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CHARACTERISTICS AND OUTCOMES OF ELDERLY PATIENTS ADMITTED FOR MEDICAL REASONS IN RWANDA UNIVERSITY TEACHING HOSPITALS: CURRENT SITUATION AT CHUK AND CHUB.

A dissertation submitted to the college of Medicine and Health Sciences, School of Medicine and Pharmacy in partial fulfillment for the requirement of award of a Masters degree in Internal Medicine of University of Rwanda

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                                                            Kigali, August 2021

DECLARATION

I declare that this dissertation is entirely the result of my work and has not been submitted for any other degree at the University of Rwanda or any other institution. It has been passed through the anti-plagiarism system and found to be compliant.

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ABSTRACT

Introduction

Elderly patients are becoming an important demographic group in the healthcare system in Rwanda. This study aimed to show the characteristics of admission and outcomes of elderly patients admitted for medical reasons in two main public tertiary hospitals.

Methods: This was a three-month period prospective descriptive cross-sectional analytical study done on elderly patients aged ≥ 60 years at University Teaching Hospitals of Kigali and Butare. The non-probability sampling method, convenience sampling type was used for study enrollment. Socio-demographic variables, initial clinical presentation, diagnoses at discharge and outcomes were recorded. Katz ADL, O3DY and MNA scale were used to assess respectively dependency, cognitive dysfunction and nutritional status. We used ICD 10 to code for disease diagnosis at discharge or death. Data were analyzed using Stata/MP 16.0 version software.

Results: Elderly patients comprised 34.5% of all admissions and 190 of them were enrolled in this study. The mean age was 72.8 (± 8.8) years and male to female ratio was of 1:1.47. 67% presented having prior medical comorbidities dominated by hypertension at 58.1%. The commonest complaints at presentation were shortness of breath (30.5%), altered mental status (20%) and non-specific symptoms (12.6%). 47.3% of the sick elderly people were found to be malnourished at their admission. The most common diagnoses were: malignant neoplasm (21.5%), pneumonia (18.4%), stroke (11.5%), hypertension (10.0%), diabetes mellitus (7.8%), acute kidney injury (7.3%), heart failure (6.8%) and chronic kidney disease (5.7%). The median duration of hospital stay was 11 days and in-hospital mortality was 23.2%. Malnutrition, malignant neoplasms and chronic kidney disease were associated with the worse outcome.

Conclusion: Non communicable diseases were the most common cause of admission and death among elderly patients admitted for medical reasons. Malnutrition was found to be high and also associated with worse outcome in hospitalized elderly patients.

Key words: medical conditions, elderly inpatients, Teaching Hospitals, Rwanda

ACKNOWLEDGMENT

DEDICATION

To God the Almighty

To my wife, Marie Mediatrice Munezero

To my daughter and my sons

To my beloved parents

To my sisters and brothers

To all my relatives and friends

To all respectable older persons

To my supervisors

I dedicate this work

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LIST OF ABBREVIATIONS

CHUK: Centre Hospitalier Universitaire de Kigali

CHUB: Centre Hospitalier Universitaire de Butare

WHO: World Health Organization

UNFPA: United Nations Fund for Population Activities

RPHC4: Rwanda Population and Housing Census

HSSP 4: Fourth Health Sector Strategic Plan

NISR: National Institute of Statistics of Rwanda

HMIS: Rwanda Integrated Health Management Information System

CKD: Chronic Kidney Disease

HIV: Human Immunodeficiency virus

IRB: Institutional review board

CMHS: College of Medicine and Health sciences

AIIMS: All India Institute of Medical Sciences

USA: United State of America

AKI: Acute Kidney Injury

CBHI: Community Based Health Insurance (commonly known as Mutuelle de Santé)

PTSD: Post-traumatic stress disorder

ADL: Activity of Daily Living

MNA: Mini Nutritional Assessment

UAP: Union des Assurances de Paris

ICD: International Statistical Classification of Diseases and Related Health Problems

OR: odds ratio

JKCI: Jakaya Kikwete Cardiac Institute

MNH: Muhimbili National Hospital

CHAPTER 1: NATURE AND BACKGROUND OF THE STUDY

1.1. Background of the study

Population ageing is currently a global phenomenon and it is a long-term trend as a triumph of development and human success story (1, 2). Consequently, elderly patients are becoming an important demographic group in healthcare system both in hospital and primary care, accounting nearly half of all health care dollars spent on hospitalization in developed countries as example of USA (3, 4, 5, 6). Developing countries, with few geriatricians, are experiencing the most rapid increase in the number of older persons (1, 7). As effect of this demographic transition, elderly people in developing countries are becoming more vulnerable due to the rapid social changes associated with poor healthcare seeking behaviors (7, 9). A paradigm shift in the morbidity and mortality patterns of elderly from communicable to non-communicable diseases in developing world is on current situation (8, 10).

