | 84.2 | 75.7-92.7 |
| **25-64** | **910** | **91.8** | **89.6-94.0** | **305** | **71.6*** | **61.9-81.2** | **1215** | **87.5** | **84.3-90.6** |

***P<0.05 vs. Corresponding male age group***

| Table 6: Percentage of Current Users of Smokeless Tobacco | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % Current users | 95% CI | n | % Current users | 95% CI | n | % Current users | 95% CI |
| 25-34 | 774 | **1.0** | 0.1-1.9 | 1307 | 5.6 | 3.0-8.2 | 2081 | 3.8 | 2.2-5.5 |
| 35-44 | 637 | **2.5** | 1.0-4.0 | 692 | 13.1 | 8.3-17.9 | 1329 | 8.1 | 5.6-10.5 |
| 45-54 | 511 | **2.6** | 0.5-4.7 | 425 | 14.8 | 9.8-19.9 | 936 | 8.0 | 5.5-10.6 |
| 55-64 | 357 | **7.7** | 3.6-11.9 | 283 | 33.7 | 25.5-41.9 | 640 | 18.5 | 13.6-23.3 |
| **25-64** | **2279** | **2.9** | **1.8-4.1** | **2707** | **12.1** | **9.3-14.8** | **4986** | **7.8** | **6.1-9.4** |

| Table 7: Percentage Daily Users of Smokeless Tobacco among Current Users | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % daily users | 95% CI | n | % daily users | 95% CI | n | % daily users | 95% CI |
| 25-34 | 774 | 0.9 | 0.0-1.8 | 1307 | 5.0 | 2.6-7.3 | 2081 | 3.4 | 1.9-4.9 |
| 35-44 | 637 | 1.0 | 0.2-1.9 | 692 | 12.2 | 7.7-16.7 | 1329 | 6.9 | 4.6-9.2 |
| 45-54 | 511 | 1.7 | 0.0-3.4 | 425 | 12.6 | 7.9-17.4 | 936 | 6.6 | 4.1-9.0 |
| 55-64 | 357 | 6.4 | 2.8-10.1 | 283 | 28.4 | 19.7-37.1 | 640 | 15.5 | 10.9-20.2 |
| **25-64** | **2279** | **2.1** | **1.0-3.1** | **2707** | **10.6** | **8.1-13.1** | **4986** | **6.6** | **5.1-8.1** |

| Table 8a: Median Minutes of Total Physical Activity on Average Per Day | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | Median minutes | Inter-quartile range (P25-P75) | n | Median minutes | Inter-quartile range (P25-P75) | n | Median minutes | Inter- quartile range (P25-P75) |
| 25-34 | 398 | 360.0 | 158.6-525.4 | 600 | 217.4 | 81.4-390.0 | 998 | 268.1 | 102.9-441.4 |
| 35-44 | 356 | 315.0 | 145.7-489.3 | 333 | 256.4 | 102.9-432.9 | 689 | 279.3 | 132.9-462.9 |
| 45-54 | 244 | 322.9 | 120.0-492.9 | 184 | 197.1 | 42.9-351.4 | 428 | 270.0 | 81.4-450.0 |
| 55-64 | 156 | 145.7 | 17.1-308.6 | 142 | 85.7 | 4.3-232.9 | 298 | 111.4 | 10.7-277.1 |
| **25-64** | **1154** | **300.0** | **120.0-489.3** | **1259** | **214.9** | **68.6-385.7** | **2413** | **248.6** | **90.0-439.3** |

| Table 8b: Median Minutes of Recreation-related Physical Activity on Average Per Day | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | Median minutes | Inter-quartile range (P25-P75) | n | Median minutes | Inter-quartile range (P25-P75) | n | Median minutes | Inter-quartile range (P25-P75) |
| 25-34 | 398 | 0.0 | 0.0-17.1 | 600 | 0.0 | 0.0-0.0 | 998 | 0.0 | 0.0-0.0 |
| 35-44 | 356 | 0.0 | 0.0-0.0 | 333 | 0.0 | 0.0-0.0 | 689 | 0.0 | 0.0-0.0 |
| 45-54 | 244 | 0.0 | 0.0-0.0 | 184 | 0.0 | 0.0-0.0 | 428 | 0.0 | 0.0-0.0 |
| 55-64 | 156 | 0.0 | 0.0-0.0 | 142 | 0.0 | 0.0-0.0 | 298 | 0.0 | 0.0-0.0 |
| **25-64** | **1154** | **0.0** | **0.0-0.0** | **1259** | **0.0** | **0.0-0.0** | **2413** | **0.0** | **0.0-0.0** |

