

Prevalence of Non-Communicable Chronic Morbidities (NCCMs) and Associated Factors Among Persons Aged 60 Years And Above in Bulambuli District, Eastern Uganda

Wanziima James G¹, Ndungutse David M², Ndooli Fredrick¹ and Christopher Ddamulira^{1*}

¹Department of Public Health, Bugema University, Kampala, Uganda

²School of Public Health, King Ceasar University, formally St. Augustine International University, Kampala, Uganda

*Corresponding Author

Christopher Ddamulira, Department of Public Health, Bugema University, Kampala, Uganda.

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Abstract

Background

The epidemiology of Non-Communicable Chronic Morbidities (NCCMs) is crucial in informing prevention and control initiatives for health systems in the developing world to handle the extra disease burden common in the aging population. Unfortunately, such evidence on the NCCMs and the associated factors remains scarce in Uganda and in Bugisu Sub-Region in particular just like in the rest of the Sub-Saharan Africa. Therefore, against this background, a study was undertaken to establish the prevalence of NCCMs and its associated factors among the elderly persons aged 60 years and above in Bulambuli District, Eastern Uganda.

Methods

A population-based cross sectional study design in which questionnaires and a key interview guide were administered to study subjects as part of the data collection process. Self-report, medical records and checklist of the typical symptoms were adopted in the diagnoses of NCCMs among elderly persons aged 60 years and above in Bulambuli district between late January and February 2020. SPSS software version 20.0 was used for data analysis and a Logistic Regression model was fitted to identify factors that independently influenced prevalence of NCCMs.

Results

A total of 317 subjects aged 60 years were recruited in the study and slightly more than half (55.0%) were less than 70 years and less than half (45.0%) were aged 70 years and above. The general prevalence rate of NCCMs was found to be 85.5%. The prevalence of the specific NCCMs was 71.0% for visual impairment, edentulousness (57.4%), Hypertension (33.4%), Diabetes mellitus (10.4%), Asthma (9.5%) and least common was Stroke at (9.1%). The statistically significant associated factors were family history of NCCMs (AOR = 4.80; 95% CI: 1.88-12.27; p = 0.001), poor state of housing (AOR = 3.22; 95% CI: 1.18-8.75; p = 0.022), cooking in a poorly ventilated kitchen (AOR = 4.53; 95% CI: 1.56-13.19; p = 0.006), and physical inactivity (AOR = 6.13; 95% CI: 2.04-18.46; p = 0.001).

Conclusions

There is generally a high burden of Non-Communicable Chronic Morbidities among elderly persons aged 60 years and above calling for more attention by the Ministry of Health and other ministries responsible for the elderly in Uganda and the developing world in general. There is need to pay attention to housing and kitchen conditions that were found to be significant influencing factors. Clear interventions are required to address the highly prevalent conditions among the elderly to improve on their quality of life.

Keywords: Prevalence Of NCCMs, Demographic Factors, Environmental Factors, And Lifestyle Factors Associated With NCCMs, Elderly Persons, Eastern Uganda

1. Background

Non-Communicable Chronic Morbidities (NCCMs) are diseases characterized by a slow onset but prolonged progression lasting for more than three months in individuals [1-8]. Such illnesses that are common are diabetes mellites, cancers, cardiovascular diseases, and chronic respiratory diseases in addition to cataracts and arthritis but vary from country to country moreover different across socio-demographic groupings [9-12].

Worldwide, NCCMs accounted for more than 35 million deaths as of the year 2005 which situation has been worsened by having multiple chronic morbidities now responsible for 63% of the global deaths estimated at 57 million since 2008 [3, 13-23]. In the developed economies where such illnesses were previously common, having more than one NCCM affects an estimated 25% of the adults with more than 50% of the older persons described as having complex multimorbidity [24]. In the emerging economies, less epidemiological documentation exists about the various patterns of chronic morbidities but evidence shows that just as obesity the primary predisposing risk factor of heart disease, high blood pressure and diabetes is on the rise so are the other chronic NCCMs [19]. NCCMs are increasingly being recognized as a chief public health challenge that has got dire consequences in that these diseases result into increased mortality rates and worsens the quality of life of the elderly people [1, 25-34]. There is a shift of such illnesses into societies previously less affected that requires re-prioritization.