In Africa, especially in Sub-Saharan Africa which remains the youngest and poorest region in the world, the health of older persons is still largely neglected. Much attention is needed as they exist possible age-based inequalities in access to health care because they use health services substantially less than younger people do despite having worse health (9, 11). Data being scarce on this last point, some available clinical studies showed that elderly patients have been hospitalised at a high number in different african countries like in Libya in 2011 and in Tanzania in 2019 (12, 13). Specialists to take care of geriatric cases being rare in the region together with a great number of medical doctors who still have suboptimal knowledge about geriatric clinical care as showed in a survey done in Uganda have consequences on elderly patients who face sometimes unsafe medical care as found in a study in Ghana that 96% of elderly people with hypertension have had no adequate treatment for the disorder (14, 31).

Recent population statistics show that the share and proportion of older people in Rwanda comprise only 4.9% of the total youthful rwandan population but there is anecdotal evidence suggesting a big number of elderly patients seeking medical attention at all levels of the health care system (15). Once hospitalised, the elderly patients are admitted into wards for young adults where they decry the lack of specialised care among their other problems, mainly consequent to nonavailability of standard protocol for managing elderly patients in most hospitals as it is seen

in most other sub-saharan countries, but also consequent to the hospital environment which remains hostile to the older patients because it is not adapted to an ageing population (9). Another major health concern in elderly people in Rwanda is poor access to primary care despite efforts to support them by government of Rwanda and different non-governemental organisations (16).

The action planned in the fourth health sector strategic plan (HSSP 4) to overcome the above issues is to make health care providers at all levels equiped to provide appropriate care to the ageing population, this in order to support the achievement of the sustainable development goals (SDGs), particularly the SDG3 to ensure healthy lives and promote well-being at all age (38). On this last, data and evidence for guiding the policy interventions are needed.

1.2. Rationale of the study

The longevity in Rwanda continues to improve with average life expectancy of a Rwandan at birth being 67.5 years in 2017 from 32.0 years in 1995 (37). Older people are expected to increase in the same line and with increased age being a risk factor for diseases and hospitalisation, older patients with different health problems are expected to increase in hospitals particulary in medical wards. This stimulates the need to have improved data on their health conditions including disease and comorbidity tendency and analysis of their demographic characteristics.

Elderly patient's specific health problems that have impact in their caring such as impaired cognitive function and impaired capacity for self-care together with malnutrition were found to be high especially in developing countries and playing a big role in their outcome when they are hospitalized. However, they are not assessed as standard of elderly patients care in the majority of hospitals in Rwanda. This study has among its objectives to show how important is this problem in elderly patients admitted at CHUK and CHUB.

This study also intended to raise the awareness of the general public and particularly the health sector stakeholders mainly the health care providers on the characteristics of presentation of common causes of morbidity and mortality in rwandan elderly people as one of the basic steps to extend life and enhance healthy aging.

1.3. Objectives of the study

Main objective: the aim of this study was to describe the clinical characteristics and outcomes of elderly patients admitted in medical wards at CHUK and CHUB.

Specific objectives:

- To determine the most common reasons of admission, diagnosis and duration of hospital stay among elderly patients at CHUK and CHUB

- To assess the factors associated with good outcomes and predictors of morbidity and mortality in elderly patients

- To propose interventions for improving the quality of care of elderly patients in the of settings of CHUK and CHUB

1.4. Hypothesis of the study

The characteristics of admission of elderly patients with medical problems define their outcome and length of stay at CHUK and CHUB.

CHAPTER II: LITTERATURE REVIEW

2.1 Overview on morbidity and mortality in elderly people

The ongoing increasing number of aging population in general has clinical consequences such as increased number of elderly persons seeking health care for various diseases related to immunosenescence such as atypical infections, malignancy, autoimmune and metabolic disorders but also degenerative diseases, teeth loss and many other conditions including venous thromboembolism events (1, 18). In fact, age is a best indicator of morbidity and consequently determines the increasing use of health care services. Old age by itself is one of the factors associated with high risk of mortality when sick and admitted to hospital (22). For ICU patients older than 75 years especially, the advanced age was regarded to be a significant independent risk factor for mortality in different studies (25, 26).

Factors like aging-associated diseases, functional disability, chronic disease and comorbidities, multiple drug use and feeding problems are associated with poor hospital outcome associated with elderly patients diseases. Response to therapies usually developed for younger adults is altered often with less effectiveness and more adverse reactions and there is associated altered clinical illness presentation of diseases in elderly which together seem to be independent predictors of poor hospital outcome and making the diseases of elderly persons difficult to diagnose and treat (4, 24).

In developed countries, the non-communicable diseases are the main reasons for elderly patients admission to the medical wards with the three leading causes of admission in people older than 65 years being heart diseases, cancers and cerebrovacular accidents(19). Data on reasons for hospital admission among elderly people in low income countries is scarce with some available data showing that Sub-Saharan Africa is currently suffering from a dual burden of infectious and non-communicable diseases (20). As exemple, infectious diseases encouted for 38.2% of all diagnosis in a study done in Nigeria and stroke and infectious diseases were the leading cause of death (21).

