

**CHRONIC OBSTRUCTIVE PULMONARY DISEASE: TRENDS AND ASSOCIATED
FACTORS AMONG PATIENTS AT KAMPALA INTERNATIONAL UNIVERSITY
TEACHING HOSPITAL, ISHAKA BUSHENYI.**

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DECLARATION

I do hereby declare that this research dissertation is the product of my own efforts and to the best of my knowledge, has never been presented to any institution for any award or qualification whatsoever. Where the works of other people have been included, due acknowledgement to this has been made in accordance with the appropriate referencing and citations.

Researcher: **ABENAWA ROBERT, BMS/0143/133/DU**

Signature

Date

APPROVAL

This research dissertation has been produced under my close supervision and guidance and I therefore recommend the student to go ahead and hand in a copy.

Supervisor: **Dr. KAEM SHIR ALI, CONSULTANT PHYSICIAN (KIUTH)**

Signed.....

Date.....

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I would like thank the Almighty God for the gift of life and all the blessings manifest in my life. I would also like to acknowledge my family for being a pillar upon which I can lean on through both good and bad times. To my friends and colleagues, I say thank you for allowing me to learn with, and through you. Most importantly, I would like to acknowledge and thank my supervisor, **Dr. KAEM SHIR ALI**, through whose inputs, corrections and guidance, this piece of work has finally managed to see the light of day.

LIST OF ABBREVIATIONS AND ACRONYMS

COPD	:	Chronic Obstructive Pulmonary Disease
FEV₁	:	Forced Expiratory Volume in one second
IREC	:	Institutional Research and Ethics Committee
KIU-TRH	:	Kampala International University Teaching & Research Hospital.
USA	:	United States of America
YLDs	:	Years Lived with Disability, Years Lost due to Disability

OPERATIONAL DEFINITIONS

Biomass Exposure Index: Measure of intensity of exposure to Biomass fuels (charcoal, firewood, grass, cow dung) that is used to estimate risk of developing chronic bronchitis and biomass fuel-induced Chronic Obstructive Pulmonary Disease. It is measured as hours-years and a threshold of biomass exposure index of 60 hours-year is necessary to have a significant risk of developing chronic bronchitis in women (López-Campos, Tan, & Soriano, 2016)(Gaikwad, 2017).

Chronic bronchitis: is defined clinically as persistent cough and sputum production and pathologically as abnormal enlargement of the mucous glands within the central cartilaginous airways (Lee Goldman, 2016).

Emphysema: is defined pathologically by abnormal enlargement of the air spaces due to destruction and deformation of alveolar walls (Lee Goldman, 2016).

Middle age: The period between early adulthood and old age, usually considered as the years from about 45 -65 years. (Oxford English Dictionary)

Pack Year: Unit for measuring the amount a person has smoked over a long period of time. It is calculated by multiplying the number of packs of cigarettes smoked per day by the number of years the person has smoked (Lee Goldman, 2016).

ABSTRACT

Introduction: Despite efforts to reduce the morbidity and mortality that results from COPD through anti-smoking campaigns and other measures, the prevalence of COPD has been noted to be still high, especially in sub-Saharan Africa. Another worrying trend is the increase in COPD prevalence in females and people of younger ages as was previously the case. So many factors can be attributed to this and the researchers set out to find out the prevalence and factors associated with COPD at KIUTH.

Objective: To assess factors associated with COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda.

Method: A descriptive questionnaire-based cross-sectional study design was used with 163 study participants.

Results: Prevalence of COPD (16%) was high compared to the global estimates, with more women affected than men. Advancing age, exposure to cigarette smoke and biofuels were found to be statistically significant in as far as COPD was concerned.

Conclusion: The prevalence of COPD among medical patients at KIUTH is high with the prevalence being higher among females than males, with COPD being seen in younger males as well as the old. Advancing age, exposure to cigarette smoke and biofuels were found significant as factors in COPD. The prevalence and trend shift are matter of concern that warrant interventional measures.

CHAPTER ONE: INTRODUCTION

1.1.BACKGROUND

Chronic obstructive pulmonary disease (COPD) currently is the preferred term for a condition characterized by progressive, largely irreversible airflow obstruction, usually with clinical onset in middle-aged or elderly persons with a history of cigarette smoking, and that cannot be attributed to another specific disease, such as bronchiectasis or asthma (López-Campos et al., 2016).

Commonly used terms for this condition in the past included chronic bronchitis and emphysema, a terminology that has long become outdated because nearly all patients with a clinical diagnosis of COPD have both air space destruction (i.e., emphysema) and pathologic changes of the conducting airways consistent with chronic bronchitis (Lee Goldman, 2016).

COPD has progressively grown into a global public health problem, although prevalence estimates vary widely according to the definition used. Cigarette smoking is the principal risk factor for COPD, so prevalence tends to reflect societal smoking habits with a lag phase of 20 to 30 years. Cigarette consumption has leveled off or decreased in large segments of North America and Europe, but the prevalence of COPD may continue to increase as exposed populations age (Adeloye et al., 2015)(Goren et al., 2015).

A greater future burden of COPD may be anticipated in Asia and other regions of the world because of rapidly increasing cigarette consumption (Goren et al., 2015).

Increase in age is also associated with increased incidence of COPD. For example, more than 10% of the population older than 45 years in the United States has airflow obstruction of at least moderate severity as judged by spirometric criteria (Waked, Salame, Khayat, & Salameh, 2012).

COPD is the third leading cause of death in the United States, and mortality from COPD has increased during the past 30 years in both men and women. COPD is also the third leading cause of death globally and the fifth leading cause of years lived with disability. Medical costs and lost productivity attributable to COPD exceed \$40 billion annually in the United States. Direct medical costs rise precipitously as COPD becomes more severe, with hospitalization for exacerbations accounting for more than half of the total (Lee Goldman, 2016).

Cigarette smoking might be the principal cause of COPD, but the relationship is complex and COPD may develop without a smoking history. Other factors have thus been implicated in contributing to COPD pathogenesis. For example, occupational exposure to dust, such as mines,

cotton mills, and grain-handling facilities, commonly develop symptoms of cough and sputum and may suffer permanent loss of lung function (Terzikhan et al., 2016).

In some other parts of the world, in Africa for instance, repeated exposure to biomass combustion (coal or firewood) in confined living quarters causes airflow obstruction and may contribute to COPD development (Sood et al., 2010).

Bronchial hyper-responsiveness has been shown to independently predict accelerated loss of lung function in persons with mild to moderate COPD, especially among persons who continue to smoke (Brashier, Londhe, Madas, Vincent, & Salvi, 2012).