In Africa, the situation is not any different as older persons suffer a number of chronic illnesses, with majority having cataracts, hypertension, arthritis, angina, asthma, chronic obstructive pulmonary disease, diabetes, depression, edentulism, obesity, cognitive impairment besides stroke [23]. Such chronic illnesses can be delayed but with well-developed interventions that are informed by a clear epidemiological understanding [7, 35-40]. Unfortunately, the epidemiology of chronic morbidities in the elderly persons remains less studied, yet the region is described as having unprepared health systems [10, 3]. In the available epidemiological studies upon which the development of interventions can be based, demographic, lifestyle alongside environmental factors explain NCCMs in older persons [11, 41-46] but have some inconsistencies with some factors showing no significant effect that needed further investigation [42]. It becomes necessary that the epidemiology of NCCMs is ascertained to adequately inform prevention initiatives and improvement efforts for health systems to handle the extra disease burden among the elderly.

In Uganda, NCCMs which mostly affect older persons are on the increase and are being viewed as a challenge of public health interest [Mugisha et al., 2016] [36]. In Bulambuli District within Eastern Uganda, it is estimated that 5.46% of the population are older persons and 13.9% of the older persons continue to be diagnosed with visual impairment, hypertension, epilepsy, diabetes, asthma, edentulousness and stroke [32,38,33]. The district health statistics showed increasingly worsening rates of NCD related diagnoses in older persons aged 60 years and above at 131.3% from the year 2015 to 2017 [32,33]. Population based evidence of chronic illnesses was nonexistent and the country studies remained incomprehensive as they had not given equal

attention to a diversity of NCCMs suffered [30,34,41]. To make matters worse, the district health system was not good enough to adequately address chronic illnesses since it constituted only one Health Centre IV serving as the highest level of referral with no hospital. It becomes crucial for more comprehensive epidemiological information to inform population based preventive initiatives. This is because the effects of suffering from chronic illnesses increases hospitalization and health care related costs [22]. Moreover, the cost for continuous lifetime care remained unaffordable to many older persons already challenged by support inconsistencies from the largely donor funded Social Assistance Grants for Empowerment [SAGE] programme [15, 31] yet the beneficiaries' age limit had been raised to a smaller fraction of only those aged 80 years and above [39]. This population-based study on the prevalence of NCCMs and its associated factors was therefore conducted among the older persons aged 60 years and above in Bulambuli district to provide empirical evidence to stakeholders so as to make informed decisions for prevention and control initiatives that are more desirable. The study set out to specifically determine the prevalence of NCCMs and identify the demographic, environmental and lifestyle factors that influenced the prevalence of NCCMs among elderly persons in Bulambuli district, Eastern Uganda.

2. Methods

This was a cross sectional study that was population based and adopted both quantitative and qualitative strategies of data collection on a random sample of subjects. Multistage sampling technique was used in the selection of eligible elderly people aged 60 years and above who were permanent residents in Bulambuli District. The administratively known 26 sub counties were first stratified according to the terrain of the land that's the highlands and the plains. In each stratum 2 Sub Counties were randomly selected. In each sub-county, 2 parishes were also randomly selected making a total of 8 parishes. In each parish, a total of 51 households with people aged 60 years and above were randomly selected through a computer-generated random number. In households with more than one elderly person, all were enrolled if they were present and agreed to participate in the study. At a 5% level of precision and prevalence rate of 37.0% for hypertension as the most prevalent NCCM earlier reported in Uganda [35] and taking into consideration an annual population growth rate of 3.0% [38], sample size of 347 elderly people was computed by applying a modified sample determination formula as developed by Kish Leslie [27].