2.2 Medical reasons for admission and hospitalisation outcome of elderly patients

Different studies worldwide are showing elderly patients becoming the major population in medical wards and emergency, staying in hospital longer compared to younger adults and their

hospitalisation being associated with high mortality. This crucial topic has been object of many studies and on conclusion is that elderly patients is a proportion which is continously growing, with challenging care especially in developping countries.

Here below there is a list of some identified studies in litterature:

Study reference	Study and number of patients	Findings
Mets TF. Et Al. 1993. Rwanda	All patients aged 60 years or more, hospitalized in a one-year period at the Medical Department, Butare University teaching Hospital,examined prospectively	192 patients were included with the majority being subsistence farmers and living in large families. The most frequently encountered problems were infections (37.5% of the patients) and liver cirrhosis (31.8%). Elderly patients occupied 17.5% of the available beds in the Medical Department (17)
E O Sanya et Al. 2008. Nigeria	Retrospective study on 2 years. Total of 456 elderly patients	Elderly patients accounted for 11.1% of total medical admissions. The 3 major common diagnoses were: hypertensive heart failure 19%, cerebrovascular accident 12% and tuberculosis 11% (21).
Basil T. Et Al. 2019. Tanzania	Prospective study, 3 months study period. 336 elderly patients	Elderly patients comprised 30.1% of hospitalisation in medical ward. The most frequent diagnoses were: hypertension 44.9%, stroke 31.5%, heart failure 18.5%, pneumonia 17.9%, diabetes mellitus 17.3% and chronic kidney disease 16.4% (13)
P Srinivas et Al. 1996 Malaysia	Prospective study on elders aged 65 years and above. Two week period. 74 elderly patients	Elders encounted 19.1% of all medical admissions. Cardiovascular and neurological conditions, in particular stroke, were found to be the most important causes of admission.

		Multiple pathology were found in 71.6% (23)
L A Adebusoye & S Z Kalula. South Africa	Retrospective study, 2010-2013, on patients aged 60 years and above admitted for medical reasons at Groote Schuur Hospital, Cape Town, South Africa.	Total of 11 254 older patients, mean age 70.7 years. Mortality was 15.1% (1701 deaths). 87.5% were admitted as emergency cases. Significant increase in mortality with increasing age. Stroke was the commonest cause of mortality (14.5%). The predictors of mortality were found to be short length of stay on admission, elevated white blood cell count, low platelet count, low haemoglobin and high blood urea (9).
Przemyslaw Kardas and Ewa Ratajczyk-Pakalska, 2003. Lodz-Poland	Data concerned elderly patients, ≥65 years, admitted in a period of 6 months to 3 departments of internal medicine in hospitals located in different districts of Lodz	Elderly persons accounted for 53.6% of total admissions. The most frequent reasons for hospital admission were cardiovascular diseases (54.7%) and respiratory tract diseases (19.9%). Coronary heart disease (15.7%), pneumonia (11.5%), stroke (8.5%), hypertension (7.2%), heart failure (5.4%), non-insulin-dependent diabetes (5.3%) and insufficiency of cerebral arteries (5.3%) were the most frequent specific diagnoses (6).
Emmanuel O Sanya et Al. 2011. Nigeria	Prospective study on deaths that occurred in patients 60 years and above. Study period: 30 months	297 deaths occurred with crude death rate of 22.8%. The top three diagnoses at deaths were stroke (19.8%), sepsis (16.5%), and lower respiratory tract disease (8.1%). Infectious diseases accounted for 38.2% of all diagnoses. Collective mean length of hospital stay at death was 6.8 ± 8 days (22).
M.R.	Retrospective observational	53% of elderly patients had atypical

Hofman et al. 2017. Netherlands	study on 355 elderly patients presenting to the emergency department	presentation of illness. 15% of patients with atypical presentation reported no specific symptoms of the underlying disease(4).
Debajyoti Banerjee et Al. 2019. India	Retrospective study of mortality patterns of elderly patients in the Department of General Medicine, in AIIMS, Rishikesh	The most commmon cause of mortality was cerebrovascular accident (28.8%), followed by hypertensive disorders (19.7%) cases, then septicemia and pneumonia accounting for 18.2% and 18.2%, respectively (10).
Teslime A., Serap B S.,2 Osman Z S et Al. 2014. Turkey	Retrospective cohort study of 1012 elderly patients hospitalized primarily for nonmalignant reasons, followed during hospitalization in 2 years	Mean age was 77.8 ± 7.6 years. The most common reason for hospitalization was diabetes mellitus (18.3%). Of the patients, 90.3% had at least a single comorbidity. 91.6% were discharged and 8.4% died. Predictors of mortality were older age, poor general status and comorbidity, high TSH level, hypernatremia, hypopotassemia, hyperucemia, hypoalbuminemia and hypertriglyceridemia (24).

2.3. Challenges associated with elderly patients care in developping countries

In developing countries, elderly patients care process has many challenges among them listed policymaking issues, access, technical infrastructure, integrity and coordination with all this showing the unpreparedness in managing geriatric cases. This results in poor management and make them consult health institutions frequently, again resulting in hospital related depression and polypharmacy which has a negative impact on their well being and the well being of their caregivers, without forgetting complications due to adverse drug reactions (21).