A severe deficiency of α 1-antitrypsin is the only genetic risk factor that has been proven to have a major impact on the development of COPD. This deficiency is found in about 1 to 2% of patients with an established diagnosis of COPD. α 1-Antitrypsin, which is a serine protease inhibitor that is secreted into the circulation from the liver, is thought to protect lung tissue against digestion by neutrophil elastase and related serine proteinases that have been implicated in the pathogenesis of human emphysema and hence COPD (Regan et al., 2011)(Hersh et al., 2011) (Meteran, Backer, Kyvik, Skytthe, & Thomsen, 2014).

Recent trends in developing countries are that the prevalence of COPD has steadily increased, more so in women. This trend can be attributed to a number of factors e.g., a raised life expectancy that may be due to better and more advanced healthcare. COPD is a disease whose manifestation occur more at middle ages and the old (Waked et al., 2012)(Jenkins et al., 2016).

The trend among women could be due to more uptake of smoking among women, occupations women now take up or other environmental influences that the women are now being exposed to. With changing times and improved socio-economic status among Africans, lifestyles have also changed in tandem. The African woman, who had initially been confined to the kitchen and constantly exposed to smoke from the fire place has replaced that smoke with that from a cigarette stick and is working side by side with their male counter-parts in occupations initially viewed a reserve of the male gender (Buist et al., 2007)(Adeloye et al., 2015).

Increased earnings and purchasing power has enabled motorization of an individual whose previous means of ambulation was nothing but his own God-given two lower limbs. Now more Africans can afford and own cars, and in their own small way can now afford to leave their mark as far as pollution is concerned! Industrialization compounds the problem even more. Industries' contribution ranges from smoke bellows that pour out toxic carbon-laden fumes all year round, to

this poor African worker forced to labour and toil for hours-on-end year in year out in dusty environments, sometimes even without protective gear e.g. face masks, which puts them at an increased risk of obstructive respiratory disease (López-Campos et al., 2016).

It is in view of all this, and much more, that the researcher wishes to propose that he conducts a study on Chronic Obstructive Pulmonary Disease (COPD): Changing Trends and Associated Factors among medical Patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda from January to July 2018.

1.2.PROBLEM STATEMENT.

The disease burden of COPD in terms of morbidity, mortality and rising medical costs is high and still rising precipitously. COPD is ranked as third both in the USA and globally as a leading cause of death and fifth cause for years lived with disability (YLDs) globally (López-Campos et al., 2016).

Disease trends have changed particularly in developing countries where COPD prevalence has increased in the past few decades with a significant increase among women. This change in trends could be as a result of so many factors at play.

The problem worth noting in COPD is that it is a disease whose manifestations, clinical presentation and burden are primarily in the middle ages and the elderly. With the improving life expectancy in developing countries, the proportion of the population in this age bracket is increasing steadily. This will have a two-pronged effect in developing countries as far as COPD is concerned. First and foremost, the prevalence of COPD in these countries will increase, and secondly, the burden placed on the shoulders of the productive youthful working population in caring for this sickly aging population will become heavier and heavier. This will have a negative ripple effect on the health, socio-economic and ultimately life expectancy gains made over the years.

1.3.STUDY OBJECTIVES

1.3.1. BROAD OBJECTIVE

To assess factors associated with COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda.

1.3.2. SPECIFIC OBJECTIVES

1. To determine the prevalence of COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda.

2. To evaluate the various factors associated with COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda.
3. To evaluate and compare the trends among male and female COPD medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda.

1.4.RESEARCH QUESTIONS

1. What is the prevalence of COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda?
2. What are the various factors associated with COPD among medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda?
3. How does the trend of COPD correlate or differ between male and female medical patients at Kampala International University Teaching and Research Hospital, Ishaka-Bushenyi, Western Uganda?

1.5.JUSTIFICATION OF THE STUDY

Over the past two or three decades, change in trends in terms of prevalence of COPD within the general population and specifically among women have been reported. Steady increase in prevalence has also been witnessed in developing countries (Adeloye et al., 2015)(López-Campos et al., 2016).

COPD offers a heavy burden in terms of morbidity, mortality and medical bills, a burden that will strain the African health sector and economy in general even further if not dealt with.

Cigarette smoking has been implicated as the principal factor contributing to development of COPD for a long time now. Over the years, studies have explored and proven the role played by other factors in the development of COPD; even in people who had never puffed on a cigarette in their entire lives (Waked et al., 2012)(Terzikhan et al., 2016).

This has been cemented further by the increase in COPD cases among women, a group whose cigarette smoking habits has always been lower than their male counterparts but has been on the increase recently (especially in Africa).

Though studies on the subject matter have been conducted in some regions of the world and Africa, information gaps still do exist, especially in Uganda. Crucial information on this subject that will

aid in policy making, planning and prioritization is still out there waiting to be obtained. This, in the researcher's own conviction, throws the doors wide open for further studies and debate on the subject matter.

1.6.STUDY SCOPE

1.6.1. GEOGRAPHICAL SCOPE

Kampala International University Teaching & Research Hospital is located in the town of Ishaka, in Bushenyi District, Western Uganda, approximately 330 kilometers (210 mi), by road, southwest of Kampala, Uganda's largest city and capital. The coordinates are:0°32'19.0"S, 30°08'40.0"E (Latitude: -0.538611; Longitude:30.144444). It runs under a private/public partnership, but is government aided because it is a training facility. It has about 700 beds.

1.6.2. CONTENT SCOPE

The study dealt with prevalence and trends of COPD among medical patients at KIU-TRH, with special scrutiny of the disease among females. It also tried to identify the different factors associated with the disease as a whole and how they compared or differed among male and female patients.