Through an interviewer administered questionnaire, the respondents were asked questions aligned to the study variables by trained health workers. One of the variables were background characteristics of age, sex, education level, religion, marital status, income, occupation, asset ownership, and family history of chronic illness. The second category of variables was environmental factors of past occupational exposures, state of housing, residential neighbourhood environment, and in-house environment while the third category was lifestyle factors of health care seeking behaviour, dietary practices, history of smoking, history of alcohol use, and physical activity as part of occupation or leisure. The respondents were scored as receiving a balanced diet if they reported to always eat foods constituting

of fats, proteins, carbohydrates, fiber, vitamins, and minerals on a daily basis. The answers to the questionnaire established hypertension (High Blood Pressure), Stroke, Edentulousness, Asthma, and visual Impairment (Cataracts) as the common chronic health issues affecting the subjects. Respondents were asked as to whether any health worker had ever indicated to them that they were suffering from a particular chronic ailment. This was combined with medical records if available to ascertain the exact condition. Besides, self-reports and medical records, a checklist of the self-reported typical symptoms for the different NCCMs modified from WHO descriptions was used. Separate in-depth interviews were held with the health facility in-charges in the selected sub counties to provide more information [14,17].

Data was entered in the computer adopting a double entry procedure to help detect and minimize errors by two data entrants who were not prior part of the data collection team. We used the Statistical Package for Social Scientists (SPSS) Version 20.0 to carry out the analysis. The prevalence of NCCMs was calculated by dividing the number of respondents who had at least one chronic illness by all the sample subjects times 100. Statistical analysis was done at univariate, bivariate and multivariate levels. Descriptive statistics involved processing of frequency tables and proportions while Pearson chi-square test

was undertaken to establish demographic, environmental, and lifestyle factors associated with prevalence of NCCMs. If the assumptions underlying the chi-square test were not satisfied, the bilateral Fisher's exact test was used. The crude odds ratios were also processed at 95% confidence level. The binary logistic regression analysis was further conducted at multivariate level to determine the factors that were independently associated with prevalence of NCCMs, as well control for confounding. Only factors with a p-value less than 0.05 were considered as independently associated with the prevalence of NCCMs among the elderly people.

The audio transcribed qualitative data whose results are presented elsewhere was analyzed following a deductive thematic approach [21].

3. Results

A total of 347 elderly persons were sampled but received complete responses from only 317 persons which was a 91.4% response rate. The rate was high as recommended by [22]. Of the 317 respondents, more than half (55.2%) were aged 60 to 69 years, slightly more than a quarter were aged 70 to 79 years (30.0%) and the minority aged 80 years and above (14.8%) (See Table 1).

Demographics		Frequency (N = 317)	Percentage (%)
Age in years	60-69	175	55.2
	70-79	95	30.0
	80 above	47	14.8
Sex	Male	138	43.5
	Female	179	56.5
Education level	None	99	31.2
	Primary	172	54.3
	O-Level	29	9.1
	A-Level	3	.9
	Tertiary	14	4.4
Religion	Catholic	186	58.7
	Protestant	98	30.9
	Muslim	11	3.5
	Others (Pentecostal & SDA)	22	6.9
Marital status	Single (Widows, Widower Separated)	150	47.3
	Married	167	52.7
Monthly income (Ugshs.)	< 50,000	275	86.8
	50,000-< 100,000	22	6.9
	100,000-< 200,000	12	3.8
	≥ 200,000	8	2.5
Current Occupation	Unemployed	54	17.0
	Farming	218	68.8
	Business	31	9.8
	Salaried	6	1.9
	On pension	19	6.0

Family history of NCCMs	Yes	144	45.4
	No	173	54.6

Source: Primary Data (2020)

Table 1: The Socio Demographics of the Study Subjects

Most subjects were females (56.5%) and had studied up to primary level of education (54.3%). The respondents were mostly Catholics (58.7%), married (52.7%) and had a monthly income of less than 50,000 Ugandan shillings (US\$14) (Table 1). Most participants were farmers (68.8%) and slightly less than half had a family history of suffering from NCCMs (45.4%).

	Frequency (N = 317)	Percentage (%)
Overall Prevalence		
Suffering from NCCM	271	85.5
Not suffering from NCCM	46	14.5
NCCMs Suffered		
Hypertension (High blood pressure)	106	33.4
Diabetes (Sugar problem)	33	10.4
Stroke	29	9.1
Asthma	30	9.5
Edentulousness (Loss of any or all teeth)	182	57.4
Visual Impairment (Cataracts)	225	71.0

Source: Primary Data (2020)

Table 2: Prevalence of the Different NCCMs Among Study Subjects in Bulambuli District

Two Hundred and Seventy-one respondents (271) out of 317 were found with at least one non –communicable chronic disease which represented a prevalence rate of 85.5% at the time of study. The most prevalent disease was visual impairment (71.0%), followed by those who suffered edentulousness (57.4%). In addition, some participants suffered Hypertension (33.4%), others Diabetes (10.4%) and Asthma (9.5%) while the minority suffered Stroke (9.1%) (Table 2).