Especially, the Sub-Saharan African elderly health has largely been neglected and older people are becoming more vulnerable due to altered family structures and living arrangements

associated to possible age-based health inequities (11, 27). While early recognition and management of atypical illness presentation through the comprehensive geriatric assessment potentially results in positive health outcomes by prompting accurate diagnosis, reducing the risk of new comorbidities and disease progression, reducing hospital length of stay, and improving quality of life of the sick elderly (4), elderly patients in developping world especially in sub-Saharan region consult with very advanced illness as the culture makes them not to consult when they are not visibly sick (9, 28).

2.4.Geriatric care challenge in Rwanda

According to HSSP 4 of Rwanda which is serving like a foundation for 2050 Vision (The Rwanda We Want), there is expected epidemiological transition of the country with more increase of the health needs of the elderly persons notably in Non-Communicable Diseases detection and management(38). On this, as it stands now, there is still much to do on side of health care system to make it ready for this need.

Elderly people in Rwanda still report difficulties in seeking healthcare service, mainly due to lack of accessibility because of long distance while a great number among them live with any form of disability and cost over. Many of the elderly people also repeatedly reported self-managing severe loss of eyesight, respiratory troubles, post-break bone pain, high blood pressure, diabetes and other ailments, with others living with severe mental problems, PTSD and depression, without access to support (31).

For the standard of care, management of elderly patients is best delivered by a multidsciplinary team because of their complex medical problems, sometimes requiring input from a geriatrician. This multidisciplinary approach is not yet well established to allow their good management with healthcare givers sometimes reporting to be inconfortable to manage them. Elderly patients in Rwanda are admitted and managed almost in the same manner as other young adults patients. No specific approach, no special attention taken on them and mainly no trained staff in nursing or medical care to provide appropriate care to the geriatric patients. There is even an implicit assumption on the part of some healthcare providers that little can be done to treat the ailments of elderly patients. Some caretakers of the very dependent elderly patients mentionned that

inhospital time is considered as transit to death, many declaring difficult supportive care at home with some cases of home mistreatment due to lack of time for them.

As rwandan health care system is making effort to increase the focus on improvement of elderly healthcare service while still maintaining current efforts to manage and prevent infectious diseases and materno-infantile diseases, data are needed to show the areas of improvment and help in establishment of adequate policies needed for the care and treatment of an ageing population, mainly focusing on training of personnel and adjusting facilities to meet the special needs of the elderly people as advised by WHO and agreed in Madrid plan (29, 30).

This hospital based study has given demograhic data, clinical characteristics, most prevalent disease and hospital outcome as well as asssociated factors of admitted elderly patients. The results also served as comparison with a previous study on the same topic almost 3 decades ago at CHUB (17).

CHAPTER III: METHODOLOGY

3.1. Settings

This study was conducted in 2 large national public referral university teaching hospitals, CHUK in Kigali city and CHUB in Huye, Southern Province.

3.1.1. CHUK

The University Teaching Hospital of Kigali (CHUK) is the biggest public referral hospital and academic center in the country, located in the center of Kigali city. It receives patients mainly from 19 Districts hospitals located in 14 Districts of Rwanda, from City of Kigali, Northern Province and northern parts of Southern and Western Provinces. The hospital capacity is of 518 beds and Internal Medicine department receives a high volume of patients in excess to its capacity of roughly 78 beds, through Emergency department or Outpatient department. The hospital's number of beds per year was 398 during the fiscal year 2019-2020 and the hospital annual average turnover is 33/bed. The hospital average length of stay is 7 days with a mean length of stay of 8 days in Internal Medicine as seen in HMIS (33).

3.1.2. CHUB

The University Teaching Hospital of Butare (CHUB) is also a public tertiary hospital and academic center, located in HUYE District, Southern Province, which receives patients transferred from 17 districts hospitals from southern Province and southern part of Western province (33). The total hospitalization capacity of CHUB is of 500 beds. The Internal Medicine department receives grossly a total of 2200 patients per year in its inpatients currently made of 73 beds. The hospital Average length of stay was 8 days in fiscal year 2019-2020 with a mean length of stay of 11 days in Internal Medicine as seen in HMIS (33).

3.2. Study design

This study was a prospective descriptive cross-sectional analytical study. It has been done by assessing the patient being admitted to hospital by an internal medicine physician. Specifically for this study, every patient that met inclusion criteria was assessed for nutritional and functional status which are not routinely as standard of elderly patient care in our settings. We performed

charts review and interview to patients who were admitted to Internal Medicine wards or their caretakers/next of kin, on a period of 3 months, from 1st February 2021 to 30th April 2021, to assess the characteristics of admissions by admitting physician. Open clinic was reviewed to check for initials laboratory investigation and imaging results. We performed where necessary small interviews to medical care team (nurses and doctors) for the information that was not found in files. The charts files also were reviewed at discharge to check for the final diagnosis, duration of hospitalization and outcomes.