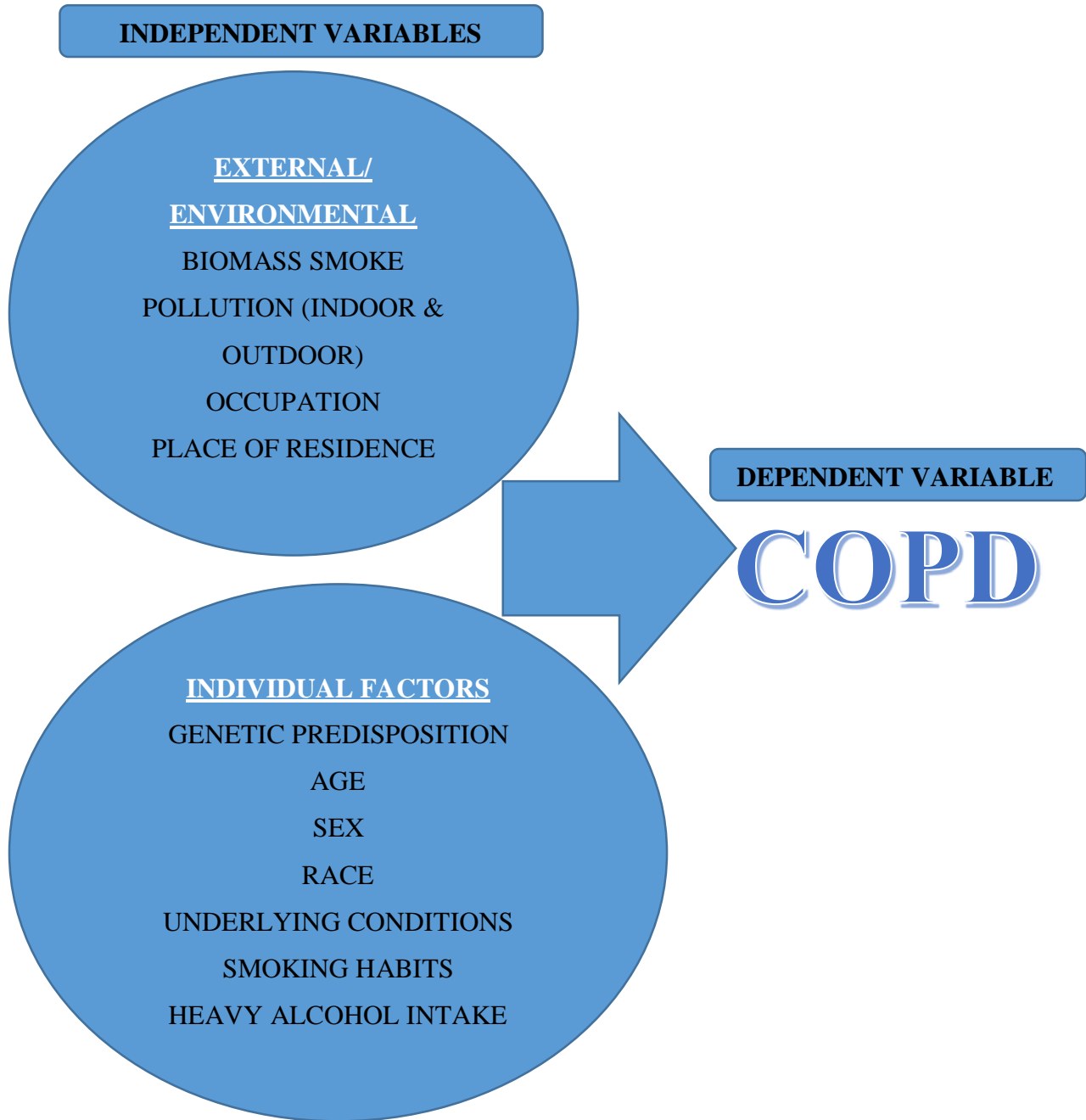
1.6.3. TIME SCOPE

The whole study was conducted from August 2017 to August 2018, a period of one year. This is from proposal formulation to the compilation of the final dissertation. The actual period of study conduction and data collection was from January to July 2018.

1.7.CONCEPTUAL FRAMEWORK

The conceptual framework adopted for this study was that the individual factors and external environmental factors were the independent variables that influenced the occurrence of COPD, the dependent variable.

Figure 1: Conceptual Framework on Factors Associated with COPD, Adopted from Afonso, 2011



CHAPTER TWO: LITERATURE REVIEW

2.0. INTRODUCTION

This chapter deals with various literature reviewed on the prevalence, factors associated with and the trends of COPD.

2.1. PREVALENCE OF COPD

Chronic obstructive pulmonary disease (COPD) has been a major public health problem and will remain a challenge for clinicians within the 21st century. Worldwide, COPD is in the spotlight, since its high prevalence, morbidity and mortality create formidable challenges for health-care systems. Despite recent trends in reduction of COPD standardized mortality rates and some recent successes in anti-smoking efforts in a number of Western countries, the overarching demographic impact of ageing in an ever-expanding world population, joined with other factors such as high rates of smoking and air pollution in Asia, will ensure that COPD will continue to pose an ever-increasing problem well into the 21st Century (López-Campos et al., 2016).

With logistic problems in terms of definition, conflicting prevalence values had been tabled till 2011 when there was consensus on what COPD was. It was then that it was consensually agreed that an estimated number of 328 million people have COPD worldwide, that is 168 million men and 160 million women (López-Campos et al., 2016).

With decreasing tobacco use, it is expected that the prevalence of COPD should also be decreasing. In Spain, by analyzing two sequential prevalence studies, and after adjusting for the same diagnostic criteria, the prevalence of airflow obstruction was halved in 10 years' time, that is from 9.1% in 1997 to 4.5% in 2007 (Soriano et al., 2010).

In another study conducted in Finland, it was reported, after an analysis of six independent cross-sectional population surveys repeated every 5 years between 1982 and 2007, that the prevalence of chronic bronchitis decreased from 19% in 1982 to 13% in 2007 in men, and from 13% to 11% in women. Overall, the prevalence of COPD and associated symptoms seems to be decreasing over the last decades (Kinnula et al., 2011).

A study conducted in the slums of Pune City showed that the overall prevalence of chronic bronchitis was 8.5% [18 -40 years: 7% (males: 7%, females:7%)] (Brashier et al., 2012) while those from Copenhagen showed the overall prevalence of COPD to be 17.4% (Fabricius, Løkke, Marott, Vestbo, & Lange, 2011).

In 2011 a COPD prevalence study was also done in Abu Dhabi, Saudi Arabia. From 520 participants surveyed (93.7% response rate), 55% male and with a mean age of 52 years, the prevalence of COPD was 3.7% and 95% C.I. (2.0-5.3) (Al Zaabi et al., 2011).

In a very recent study on the prevalence of COPD in Uganda findings ranged between 12.4% and 16.2% (van Gemert et al., 2015).

2.2. FACTORS ASSOCIATED WITH COPD

Cigarette smoking has been cited universally as being an important risk factor; other factors, such as exposure to indoor and outdoor air pollution, increasing age, comorbid conditions, occupational hazards, and infections, have also been proven important (Tashkin, 2015).

“Despite recent successes registered in combating COPD e.g. through the anti-smoking campaigns, an increase in the ageing population amongst us, joined with other factors such as high rates of smoking and air pollution in Asia, will ensure that COPD will continue to pose an ever-increasing problem well into the 21st century.” (López-Campos et al., 2016).

In 2012, Khayat and colleagues posted in the International Journal of COPD their findings of their study among non-smokers. The significant correlates of COPD included a childhood respiratory disease, house heated by diesel, and older age (Waked et al., 2012).