| Table 9: Percentage of Respondents who Reported No-work-related Physical Activity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % no activity at work | 95% CI | n | % no activity at work | 95% CI | n | % no activity at work | 95% CI |
| 25-34 | 398 | 8.9 | 4.9-13.0 | 600 | 15.2 | 6.9-23.6 | 998 | 12.6 | 7.0-18.2 |
| 35-44 | 356 | 11.8 | 6.2-17.3 | 333 | 10.7 | 5.0-16.3 | 689 | 11.2 | 6.6-15.8 |
| 45-54 | 244 | 11.9 | 6.4-17.5 | 184 | 20.5 | 9.8-31.2 | 428 | 15.7 | 9.9-21.5 |
| 55-64 | 156 | *30.6 | 18.6-42.6 | 142 | 36.3 | 25.3-47.2 | 298 | 33.2 | 23.1-43.2 |
| **25-64** | **1154** | **13.4** | **9.0-17.8** | **1259** | **17.1** | **10.0-24.1** | **2413** | **15.3** | **10.2-20.4** |

***P<0.05 vs. Male respondents in the 25-55 years age group***

| Table 10: Percentage of Respondents who Reported No-transport-related Physical Activity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % no activity for transport | 95% CI | n | % no activity for transport | 95% CI | n | % no activity for transport | 95% CI |
| 25-34 | 398 | 16.7 | 6.3-27.1 | 600 | 23.4 | 12.9-33.9 | 998 | 20.6 | 11.1-30.1 |
| 35-44 | 356 | 25.3 | 9.5-41.1 | 333 | 20.4 | 6.5-34.3 | 689 | 22.9 | 8.4-37.3 |
| 45-54 | 244 | 21.3 | 8.0-34.5 | 184 | 19.8 | 8.8-30.7 | 428 | 20.6 | 11.0-30.3 |
| 55-64 | 156 | 28.7 | 16.5-40.9 | 142 | 32.8 | 20.6-45.0 | 298 | 30.6 | 20.4-40.8 |
| **25-64** | **1154** | **21.9** | **10.0-33.8** | **1259** | **23.1** | **13.2-33.0** | **2413** | **22.5** | **12.4-32.6** |

| Table 11: Number of Respondents who Reported No-recreation-related Physical Activity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | % no activity at recreation | 95% CI | n | % no activity at recreation | 95% CI | n | % no activity at recreation | 95% CI |
| 25-34 | 398 | 71.1 | 63.3-78.9 | 600 | *91.6 | 87.3-95.9 | 998 | 83.1 | 78.1-88.1 |
| 35-44 | 356 | 83.9 | 78.6-89.1 | 333 | *92.7 | 87.9-97.4 | 689 | 88.2 | 84.3-92.1 |
| 45-54 | 244 | 80.7 | 72.9-88.5 | 184 | *93.9 | 89.4-98.3 | 428 | 86.4 | 81.3-91.4 |
| 55-64 | 156 | 92.7 | 87.9-97.5 | 142 | 95.5 | 89.5-100.0 | 298 | 94.0 | 89.8-98.1 |
| **25-64** | **1154** | **79.9** | **75.1-84.6** | **1259** | **92.7** | **89.0-96.3** | **2413** | **86.5** | **82.8-90.2** |

***P<0.05 vs. Corresponding male age group***

| Table 12a: Time Spent in Sedentary Activities on Average Per Day | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | Mean Minutes | 95% CI | n | Mean Minutes | 95% CI | n | ***Mean Minutes*** | 95% CI |
| 25-34 | 773 | 120.8 | 99.5-142.1 | 1307 | 120.5 | 97.9-143.2 | 2080 | 120.6 | 100.7-140.6 |
| 35-44 | 637 | 142.1 | 113.2-170.9 | 691 | 116.9 | 91.1-142.6 | 1328 | 128.8 | 105.1-152.5 |
| 45-54 | 511 | 134.7 | 105.6-163.8 | 425 | 92.6 | 70.6-114.6 | 936 | 116.0 | 94.9-137.1 |
| 55-64 | 357 | 116.9 | 81.5-152.4 | 283 | 122.7 | 91.5-153.9 | 640 | 119.3 | 89.0-149.6 |
| **25-64** | **2278** | **129.0** | **107.1-150.9** | **2706** | **115.3** | **94.8-135.7** | **4984** | **121.7** | **102.0-141.4** |