3.3. Study population

Inclusion criteria: we including in our study all elderly patients, who were admitted for medical reasons at CHUK and CHUB in the period of the study of three months, from 1st February 2021 to 30th April 2021. We included also ICU and Emergency department elderly patients who were admitted by internal medicine physician and meeting the inclusion criteria, all after accepting to take part of the study by signing the informed consent form. The next of kin signature was considered enough for consent in case the participant was not able to do so.

We considered 60 years and plus as age cut-off for inclusion criteria, consistent with the UN agreed standard and referred in the Madrid International Plan of Action on Ageing and also which is being used by National Institute of Statistics of Rwanda (26). The total admitted patients in internal medicine during the study period was found in the software HMIS in the hospital statistics department at CHUK and CHUB.

Exclusion criteria:
- Refusal to give and sign the informed consent or refusal to participate in the study by patient himself or the next of kin legally accepted.
- Death before being reviewed by Internal Medicine team
- Absence of internal medicine admission note in patient file
- Active Covid-19 infection

3.4. Sampling method

To obtain the needed sample in our study, we used the non-probability sampling method, convenience sampling type. We recruited consecutively all patients who were meeting inclusion

criteria and who were admitted with medical conditions at CHUB and CHUK during the study period in Internal Medicine, ICU and Emergency department. All information needed was taken using the data collection that was made to be used in this study.

Sample size calculation

The target population number for our study was known to be 334 (171 at CHUB and 163 at CHUK). This being a definite population, sample size was calculated using Yamane sample calculation formula denoted as following: $\mathbf{n} = \frac{N}{1+N(e)^2}$ with **n** being the sample size, **N** was taken as sample size of 334 and **e** being the acceptable sampling error, equal to 5% (36).

Taking the calculations, the sample size for this study became **182 people** calculated as follows:

$$\textbf{Sample size} = \frac{334}{1+334\times(5\%)^2} = \frac{334}{1+0.835} = \frac{334}{1.835} = 182.1 \approx \mathbf{182}$$

3.5. Study period

This study was conducted in a period of 3 months, from 1st February to 30th April 2021. All the patient's informations were followed up to their day of discharge.

3.6. Data collection process

Data were collected by investigator himself with a help from 2 medical interns with prior experience in data collection at each study site (CHUK and CHUB) who were helping by completing the required information on data collection tool after making sure that the informed consent is signed. The elderly patients who were included in the study were found on bedside in Internal Medicine ward (general wards or private rooms) for the majority in this study but also those admitted ICU and Emergency department by internal medicine team. Before starting enrolment into the study, we had to check if the internal medicine admission note was present in file. Socio-demographic data, past clinical history, chief complaints and important clinical and para-clinical findings were considered in this study as characteristics of admission. The diagnosis was taken as the cause of admission and patient status at discharge (improved, not improved or death) was taken as outcome.

The names and hospital identification number were recorded first. Recruited patients were then assessed for nutritional status using Mini Nutritional Assessment (MNA) Score, cognitive functional status using Ottawa 3DY scale, depression screening using Geriatric Depression Scale short form. The capacity for self-caring or level of independence also was assessed using Katz activities of daily living scale. The medical charts of those recruited patients were reviewed after discharge to find for clinical, final diagnosis and length and outcome of hospitalization. We used also the OpenClinic to check for laboratory and imaging work up results. The recorded final diagnosis from the hospital charts were coded using 2021 ICD-10-CM Codes.

In some circumstances to make information clear, we had to ask the next of kin or caretaker some information that was missing in the medical file. There were also some comments or recommendations that were given by medical or nursing team that helped in completing well the data collection tool.

The investigator did not influence in any case the treating team in the management or discharge plan of the patient.

3.7. Data management

After discharge or death, all completed paper-based data collection tool (questionnaire) were taken to the investigator. All well completed data were entered through google forms and later transferred to Microsoft Excel 2013 software for data cleaning and then exported to Stata version MP 16.0 for analysis.

3.8. Statistical methods for analysis

Qualitative variables such as sex, marital status, level of education, health insurance type, previous chronic disease, smoking and alcohol history, hospital outcome and discharge or death diagnosis were summarized as frequency and proportions in form of tables. Quantitative variables such as age, vital signs, time to consultation, laboratory studies, Malnutrition indicator score (MNA), Cognitive function score (O3DY), Activity of daily living (Katz ADL) and Depression score (GDS Short form) were categorized according to their respective levels and

summarized as frequency and proportions. Differences in proportions across groups were compared using Chi-square test or Fisher's exact test. Binary logistic regressions were performed to identify independent risk factors associated with mortality and morbidity. All factors with p value of <0.2 in bivariate analysis were included in the multivariate analysis model. A p-value of <0.05 was considered statistically significant.

3.9. Ethical Statement

This research protocol was first presented for review and was approved by the department of internal medicine, Ethical committee at CHUK, CHUB and UR ethical and research committee at School of Medicine (CMHS /IRB) respectively. After permission to carry out this study, we started enrolment of all the patients who were meeting study inclusion criteria. An informed consent was obtained from patients or next of kin (who is legally accepted) in case the patient was not able to give his/her consent. There was no pressure to participate in this study.