Results of a study that aimed to show the correlation between COPD and wood smoke, a major risk factor in developing countries were published in the American Journal of Respiratory and Critical Care Medicine in 2010. Self-reported wood smoke exposure was independently associated with a lower percent predicted FEV₁ (point estimate [± SE] -0.03 ± 0.01) and a higher prevalence of airflow obstruction and chronic bronchitis (odds ratio, 1.96; 95% confidence interval, 1.52-2.52 and 1.64 (95% confidence interval, 1.31-2.06, respectively). These associations were stronger among current cigarette smokers, non-Hispanic whites, and men. Wood smoke exposure interacted in a multiplicative manner with aberrant promoter methylation of the p16 or GATA4 genes on lower percent predicted FEV₁ (Sood et al., 2010).

Among the Dutch, risk factors include primarily cigarette smoking, but also exposure to noxious particles or gases, recurrent infection, diet, and genetic factors (Bischoff et al., 2009).

In Spain the prevalence of COPD was shown to increase with age and with cigarette smoking and was higher in those with a low educational level (Soriano et al., 2010).

Ashraf and colleagues in Abu Dhabi showed that there was no significant difference by gender, and COPD prevalence only significantly increased in those 70 year and older. Among those with

COPD, cigarette smoking use was relatively low (12% current- and 12% former-smokers), and it was even lower in those who used shisha (5%), pipe (0%), or exposure to passive smoking (5%), while exposure to biomass was higher (33%). Interestingly, bakhour use was very high (78%), but neither bakhour nor any of the above-mentioned exposures were associated with the risk of COPD (Al Zaabi et al., 2011).

A significant correlation was identified between cigarette smoking and both COPD prevalence and advanced disease in Tunisia (Daldoul et al., 2013).

2.3. TRENDS OBSERVED IN COPD

Recent trends in physician diagnosed COPD in the United Kingdom where a total of 50 714 incident COPD patients were studied, 23 277 (45.9%) of whom were women. From 2002 to 2008 the annual prevalence rates of physician diagnosed COPD in women rose continuously from 0.80% (95% CI 0.75 to 0.83) to 1.36% (95% CI 1.34 to 1.39), (p for trend <0.01), rising to the rate observed in men in 2008. Increases in the prevalence of COPD were observed in women of all ages; in contrast, a plateau was observed in the prevalence of COPD in men from the mid-2000s (López-Campos, Ruiz-Ramos, & Soriano, 2014).

In Rotterdam the overall incidence of COPD in an elderly population is 9.2/1,000 per year, with a remarkably high incidence in the youngest women, suggesting a further shift toward the female sex in the gender distribution of COPD. During their further lives, one of four men and one of six women free of COPD at the age of 55 years will have developed COPD (Van Durme et al., 2009). Results in Uganda showed an increase in the younger ages as compared with older ones. This is the reverse of the age distribution of COPD prevalence in developed countries, for example, Spain. The very young age distribution of the Ugandan population, together with the very recent tobacco smoking epidemic (mainly in children and young adults), actually produces COPD mostly in young Ugandans. Interestingly, the clinical features of these COPD cases from Uganda share some particularities in common with COPD due to biomass smoke exposure, such as having low frequency of symptoms, mild spirometric impairment and with a high proportion of biomass-exposed cases (López-Campos et al., 2016).

Exposure to indoor air pollution due to combustion of biomass fuels remains one of the significant risk factor of COPD. Rural women in developing countries bear the largest share of this burden resulting from chronic exposure to biomass fuel smoke. Biomass fuels are chiefly derived from the use of wood, grass, vegetable matter, animal dung and charcoal. Worldwide about 50% of all

households and 90% of rural households use biomass fuel as chief source of domestic energy, chiefly for cooking and heating. 3 billion people are exposed to smoke from incomplete combustion of biomass fuel compared to 1.01 billion to tobacco smoke globally. More than 80% of household of China, India and sub-Saharan Africa use this fuel for cooking and 30 to 75% of homes in South America. Using this fuel in small rooms with little or no ventilation is added risk to severe airway obstruction. Severe COPD with cor pulmonale and right heart failure is observed comparatively at a very young age in these women, in contrast to cor-pulmonale due to tobacco smoke (Gaikwad, 2017).

Women are more vulnerable to lung damage due to their small lungs and airways and less strong respiratory muscles to move air in and out. Biomass fuel smoke and other pollutants are more highly concentrated in the smaller space, increasing the potential for damage. The female sex hormone estrogen also plays a role in worsening lung damage by increasing the rate of nicotine breakdown in the body. Added rise in COPD in females due to working in tobacco industries. Exposure to biomass smoke is thought to increase the risk of COPD two to three fold(Gaikwad, 2017).

CHAPTER THREE: METHODOLOGY

3.0.INTRODUCTION

This chapter deals with the different tools and methods used in population selection and sampling, study design, data handling, analysis and presentation plus all other determinants of study feasibility.

3.1. STUDY DESIGN

A descriptive cross sectional study that utilized both qualitative and quantitative data was employed in the study.

3.2. STUDY POPULATION

The study population was all patients with a diagnosis of COPD attending KIU-TRH whether as an out-patient or admitted in the medical wards (both male and female) at Kampala International University Teaching and Research Hospital.

3.2.1. INCLUSION CRITERIA

Participants for the study were physician-diagnosed cases of COPD attending KIU-TRH whether on an out-patient basis or as an in-patient and who consented.

3.2.2. EXCLUSION CRITERIA

Patient with other diagnoses other than COPD or patients who met the eligibility criteria but failed to consent.

3.3. SAMPLE SIZE DETERMINATION

Using the formula (Fisher et al, 2006)

I.e. $N=Z^2PQ/D^2$:

Where N is the desired sample size

Z is the standard normal deviation taken as 1.96 at a confidence interval of 95%.

P is the prevalence of COPD taken from recent findings in Uganda = 12% as the lowest value

D is the degree of accuracy= 0.05.

Q= (1-P) which is the population without the desired characteristics.

Therefore, $N= 1.96^2 \times 0.12 \times 0.88/ (0.05)^2= 163$

163 was the sample size required.

3.4. SAMPLING TECHNIQUE

A purposive convenient sampling technique was used whereby medical cases with respiratory symptoms visiting or admitted into the health facility on the days of study were consecutively

approached for inclusion into the study. Then those who had physician-diagnosed COPD and who consented were selected.

3.5. DATA COLLECTION METHOD

Information was collected both by the use of a specifically tailored questionnaire that was administered by the researcher and through review of patient records for appropriate patient history and diagnosis confirmation.

3.6. DATA COLLECTION TOOLS

An interviewer-administered structured questionnaire with both closed and open-ended questions was used for the study. Patient files and lab reports were also used where necessary.