| Table 12b: Time Spent in Sedentary Activities on Average Per Day | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | Men | | | Women | | | Both Sexes | | |
| | n | Median Time (Mins) | Inter-quartile range (P25-P75) | n | Mean Minutes | Inter-quartile range (P25-P75) | Number | ***Median Minutes*** | Inter-quartile range (P25-P75) |
| 25-34 | 773 | 60.0 | 0.0-180.0 | 1307 | 55.0 | 0.0-180.0 | 2080 | 60.0 | 0.0-180.0 |
| 35-44 | 637 | 90.0 | 0.0-180.0 | 691 | 60.0 | 0.0-180.0 | 1328 | 60.0 | 0.0-180.0 |
| 45-54 | 511 | 60.0 | 0.0-180.0 | 425 | 30.0 | 0.0-120.0 | 936 | 50.0 | 0.0-180.0 |
| 55-64 | 357 | 0.0 | 0.0-180.0 | 283 | 70.0 | 0.0-180.0 | 640 | 45.0 | 0.0-180.0 |
| **25-64** | **2278** | **60.0** | **0.0-180.0** | **2706** | **60.0** | **0.0-180.0** | **4984** | **60.0** | **0.0-180.0** |

**Physical Inactivity**

In the current study, 15%, 23% and 87% of the total respondents reported no work-, transport- or recreational- related physical activity respectively (Tables 9-11); and were therefore classified as physically inactive. The prevalence of no work related physical activity among male respondents aged 55-64 years (30.6%) was significantly higher than that reported by the younger age groups ($P$<0.05; Table 9). Although females reported a somewhat higher prevalence of no work- or transport-related activity than males among each age group, the difference was not significant, and the apparent age related trend in physical inactivity was less marked in females than males (Tables 9 and 10). On the other hand, a sex specific significant difference was noted in the proportion of respondents who reported no recreational related activity among 25--54 years age groups (Table11). Time spent sitting or reclining was also measured and used as an additional indicator of sedentary lifestyle. In tables 12a & 12b the mean and median time spent sitting or reclining was 121 and 60 minutes among the respondents respectively and this did not significantly differ by sex and age group. Moreover, in both cases there were no clear age-related trends in the mean and median minutes spent in sitting or reclining (Tables 12a-b).