Privacy and confidentiality were maximized for all participants' informations in this study.

3.10. Assessment of risks to participants

Participation in the study was entirely voluntary and did not affect at any point the patient's management. No significant risks or discomforts occurred when this study was being carried out and no specific intervention made by anyone involved in the study.

CHAPTER 4: RESULTS

4.1. Introduction

During the three-month period of this study, 968 patients in total were hospitalized in CHUB and CHUK for medical reasons out of which 334 (34.5%) were aged 60 years and above. We managed to enroll correctly 190 elderly patients in this study, 104 from CHUK (54.7%) and 86 from CHUB (45.2%).

Details of enrolment are shown as the diagram below:

Figure 1: **Details of enrolment**

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                    ┌──────────────────────────────────────┐
                    │ Total admissions in Internal Medicine: 968 │
                    └──────────────────────────────────────┘
                         ╱                          ╲
            ┌─────────────────┐              ┌─────────────────┐
            │ CHUK: 488       │              │ CHUB: 480       │
            └─────────────────┘              └─────────────────┘
                    │                                │
            ┌─────────────────────┐        ┌─────────────────────┐
            │ Elderly patients: 163 │      │ Elderly patients: 171 │
            └─────────────────────┘        └─────────────────────┘
                         ╲                          ╱
                ┌──────────────────┐      ┌──────────────────┐
                │ Recruited: 131   │      │ Recruited: 103   │
                └──────────────────┘      └──────────────────┘
                         │                          │
        ┌──────────────────────────┐    ┌──────────────────────────┐
        │ Meeting inclusion criteria │   │ Meeting inclusion         │
        │ and enrolled: 104          │   │ criteria and enrolled: 86 │
        └──────────────────────────┘    └──────────────────────────┘
```
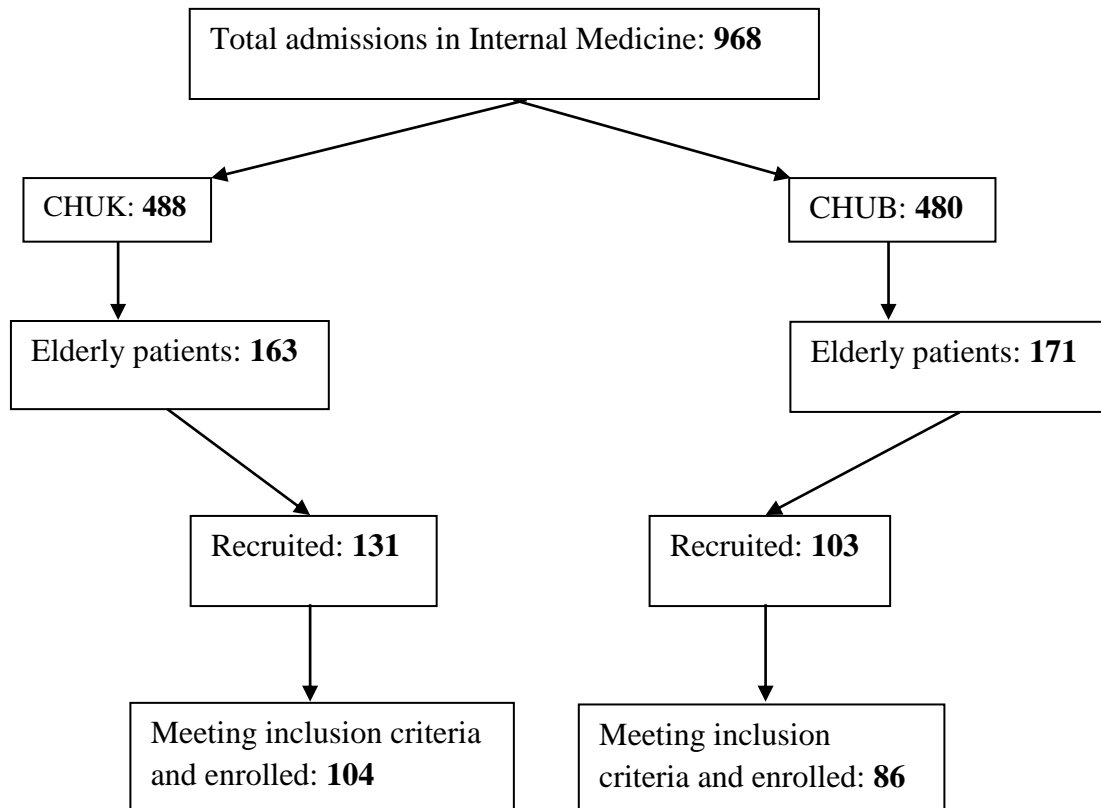
Among participants pre-selected, 44 were later disqualified for the study, mainly due to patients who were seen at emergency to be medical and later found to have surgical conditions and those who had incomplete data or wrongly copied patient ID number. The main reason of data incompleteness was the rule of isolation that was being applied to suspects and patients of

COVID-19 infection. As they were taken as special patients, active COVID-19 infected patients were not enrolled in this study but are included in the total admissions.

4.2. Socio-demographic characteristics of study participants

The mean age ($\pm$ SD) for enrolled participants was 72.8 ($\pm$ 8.8) years, 79 (41.5%) were in the age group 60 – 69 years, 59.5% of enrolled participants were female and 188 (98.9%) had health insurance in which CBHI covers 91.5%. About 40% of the study participants had no formal education and there was a significant difference in proportion of uneducated females compared to males 59 (52.2%) vs. 17 (22.0%) respectively p<0.001.

Table 1: The socio-demographic characteristics of the study participants

Variables	Categories	Total	Female, n=113 (59.5%)	Male, n=77 (40.5%)	P- value
Age group					
	60-69	79 (41.58%)	47 (41.59%)	32 (41.56%)	0.066*
	>70-79	63 (33.16%)	31 (27.43%)	32 (41.56%)	
	80-89	41 (21.58%)	31 (27.43%)	10 (12.99%)	
	90+	7 (3.68%)	4 (3.54%)	3 (3.9%)	