Environmental factors	Frequency (N = 317)	Percentage (%)	
Occupational Exposures			
Work most engaged in prior to 60 years			
	Farmworker	225	71.0
	Business attendant	27	8.5
	Civil Servant	15	4.7
	All above combined	50	15.8
Ever been a Factory/chemical related business worker			
	Yes	48	15.1
	No	269	84.9
State of current dwelling unit			
	Temporary (mad & wattle)	186	58.7
	Semi-Permanent (mad but cemented)	104	32.8
	Permanent	27	8.5
In-House Environment			
Damp and moldy unit			
	Yes	179	56.5
	No	138	43.5
Cooking Place			

Cooks in house of residence			
	Yes	34	10.7
	No	283	89.3
Cooks in poorly ventilated separate kitchen			
	Yes	191	60.3
	No	126	39.7
Cooks in the Open			
	Yes	51	16.1
	No	266	83.9
Cooking Material			
	Firewood only	252	79.5
	Combination with Charcoal/ Paraffin	65	20.5
Neighbourhood environment			
Swampy			
	Yes	69	21.8
	No	248	78.2
Noisy			
	Yes	50	15.8
	No	267	84.2
Heavy traffic			
	Yes	99	31.2
	No	218	68.8
Slum area			
	Yes	58	18.3
	No	259	81.7

Source: Primary Data (2020)

Table 3: Occupational Exposures, In-house and Neighbourhood Environmental Characteristics Among Respondents

In Table 3 are the results related to the past and present Occupational Exposures, In-house and Neighbourhood Environmental Related Characteristics. As seen majority of elderly persons were farm workers (71.0%), very few worked in a factory or chemical related business (15.1%) and slightly higher than half were residing in temporary houses (58.7%). The in-house environment conditions were such that most of them were either currently or previously or throughout life residing

in houses characterized with damp floors and mouldy walls (56.5%). Most of the subjects were cooking in poorly ventilated separate kitchens (60.3%). In addition, the neighbourhood environment to the participants was such that few of them had their residential houses either near swamps (21.8%), surrounded by slums (8.7%), in close vicinity to heavy traffic (31.2%) or generally noisy environment (15.8%).

Life style factors	Frequency (N = 317)	Percentage (%)
Health care seeking behaviour		
Self-Medicare (Herbs/ Medicine) when sick		
	Yes	172
	No	145
Visit physician every 3 months for check up		
	Yes	5
	No	312

Dietary Practices			
	Unbalanced Diet	307	96.8
	Balanced Diet	10	3.2
History of smoking			
	Yes	83	26.2
	No	234	73.8
History of alcohol drinking			
	Yes	244	77.0
	No	73	23.0
Physical activity			
	Daily	140	44.2
	At least 2 Days/week	132	41.6
	Rarely	37	11.7
	Not at all	8	2.5

Source: Primary Data (2020)

Table 4: The Lifestyle Characteristics of Study Subjects

In Table 4 majority respondents self-medicated themselves using either herbs or medicines (54.5%) and did not visit physician every 3 months for checkup (98.4%). Most of the respondents did not receive a balanced diet (96.8%) yet had a history of

alcohol drinking (77.0%). Almost one in four participants had a history of smoking (26.2%) but most of them were physically active either daily or for at least 2 days a week (85.8%).