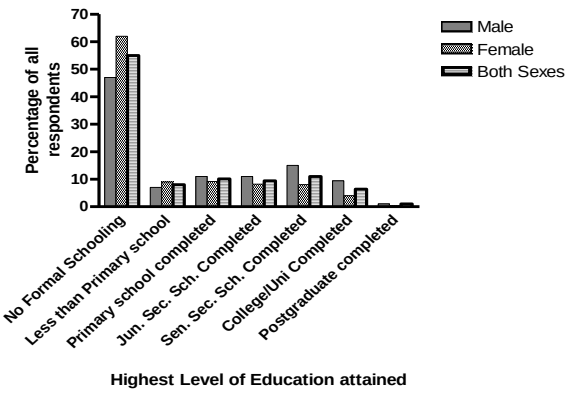


**Figure 1: Highest Level of Education Achieved by the Respondents**

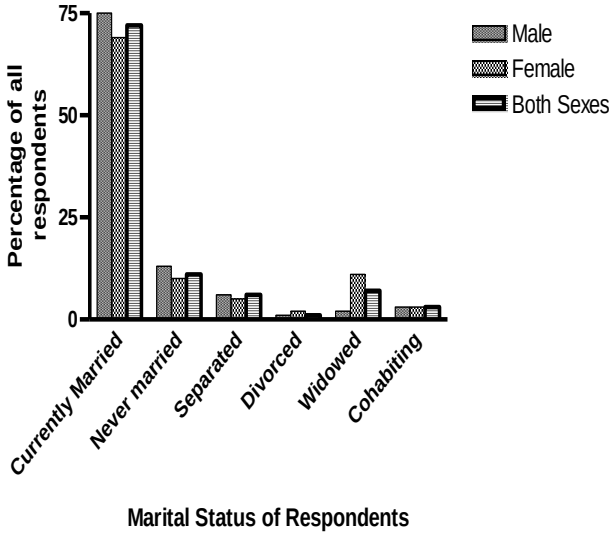


**Figure 2: Marital Status of all Respondents**

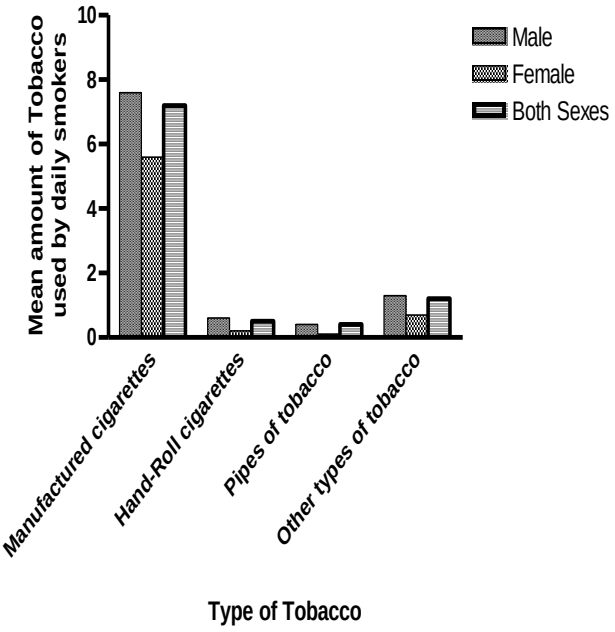


**Figure 3: Amount of Tobacco Used by Daily Smokers and Type**

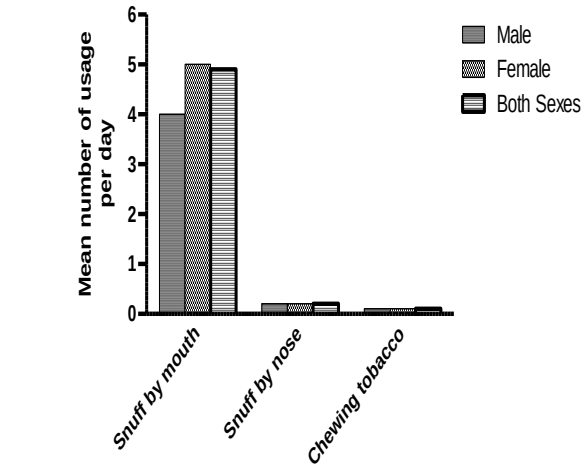


**Figure 4: Prevalence of Smokeless Tobacco by Type among Smokeless Tobacco Users**

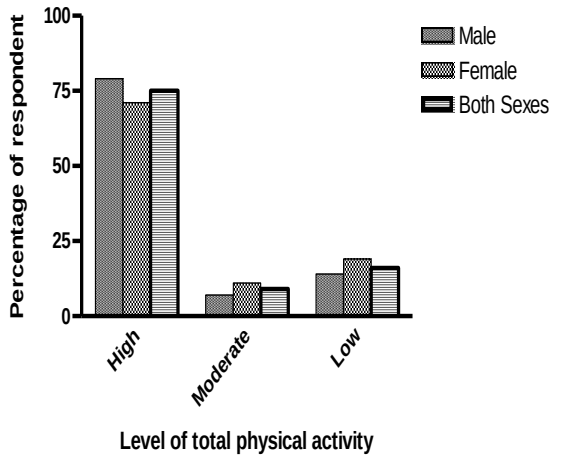


**Figure 5: Classification of Respondents into the Three Category of Total Physical Work**

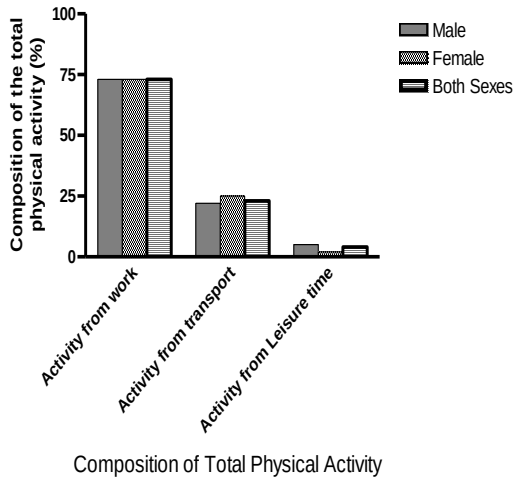


**Figure 6: Effect of Work, Transport and Recreational Activity on Total Physical Activity**

## DISCUSSION

In this study, the sex specific significant difference in both current tobacco smoke and daily smoking documented is similar to reports from other countries such as Ethiopia (WHO, 2006), Benin (WHO, 2008), Cote d'Ivoire (WHO, 2005), and Swaziland (WHO, 2007). It is also in agreement with a previous sub-national report by Lisk and colleagues in rural and urban Sierra Leone (Lisk *et al.,* 1999). However, the reported prevalence rate of tobacco use in the current study would have been underestimated as population between 15-24 years and above 64 years were excluded from the study. Furthermore, although the current study did not document the prevalence of tobacco use in pregnant women, smoking in pregnancy should be discouraged and NCDs prevention policies should also address smoking in pregnancy as it is associated with intrauterine growth retardation, spontaneous miscarriages and low birth weight babies (WHO, 2004a).

As a significant proportion of the non-smoking respondents (at least 69%) were exposed to ETS either at home or workplace, NCDs prevention policy discouraging smoking at home, workplace or public places should be adopted. Apart from the health hazards of tobacco use, it can also pose serious economic burden on individuals and families. Several studies have documented that as much as 10% of the total household's expenditure in some low-income countries is on tobacco (Sesma – Vazquez *et al.,* 2002; Karki *et al.,* 2003*;* WHO, 2004b). Although this was not verified in this study it may not be far from what is obtained in Sierra Leone as on average, six manufactured tobacco is smoked daily by the smoking population.

In the current study, a significant proportion of the younger age group was engaged in high level physical activity and the converse was true for the older population. Additionally, a significant proportion of the total physical activity was derived from work (73% for both sexes), followed by transport-related activity. Although a median time of 249 met/minutes was reported on the total physical activity, it should be noted that a minimum of 60 minutes of light to moderate intensity activity per day (1360 met/minutes) is usually required to meet basic daily functions. It is the activity over and above this which has protective health benefits (WHO, 2009).