3.7. DATA COLLECTION PROCEDURE

The chief researcher enrolled a nurse as a research assistant. She was also proficient in the local language, which was an added advantage. The assistant was then trained on the research aims and objectives and what each question in the questionnaire was looking for. Any clarification information required was obtained from patient records and one-on-one history taking.

3.8. QUALITY CONTROL

The researcher ensured quality control through induction and training of the research assistant, who had been selected based on their knowledge of the field and language. The questionnaire was also pre-tested before the primary study.

3.9. DATA ANALYSIS

Data was entered into Microsoft excel 2016 spreadsheets and analyzed using SPSS version 17.0. Descriptive statistics were performed using absolute numbers, percentages, ranges and measures of central tendency accordingly. Data is presented in tables, graphs and charts using MS PowerPoint.

3.10. ETHICAL CONSIDERATIONS

Written introductory/approval letter from KIU-TRH was sought and presented to the departmental heads in charge. Informed consent from the respondents was sought both verbally and in writing. Participants were assured of confidentiality and use of the information obtained only for the purpose of the research. They had the choice of participating, not participating or pulling out of the study at any time into the study.

CHAPTER FOUR: RESULTS OF THE STUDY

4.0.INTRODUCTION

This chapter deals with the findings of the study as per the objectives and presents them in the form of statements, tables, graphs and charts.

4.1. SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

There were a total of 163 COPD diagnoses were reviewed during the study period. A total of 1019 admissions were recorded during the same period. All of the 163 respondents took part in the study, with 163 patient records reviewed. This gave a response rate of 100%.

4.1.1. Age and sex of Respondents (N=163)

AGE (Yrs.)	FREQUENCY (N)	PERCENTAGE (%)
19 – 28	18	11.04
29 – 38	6	3.68
39 – 48	24	14.72
49 – 58	24	14.72
50 – 68	18	11.04
69 – 78	61	37.42
79 – 88	12	7.36
SEX	FREQUENCY (N)	PERCENTAGE (%)
Male	54	33.13
Female	109	66.78
TOTALS	163	100

Table 1: Age and Sex of Respondents (N=163)

The respondents' age ranged from 19 years to 87 years with the mean age of 58.78 years. There were 54 (33.13%) males and 109 (66.87%) females. Most of the COPD patients were above 40 years. This is shown in table 1 above

4.1.2. Socioeconomic Descriptors of Respondents (N=163)

RESIDENCE	FREQUENCY (N)	PERCENTAGE (%)
Rural	5	3.07
Urban	158	96.93
RELIGION	FREQUENCY (N)	PERCENTAGE (%)
Catholic	68	41

Protestant	56	34.36
Moslem	39	23.94
MARITAL STATUS	FREQUENCY (N)	PERCENTAGE (%)
Single	18	11.04
Widowed	18	11.04
Married	103	63.19
Divorced	12	7.36
Separated	12	7.36
EDUCATION LEVEL	FREQUENCY (N)	PERCENTAGE (%)
Primary	79	48.47
Secondary	30	18.40
Post-secondary	12	7.36
None	42	25.77
EMPLOYMENT STATUS	FREQUENCY (N)	PERCENTAGE (%)
None	6	3.68
Formally employed	157	96.32
TOTAL	163	100

Table 2: Socioeconomic descriptors of respondents (N=163)

Most of the respondents were rural dwellers, Christians, married, with mostly primary level of education.

4.2. PREVALENCE OF COPD

During the study period, a total of 1019 admissions were recorded out of which 163 had the diagnosis of COPD and were include in the study. This gave a COPD prevalence of 16% for the study. 54 (33.13%) of the COPD diagnoses were males while 109 (66.78%) were females. This is shown in figure 2 and 3 respectively.

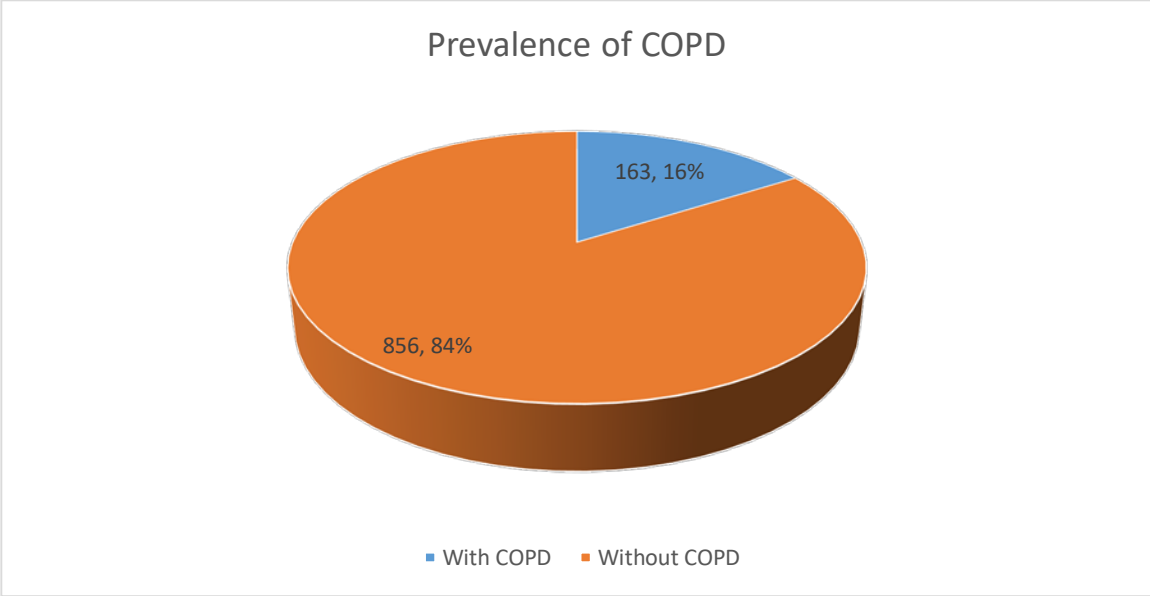


Figure 2: Prevalence of COPD (N=1019)