Factors		NCCM condition		COR (95%CI)	AOR (95%CI)
		Yes N (%)	No N (%)		
Demographic factors					
Sex	Male	119(86.2)	19(13.8)	1.11(0.59-2.09)	1.11(0.44-2.78)
	Female	152(84.9)	27(15.1)	1	1
Education Level	None	79(79.8)	20(20.2)	0.71(0.28-1.82)	0.98(0.24-4.04)
	Primary	153(89.0)	19(11.0)	1.45(0.57-3.68)	0.74(0.19-2.91)
	Post Primary	39(84.8)	7(15.2)	1	1
Marital status	Single	134(89.3)	16(10.7)	1.83(0.95-3.52)	1.82(0.74-4.46)
	Married	137(82.0)	30(18.0)		1
Family History of NCCMs	Yes	134(93.1)	10(6.9)	3.52(1.68-7.38)	4.80(1.88-12.27)**
	No	137(79.2)	36(20.8)		1
Environmental factors					
State of Housing	Temporary	178(95.7)	8(4.3)	9.09(4.07-20.29)	3.22(1.18-8.75)**
	Permanent & Semi	93(71.0)	38(29.0)	1	1
In-house environment					
Damp floors & mould walls	Yes	173(96.6)	6(3.4)	11.77(4.82-28.75)	1.94(0.59-6.32)
	No	98(71.0)	40(29.0)	1	1
Cook in poorly ventilated kitchen	Yes	185(96.9)	6(3.1)	14.34(5.86-35.11)	4.53(1.56-13.19)**
	No	86(68.3)	40(31.7)	1	1
Residential neighbourhood environment					
Swampy	Yes	47(68.1)	22(31.9)	0.23(0.12-0.44)	0.46(0.19-1.23)
	No	224(90.3)	24(9.7)	1	
Lifestyle factors					

Dietary Practices	Unbalanced	266(86.6)	41(13.4)	6.49(1.79-23.39)	0.81(0.16-4.22)
	Balanced	5(50.0)	5(50.0)	1	1
Smoking History	Yes	78(94.0)	5(6.0)	3.31(1.26-8.69)	3.14(0.81-12.13)
	No	193(82.5)	41(17.5)	1	1
History of alcohol use	Yes	214(87.7)	30(12.3)	2.00(1.02-3.93)	0.62(0.24-1.64)
	No	57(78.1)	16(21.9)	1	1
Physical activity	None/ at least 2 days	170(96.0)	7(4.0)	9.38(4.04-21.75)	6.13(2.04-18.46)**
	Daily	101(72.1)	39(27.9)	1	1

****Significant at 5%**

Table 5: Multivariate Results of the Factors Associated with the Prevalence of NCCMs Among Study Subjects

Table 5 shows the demographic factors significantly associated with prevalence of NCCMs among the study subjects after controlling for confounding. Family history of NCCMs was the only demographic characteristics associated with prevalence of NCCMs among participants (AOR = 4.80; 95% CI: 1.88-12.27; $p = 0.001$). The odds of suffering NCCMs were 4.80 times higher among subjects with a family history of NCCMs compared to those without family history of NCCMs. The demographic characteristics such as sex of the participants (AOR = 1.11; 95% CI: 0.44-2.78; $p = 0.827$), their education level (AOR = 0.98; 95% CI: 0.24-4.04; $p = 0.972$), and marital status (AOR = 1.82; 95% CI: 0.74-4.46; $p = 0.192$) were not statistically significant.

In relation to environmental factors, the state of housing (AOR = 3.22; 95%CI: 1.18-8.75; $p = 0.022$), and in-house environment particularly cooking within a poorly ventilated kitchen (AOR = 4.53; 95%CI: 1.56-13.19; $p = 0.006$) were significant. The odds of suffering from NCCMs were 3.22 times among study subjects who previously resided or are currently residing in temporary houses compared to those in semi-permanent and permanent houses. In addition, the odds of suffering from NCCMs were 4.53 times among those who cook in poorly ventilated kitchens compared to those who cook from a well-ventilated kitchen. Other in-house environment conditions show residing in houses with damp floors and walls with moulds (AOR = 1.94; 95%CI: 0.59-6.32; $p = 0.269$) and residential neighborhood environment (AOR = 0.46; 95%CI: 0.19-1.23; $p = 0.089$) associated with prevalence of NCCMs among the study subjects after controlling for confounding.