Thus, majority of the population studied did not meet the minimum level of physical activity that is beneficial to health. This observation is at variance with the report of a study carried out among 1906 adults aged 25–64 years in Ho Chi Minh City, Vietnam (Trinh *et al*., 2008). Nevertheless, a small proportion of respondents in our study reported some amount of leisure-related activity and 15%, 23% and 87% of the total respondents reported no work-, transport-or recreational-related physical activity respectively. They were therefore classified as physically inactive. A sex specific significant difference was noted in the proportion of respondents who reported no recreational related activity among 25-54 years age group. In addition, the regular time spent sitting or reclining on a typical day was 121 and 60 minutes among the respondents respectively.

The lowest level of physical activity was reported in the recreation domain which clearly reflects the limited organized sports, lack of physical activity culture and facilities, particularly for females and the older age groups. Furthermore, a large proportion of the respondents were classified as been physically inactive as those who reported moderate physical activity at work or from travel had insufficient MET to achieve a level of physical activity that is beneficial to their health (WHO, 2009a). Although the effects of physical inactivity were not verified in the current study, it is not unlikely that the high physical inactivity seen in this study coupled with other risk factors such as tobacco use may be important predisposing factors of NCDs in our environment. Thus, NCD prevention policy which promotes physical activity will not only reduce the incidence of NCDs but will also protect against the development of cognitive impairment and dementia (Elwood *et al.*, 1999*;* Mutrie, 2000, Stewart *et al*., 2001), osteoporosis and its related features (Vuori, 2004).

In conclusion, a significant proportion of the population is exposed either directly or indirectly to tobacco smoke, and a large proportion of the adult population are physically inactive. Thus, with the high illiteracy and unemployment rate documented in this study, health promotion messages on lifestyle changes such as cessation of tobacco use, and promotion of physical activity should be done in the common local languages and also designed according to the educational level of the population. Furthermore, NCD prevention policies addressing lifestyle changes such as non smoking policy should not be limited to work places but population based.