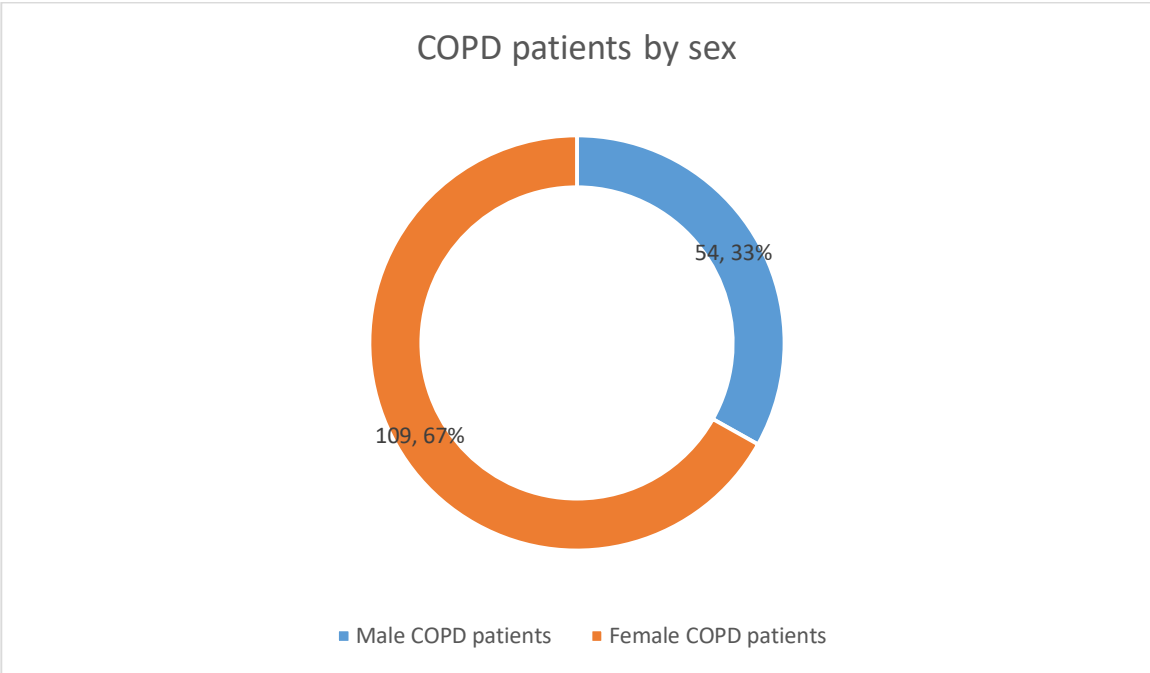


Figure 3: Sex Distribution of COPD patients (N=163)

4.3. FACTORS ASSOCIATED WITH COPD

4.3.1. History of Smoking among COPD patients (N=163)

As shown in figure 4 below, a staggering 102 (62.58%) of the COPD patients had a positive history of cigarette smoking either in the past or were currently smoking. Only 61(37.42%) were not or had never smoked in their lives but all 163 had very close friends who were smoking and who could smoke in their presence.

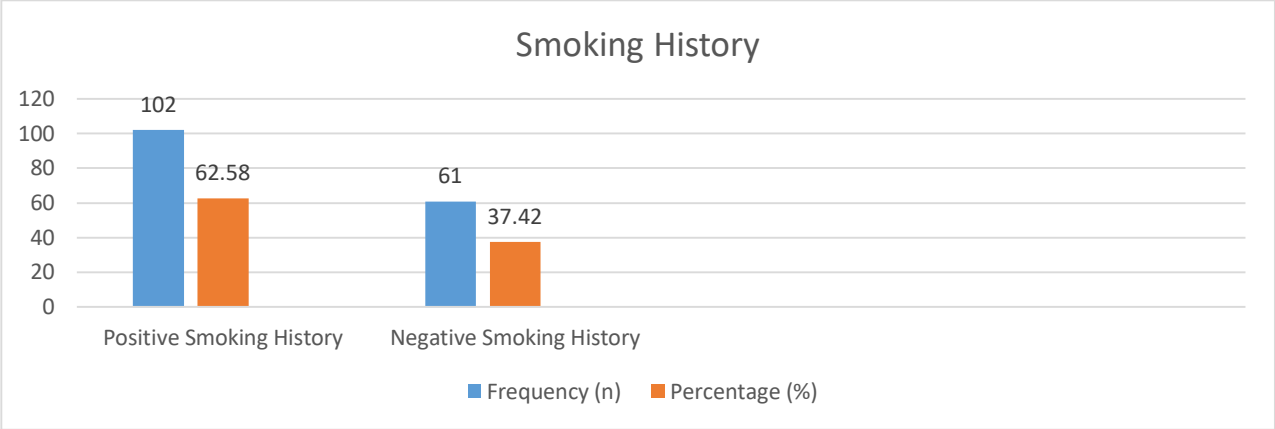


Figure 4: Smoking History Among COPD Patients (N=163)

4.3.2. History of Alcohol use among COPD patients (N=163)

Of the 163 COPD patients, 36 (22.09%) had a positive history of alcohol use while 127 (77.91%) had none.

4.3.3. Environmental Predictors of COPD among Respondents (N=163)

The environmental factors assessed relevant in COPD were number of rooms, average number and size of windows per room and more importantly source of fuel for cooking. The least number of rooms was 2 and the most number of rooms 8. The average room number calculated was 4.80 with an average of 1 medium-sized window. All of the COPD patients used biofuels for their home cooking with 139 (85.28%) using firewood and 24 (14.72%) regularly using charcoal. This information on biofuel use is shown in figure 5 below.

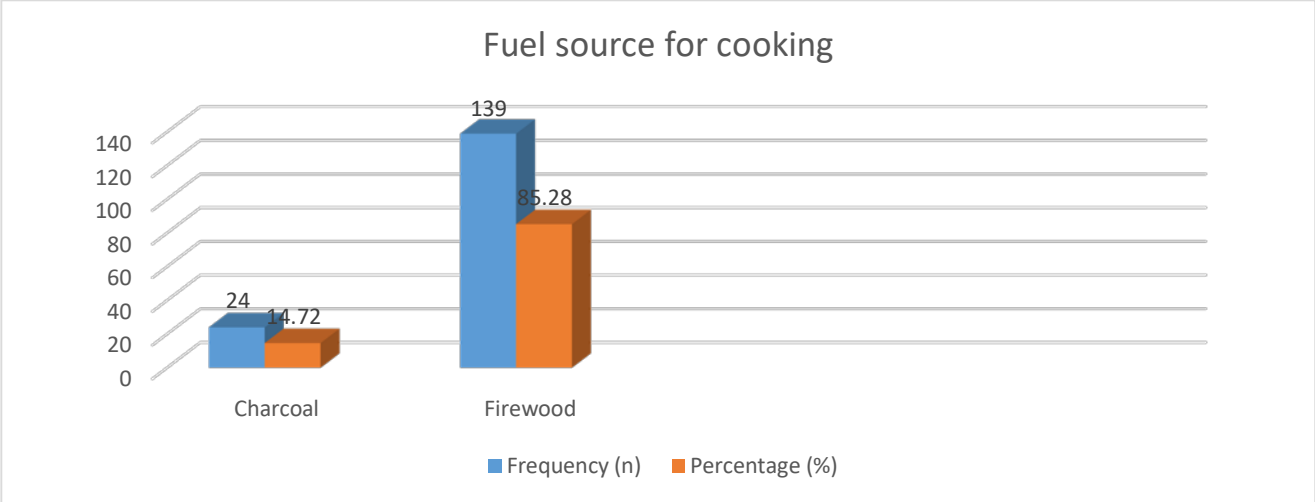


Figure 5: Biofuel Use among COPD Patients (N=163)

4.4. TRENDS OF COPD AMONG RESPONDENTS

4.4.1. Sex and Age Distribution of COPD

Out of the total 163 COPD patients, 54 (33.13%) were males and 109 (66.87%) were females. In the male cohort, the youngest COPD patient was 28 years while the oldest was 78 years whereas in the female cohort the youngest was 19 years and the oldest 87 years. The mean age of male COPD patients was 49.11 years whereas that for the female counterparts was 62.61 years. The clear trend observed here is that the prevalence of COPD in women is on the increase with more elderly patients and also, COPD in males is creeping into the younger ages.

CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

5.0.INTRODUCTION

This chapter discusses the study findings, presents conclusions drawn from those findings and recommendations made to various concerned parties.

5.1. DISCUSSIONS

5.1.1. PREVALENCE OF COPD

163 COPD diagnoses were made out of 1019 admissions during the period under study thus giving a prevalence of about 16%. Males contributed 33.13% whereas females contributed 66.78% of the total COPD cases. This was way higher than the global estimates of global prevalence of 4.56%, male prevalence of 51.22% and female prevalence of 48.78%. Study population differences and different population dynamics could be attributed to this discrepancy.

Our results were also higher than those found in Spain by (Kinnula et al., 2011) solely maybe due to differences in cooking fuels. Spain's primary energy consumption in 2015 was mainly composed of fossil fuels. The largest sources are oil (42.3%), natural gas (19.8%) and coal (11.6%) (Biol, 2016), whereas in our study the sources were mainly firewood or charcoal. Socioeconomic differences may also be attributable to this difference though, standing alone, it is not sufficient as seen from the fact that our prevalence was higher than that from Pune City slums (Brashier et al., 2012) but lower than the 17.4% recorded in Copenhagen. This brings in the aspect of cigarette smoking as a key factor as evidenced by the fact that it was so bad in Copenhagen that it had to get banned in public places of Copenhagen (CONNIE MARIA WESTERGAARD, 2013). The value is however close to the 16.2% estimate according to most recent Ugandan statistics (van Gemert et al., 2015).

5.1.2. FACTORS ASSOCIATED WITH COPD

Among the COPD patients, possible factors that could have been linked to COPD incidence were assessed among them being history of cigarette smoking, alcohol use, environmental predictors such as number of rooms, number and average size of windows per room and source of cooking fuel. History of exposure to cigarette smoke (whether primary or secondary), advancing age, and cooking fuel source were found to be significant. 62.585 had a positive history of smoking, while all 163 had close friends or relatives who smoked even in their presence. The respondents' chief sources of fuel for cooking were biofuels with 82.58% using firewood and 14.72% using charcoal.

These findings agree with those of (Tashkin, 2015) and emphasize the anti-smoking campaign promoted globally as a measure of combating COPD (López-Campos et al., 2016). Advanced age has been seen as an important factor even in non-smokers as evidenced by findings in (Waked et al., 2012) which put forward the issue of declining immune defenses, prolonged exposure to indoor and outdoor pollutants among others. In these people, passive smoking becomes an important factor too, as seen in (Al Zaabi et al., 2011) study in Abu Dhabi and seconded by (Daldoul et al., 2013) in Tunisia.

5.1.3. TRENDS OF COPD

The trend evident from our study findings is that COPD is becoming more prevalent in females compared to males, in males, COPD cases were reported in younger age groups (mean age 49.11 years) and in females (mean age 62.61 years). So many reasons could be attached to this; one being that women, on average, outlive males. Another reason for this is the increased exposure to biofuels among the females who have to spend a large part of their lifetime in the kitchen preparing meals for the family. Change of lifestyle could also be blamed; prevalence of smoking among women has been on the increase. Younger males have also been seen to have some aspect of COPD. This could be attributed to lifestyle (smoking), urban dwelling in search of a living that exposes them to outdoor pollution by car and industrial exhausts.

The shift in COPD trend has been reported in previous studies such as that by (López-Campos et al., 2014). This trend shift has been so evident in Uganda. The very young age distribution of the Ugandan population, together with the very recent tobacco smoking epidemic (mainly in children and young adults), actually produces COPD mostly in young Ugandans. Interestingly, the clinical features of these COPD cases from Uganda share some particularities in common with COPD due to biomass smoke exposure, such as having low frequency of symptoms, mild spirometric impairment and with a high proportion of biomass-exposed cases (López-Campos et al., 2016).

5.2. CONCLUSIONS

The prevalence of COPD among medical patients at KIUTH is high with the prevalence being higher among females than males, with COPD being seen in younger males as well as the old. Advancing age, exposure to cigarette smoke and biofuels were found significant as factors in COPD. The prevalence and trend shift are matter of concern that warrant interventional measures.

5.3. RECOMMENDATIONS

5.3.1. To The Respondents

Consider lifestyle modifications especially among the youth such as refraining or quitting from cigarette smoking and, in as much as possible, avoid exposure to secondary cigarette smoke. They should also consider use of cheap alternatives to charcoal or firewood that have less risk of COPD causation. Lastly, always encourage use of well-ventilated, spacious separate kitchens with as minimal time spent there as possible.

5.3.2. To The Management of KIUTH

Upscale campaigns against smoking and the importance of use of separate, well aerated kitchens. All these will be to increase awareness of COPD and highlighting as an important pulmonary disease.

5.3.3. To The Government of Uganda Through the Ministry of Health

Allocate funding and other resources towards awareness creation about COPD as well as funding research on cheaper, cleaner alternatives to firewood and charcoal (and other biofuels) as sources of domestic energy. The research could also be extended to outdoor fuels for cars and machinery. Lastly, but most importantly, enforce the anti-smoking campaign together with legislation against public smoking.

5.3.4. To Fellow Researchers

Research on cheaper, cleaner alternatives to biofuels and sources of energy for domestic use.

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APPENDICES

APPENDIX ONE: CONSENT FORM

CONSENT FORM

STUDY TITLE: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): CHANGING TRENDS AND ASSOCIATED FACTORS AMONG MEDICAL PATIENTS AT KAMPALA INTERNATIONAL UNIVERSITY TEACHING AND RESEARCH HOSPITAL, ISHAKA-BUSHENYI, WESTERN UGANDA FROM JANUARY TO JULY 2018.