Education					
	No education	76 (40%)	59 (52.21%)	17 (22.08%)	<0.001***
	Post primary	43 (22.63%)	17 (15.04%)	26 (33.77%)	
	Primary	71 (37.37%)	37 (32.74%)	34 (44.16%)	
Marital status					
	Married	103 (54.5%)	37 (33.04%)	66 (85.71%)	<0.001***
	Separated	9 (4.76%)	3 (2.68%)	6 (7.79%)	
	Single	2 (1.06%)	2 (1.79%)	0 (0%)	
	Widow	75 (39.68%)	70 (62.5%)	5 (6.49%)	
Ubudehe					
	1	53 (27.89%)	41 (36.28%)	12 (15.58%)	0.001**
	2	66 (34.74%)	40 (35.4%)	26 (33.77%)	
	3	71 (37.37%)	32 (28.32%)	39 (50.65%)	
Work status					
	No	97 (53.01%)	61 (54.95%)	36 (50%)	0.512
	Yes	86 (46.99%)	50 (45.05%)	36 (50%)	
Type of insurance					
	CBHI	174(91.58%)	102 (90.27%)	72 (93.51%)	0.304
	HCR	1 (0.53%)	0 (0%)	1 (1.3%)	

	No insurance	2 (1.05%)	1 (0.88%)	1 (1.3%)	
	(Burundi)	1 (0.53%)	1 (0.88%)	0 (0%)	
	RAMA	11 (5.79%)	9 (7.96%)	2 (2.6%)	
	UAP	1 (0.53%)	0 (0%)	1 (1.3%)	
Patient next of kin					
	Children	130(68.42%)	77 (68.14%)	53 (68.83%)	0.823
	Grandchildren	13 (6.84%)	9 (7.96%)	4 (5.19%)	
	Others	21 (11.05%)	13 (11.50%)	8(10.39%)	
	Spouse	26 (13.68%)	14 (12.39%)	12 (15.58%)	

4.3. Patients' comorbidities

Table 2: chronic disease and chronic medications use

Variables	Categories	Number	Percentage
Comorbidity present (n=190)			
	No	61	32.11%
	Yes	129	67.89%
Type of comorbidity (n =129)			
	Hypertension	75	58.14%
	Diabetes Mellitus	29	22.48%
	Others	18	13.95%
	Hepatitis B /Hepatitis C	13	10.08%
	Asthma	9	6.98%
	Chronic kidney disease	8	6.20%
	Malignant Neoplasms	8	6.20%
	Heart Failure	6	4.65%
	More than one disease	36	27.91%
Home medications (n=190)			
	No	76	40%
	Yes	114	60%
Medications per day (n=114)			
	1	29	25.4%
	2-3	66	57.9%
	4+	19	16.7%
History of surgery (n=114)			
	More than 6 months	7	3.68%

	No surgery	180	94.74%
	Recent less than 6 months	3	1.58%
Alcohol history (n=190)			
	No	128	67.37%
	Yes	62	32.63%
Smoking history (n=190)			
	No	154	81.05%
	Yes	36	18.95%

67.9% of these study participants were having at least one chronic condition. Hypertension and diabetes mellitus either isolated or combined were the most found prevalent comorbidities. At least 60% of participants were on chronic medications including 16.7% taking polypharmacy.

4.4. Patient's characteristics of admission

Table 3:Patient's characteristics of admission

Variables	Categories	Number	Percentage
Chief complaint (n=190)			
	Shortness of breath	58	30.53%
	Altered mental status	38	20.00%
	Non-specific symptoms	24	12.63%
	Vomiting	21	11.05%
	Abdominal pain	20	10.53%
	Hemi-body weakness	14	7.37%
	Fever	8	4.21%
	Abdominal distension	7	3.68%
	Chest pain	7	3.68%
	Lower leg swelling and pain	7	3.68%
	Generalised body swelling	6	3.16%
	Others	49	25.79%
	More than 1 symptom	66	54.74%
Malnutrition score (MNA) n=190			
17-23.5 points	At risk of malnutrition	61	32.11%
Less than 17 points	Malnourished	90	47.37%
24-30 points	Normal	39	20.53%
Cognitive function O3DY n=180			
Score below 4	Impaired cognitive function	81	45%
Score of 4	Normal	99	55%
Activities abilities KATZ ADL n=184			
2 or less points	Dependent	56	30.43%

5-3 points	Partially dependent	60	32.61%
6 points	Independent	68	37.96%
Geriatric Depression Scale n=148			
Score of 5 and above	Depressed	45	30.41%
Score less than 5	Normal	103	69.60%
Patient origin n=189			
	District hospital	125	66.14%
	Home	59	31.22%
	Referral Hospital	2	1.06%
	Covid-19 treatment center	1	0.53%
	Public place	1	0.53%
	Private Clinic	1	0.53%
Time from 1ˢᵗ symptom to admission n=190			
	Less than a week	79	41.58%
	More than a week	111	58.42%