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**REFERENCES**

Al-Tannir M, Kobrosly S, Itani T, El-Rajab M and Tannir S (2009). Prevalence of Physical Activity Among Lebanese Adults: A Cross-Sectional Study. *J Physical Activity and Health.* **6**: 315-320

Bangura and Lisk (1995)**.** Tobacco and Cannabis Smoking in Secondary School pupils in Bo, Sierra Leone. West *Afr J Med*. **14** (3): 157-160

California Environmental Protection Agency (CEPA) (1997). *Health Effects of Exposure to Environmental Tobacco Smoke.* Office of Environmental Health Hazard Assessment: *http://www.oehha.org/air/environmental_tobacc/index.html*

Elwood PC, Gallacher JEJ, Hopkinson CA, Pickering J, Rabbitt P, Stollery B, Brayne C, Felicia AH and Bayer A (1999). Smoking, Drinking and Other Lifestyle Factors and Cognitive Function in Men in the Caerphilly Cohort. *J Epidemiol Comm Health*. **53**: 9-14

He J, Vupputuri S, Allen K, Prerost MR, Hughes J and Whelton PK (1999). Passive Smoking and the Risk of Coronary Heart Disease-A Meta- Analysis of Epidemiologic Studies. *NEJM*. **340**: 920-6

Karki YB, Pant KD and Pande DR (2003). A Study on the Economics of Tobacco in Nepal. HNP Discussion Paper, Economics of Tobacco Control. Paper no: 13

Lisk DR, Williams DE and Slattery J (1999). Blood Pressure and Hypertension in Rural and Urban Sierra Leone. *Ethn Dis*. **9** (2): 254-263

Mutrie N (2000). The Relationship between Physical and Clinically Defined. In: *Physical Activity and Psychological Well-being*, Biddle SJH, Fox KR, Boutcher SH (Eds). London, Routledge. Pp: 46-62

Stewart R, Richards M, Brayne C and Mann A (2001). Vascular Risk and Cognitive Impairment in Older, British, African-Caribbean Population*. J Am Geriatr Soc*. **49**: 263-269

Sesma–Vázquez S, Campuzano-Rincón JC, Carreón-Rodriquez VG, Knaul F, Lopéz-Antuñano FJ and Hernández-Avila M (2002). Tobacco Demand in Mexico: 1992-1998. *Salud Public de Mexico*. **44** (1): S82-S92

Siziya S, Babaniyi O, Songolo P and Nsakashalo-Senkwe M (2011). Prevalence and Correlates for Tobacco Smoking among Persons Aged 25 years or Older in Lusaka Urban District, Zambia. *J Public Health Epidemiol*. **3**(2): 43-48

Trinh OTH, Nguyen ND, Dibley MJ, Phongsavan P and Bauman AE (2008). The Prevalence and Correlates of Physical Inactivity among Adults in Ho Chi Minh City. *BMC Public Health.* **8**:204 *(http://www.biomedcentral.com/content/pdf/1471-2458-8-204.pdf)*

Vuori I (2004). Physical Inactivity as a Disease Risk and Health Benefits of Increased Physical Activity. In: Oja P, Borms J (eds). *Perspectives-The Multidisciplinary Series of Physical Education and Sport Science: Health Enhancing Physical Activity*. **6**: 29-73

World Health Report (2002). Reducing Risks, Promoting Health Life. World Health Organisation, Geneva

World Health Organisation Report (2004a). Building Blocks for Tobacco Control: A Handbook. World Health Organisation, Geneva

World Health Organisation Report (2004b). Tobacco and Poverty: A Vicious Cycle. World Health Organisation

World Health Organisation (2009). WHO STEPS Surveillance Manual. The WHO STEPwise approach to chronic disease Risk Factor Surveillance. Geneva, World Health Organisation.

World Health STEPS Chronic Disease Risk Factor Surveillance (2006). Ethiopia (Addis Ababa) STEPS Survey Fact Sheet: *www.who.int/chp/steps*

World Health organisation STEPS Chronic Disease Risk Factor Surveillance (2008). Bénin Enquête STEPS Survey Fact Sheet: *www.who.int/chp/steps*

World Health Organisation STEPS Chronic Disease Risk Factor Surveillance (2005). Côte d'Ivoire Enquête STEPS Survey Fact Sheet: *www.who.int/chp/steps*

World Health STEPS Chronic Disease Risk Factor Surveillance (2007): Swaziland STEPS Survey Fact Sheet: *www.who.int/chp/steps*

Worley H (2010). Chronic Diseases Beleaguer Developing Countries. Population Reference Bureau: *http://www.prb.org/articles/2006/chronicdiseasesdeleaguer developingcountries.aspx p.1*