I do hereby willingly consent to take part in this study as explained to me by (Name of interviewer).

Signature of respondent Date

APPENDIX TWO: DATA COLLECTION TOOL

STUDY QUESTIONNAIRE

SERIAL NO:

INTRODUCTION

STUDY TITLE: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): CHANGING TRENDS AND ASSOCIATED FACTORS AMONG MEDICAL PATIENTS AT KAMPALA INTERNATIONAL UNIVERSITY TEACHING AND RESEARCH HOSPITAL, ISHAKA-BUSHENYI, WESTERN UGANDA FROM JANUARY TO JULY 2018.

CONFIDENTIALITY: I am **Abenawe Robert**, a final year medical student at Kampala International University – Western Campus carrying out the above research. I would hereby wish to assure you that the information you will provide will be accorded the confidentiality it deserves and will not be used for purposes other than those meant for this research. You have the right not to answer any questions you feel uncomfortable to and you are free to pull out of the study at any time you wish.

DEMOGRAPHIC DATA

AGE

SEX MALE FEMALE

ADDRESS/RESIDENCE

RELIGION (Mention appropriate)

MARITAL STATUS SINGLE DIVORCED
MARRIED WIDOWED
SEPARATED

EDUCATION STATUS NO FORMAL EDUCATION
PRIMARY
SECONDARY
POST SECONDARY

EDUCATION STATUS OF PARTNER (If applicable) NO FORMAL EDUCATION
PRIMARY
SECONDARY
POST SECONDARY

OCCUPATION FORMAL EMPLOYMENT

Specify

NOT FORMALLY EMPLOYED

Specify

OCCUPATION OF PARTNER (If applicable) FORMAL EMPLOYMENT

Specify

NO FORMAL EMPLOYMENT

Specify

MAIN SECTION

1. Individual factors

a) Other than this condition that has brought you to seek medical assistance at the moment do you have any other condition that has been bothering you? (Diabetes, Hypertension.)

YES NO

If yes to 1(a) above, please specify

b) Do you smoke?

YES NO

If yes to 1 (b) above,

- i. which brand?
- ii. how many per day on average?
- iii. for how long? (in years)

(so as to determine pack years).

c) Have you ever smoked in your life?

YES NO

If yes to 1 (c) above,

- i. when was it?
- ii. which brand?
- iii. how many per day on average?
- iv. for how long did you smoke? (in years)
- v. when did you stop?
- vi. why did you stop?

(also to determine pack years).

If no to 1(c) above, do you have close people or friends you are always together and who smoke around you?

YES NO
YES NO

d) Do you take alcohol?

If yes to 1 (d) above,

- i. which brand?
- ii. how much per sitting or per day? (can be in terms of bottles, shots, or milliliters)
(so as to calculate total units per week to determine unhealthy drinking)
- iii. For how long have you been drinking? (in years)

NB: remember to rule out dependence using the CAGE criteria.

e) Have you ever taken alcohol in your life? YES NO

If yes to 1 (e) above,

- i. When was it?
- ii. Which brand?
- iii. How much per sitting or per day? (can be in terms of bottles, shots, or milliliters)
(so as to calculate total units per week to determine unhealthy drinking)
- iv. When did you stop?
- v. Why did you stop?

2. Environmental factors

a) How many rooms does your house have?

b) How many windows per room?

c) Where is your cooking area located?

- i. An area within the main house
- ii. Separate structure from the main house

d) What is the rough estimate of the window size? (interviewer to decide from respondent's description)

- i. Very small
- ii. Small
- iii. Medium
- iv. Large

e) What is your source of fuel for cooking? (tick as many applicable)

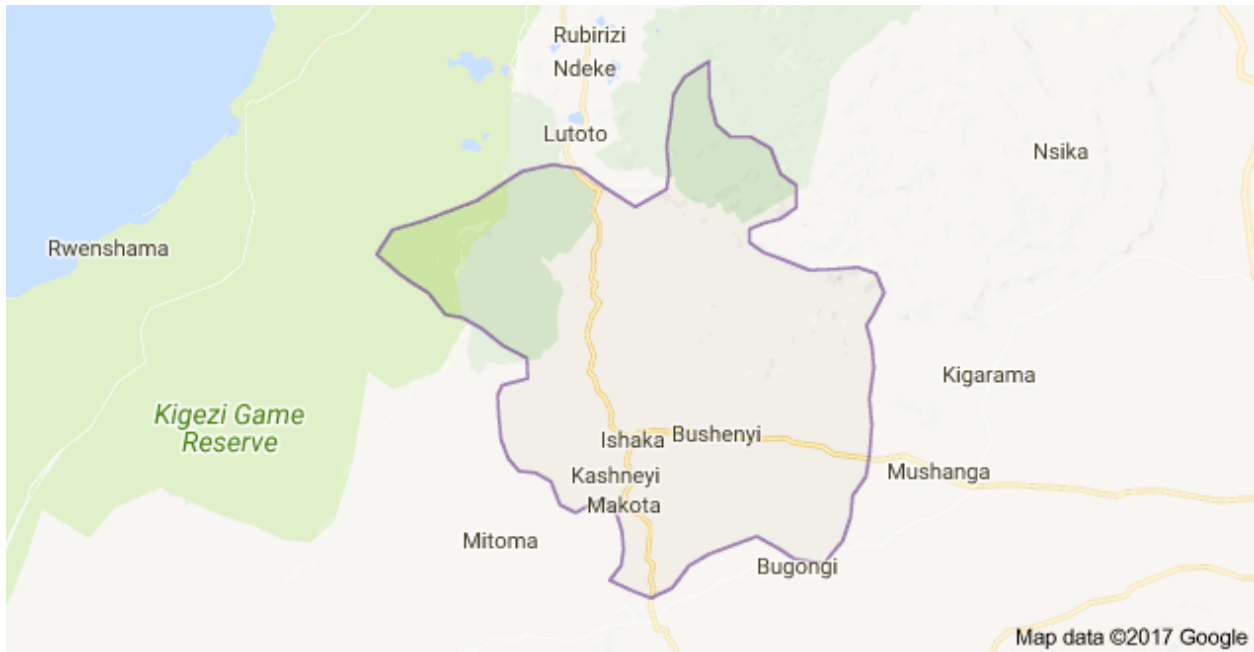
- i. Firewood
- ii. Paraffin
- iii. Charcoal
- iv. Gas

(so as to estimate the biomass exposure index)

Do you have anything else you want to add, any question, clarification, concern etc.?

THANK YOU.

APPENDIX FOUR (a): MAP OF BUSHENYI WITH ITS NEIGHBOURS



APPENDIX FOUR (b): DETAILED MAP OF BUSHENYI (RED STAR) WITH ITS NEIGHBOURS