Table 5 additional results regarding lifestyle factors show that physical activity (AOR = 6.13; 95%CI: 2.04-18.46; $p = 0.001$) was statistically significant. The odds of suffering from NCCMs were 6.13 times in study subjects who never undertake physical activities daily compared to those who undertake physical activities on a daily basis. The dietary practices (AOR = 0.81; 95%CI: 0.16-4.22; $p = 0.805$), history of smoking (AOR = 3.14; 95%CI: 0.81-12.13; $p = 0.098$), and history of alcohol use (AOR = 0.62; 95%CI: 0.24-1.64; $p = 0.336$) were not significant after controlling for confounding. The quantitative results were consistent with the qualitative results.

4. Discussion

The current results of the population-based survey indicated a

prevalence rate of suffering NCCMs at 85.5% which was very high. This finding is comparable to what was reported in rural Nigeria where prevalence of hypertension as a NCCM was 84.2% [2]. The overall prevalence rate is much higher due to inclusion of visual impairment and edentulousness which the other previous studies didn't consider but this result confirms that elderly persons in Uganda are prone to ill-health like elsewhere in the world. This study found the prevalence rates for visual impairment (71.0%), edentulousness (57.4%), Hypertension (33.4%), Diabetes (10.4%), Asthma (9.5%) and the least suffering from Stroke (9.1%). Such prevalence rates were consistent with earlier reported rates for cataracts in India, hypertension and on the overall hypertension, diabetes, and stroke in Uganda [41,35]. This result shows how challenging it is for the elderly persons to freely undertake their daily activities that they desire thus calling for well suited primary prevention programs in the younger populations alongside control initiatives for elderly persons.

This study found family history of suffering NCCMs associated with prevalence of NCCMs. This result was consistent with earlier findings in India that showed family history was associated with some chronic diseases [26]. The findings on Diabetes II were also associated with family history and these are in agreement with what Chege found in rural Kenya. It is therefore advisable, that elderly people from families with a history of diabetes should take preventive measures in form of dieting and reducing other risk behaviours [16].

In this study, the elderly subjects who previously resided or were currently residing in temporary houses had 3.22 times higher risk of suffering from NCCMs. This finding is similar to what was found in Ireland that respiratory ill-health problems were mostly in elderly persons who resided in poor dwellings with poor heating [23]. The participants who cooked within a poorly ventilated kitchen and those physically inactive respectively had 4.53- and 6.13-times higher risk of suffering from NCCMs. These findings are consistent with what was established in Bangladesh that kitchens that were built using construction materials that were permeable with proper ventilation enhanced a healthy indoor environment [18]. Implementation of universal housing policies and interventions that limit air pollution within households are pertinent in limiting the increasing burden of NCCMs.

Our study results showed insignificant associations of sex,

education level, marital status with prevalence of NCCMs. Such results are not in line with what was earlier found in South Korea [45] and Ethiopia [44]. Insignificant associations were also found in the current study for residential neighbourhood environment which was inconsistent with what was established in China [29] and USA [20] that neighbourhood environments had a bearing in health conditions of elderly people. This is perhaps because most areas in Bulambuli district in Uganda remain generally rural and thus characterized by a less built environment.

The current study showed insignificant associations between lifestyle practices such as dietary practices and smoking with prevalence of NCCMs. Such findings are different from what was reported in previous studies in which maintaining a normal health in elderly people was associated with adhering to appropriate dietary practices in Switzerland [28]. The results are also different from what was earlier found in Southeastern Brazil in which smoking was a significant factor [6]. This study also found alcohol drinking not associated with prevalence of NCCMs which was consistent with what was found in Haikou, China. Most people in rural areas demonstrate poor eating habits for dietary practices and also fear to report smoking and chronic alcohol drinking behaviors. This explains the insignificant findings [47].

5. Limitations

For purposes of comparison, caution should be taken as more NCCMs than often studied in other previous studies were considered in this study. This also applies to the study setting, the design and the triangulated methods alongside tools used in measuring NCCMs among the elderly persons. Notwithstanding all this, the current estimates of prevalence of the NCCMs could vary as the self-reports used suffer inherent inaccuracy weaknesses as well as recall bias compared to when participants are subjected to more accurate laboratory tests.

6. Conclusions

This is the first documented report of a high prevalence rate of non-communicable chronic illnesses at a high rate of 85.5% in this rural district of Eastern Uganda. Significantly associated factors have been identified and it is hoped that Ministry of Health (MOH) system will take appropriate measures to prevent this high prevalence rate.

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