Almost 2/3 of the participants (66.1%) in this study were referred for further investigations and management from district hospitals while 31.2% were admitted from home. 58.4% of patients arrived at CHUK or CHUB after more than 1 week of symptoms, trying other therapeutic measures or receiving treatment in primary care. The commonest presenting complaint that was associated with admission to hospital was shortness of breath in 30.5% followed by altered mental status in 20% and 54.7% presented multiple symptoms. Non-specific symptoms such as not eating, refusal to collaborate, generalized body weakness and others were present in 12.6%.

Malnutrition (under-nutrition) with MNA score less than 17 was high in our study participants at 47.3% and this was associated with worse outcome. With an O3DY score less than 4, 45% of enrolled elderly patients enrolled were found to have cognitive dysfunction while 30.4% among them were found to be dependent by Katz ADL. 30.4% were found to have depression among 148 elderly patients assessed for depression using Geriatric Depression Scale short form.

4.5. Causes of admission

The principle diagnoses responsible for hospital admission are described here. 65 (34.2%) had more than 1 diagnosis with an average of 1.4 diagnosis per study participant. The table below summarizes the diagnosis as found.

Table 4. Principle diagnosis of study participants

ICD-10 codes	Diagnosis	Cause of admission n=190	
		Frequency	Percentage
C22 - 95.9	Malignant neoplasms	41	21.58%
J18	Pneumonia	35	18.42%
I63 & I61	Stroke (ischemic, haemorrhagic)	22	11.58%
I10 & I15	Hypertension	19	10.0%
E11	Type 2 Diabetes Mellitus	15	7.89%
N17.9	AKI	14	7.37%
I50.9, I11.0	Heart Failure	13	6.84%
N18	CKD	11	5.79%
J44. 9	COPD and cor pulmonale	9	4.74%
K74	Cirrhosis	9	4.74%
G96.0	Neurological conditions	9	4.74%
B94.8	COVID 19 sequellae	8	4.21%
K27	Peptic ulcer disease	6	3.16%
N39.0	UTI	6	3.16%
I82. 409	DVT	5	2.63%
	Others	52	27.37%
	More than 1 disease	65	34.21%

The leading diagnoses as cause of admission were malignant neoplasm followed by pneumonia, stroke and hypertension accounting 21.5%, 18.4%, 11.5% and 10% respectively. According to ICD-10 2016 edition, NCDs were responsible of 136 (71.5%) of admission and were present in 153 (80.5%) as principle diagnosis or comorbidity at admission. Only 4 patients were found to be HIV positive and presented having it as comorbidity and no case of malaria found in elderly patients during study period.

4.6. Hospital outcomes and duration of hospital stay

Of the 190 study participants, 97 (51.1%) of them were discharged with improvement of the symptoms they presented on admission. 49 (25.8%) were discharged from the hospital with similar clinical status as on arrival. Among them, 31 (71.4%) were counter-referred for continuing supportive care at district hospital, 14 (28.5%) were discharged home for nursing

home care or other form of palliative care while 4 (8.1%) were transferred in other hospital or other department for management and follow up. The overall participant mortality was 23.2%.

Table 5: Hospital outcome and hospital stay duration

Outcomes	Female n=113		Male n=77		Total n=190	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Improved	61	54.0%	36	46.8%	97	51.1%
Not improved	28	24.8%	21	27.3%	49	25.8%
1. Counter referred DH	20	71.43%	11	52.38%	31	63.27%
2. Discharged home	6	21.43%	8	38.10%	14	28.57%
3. Transferred elsewhere	2	7.14%	2	9.52%	4	8.16%
Death	24	21.2%	20	26.0%	44	23.2%
Hospital stay	Median	Min-Max	Median	Min-Max	Median	Min-Max
	10	1-240	11	1-60	11	1-240

The median hospital stay was 11 days, ranging from 1 day to 240 days. The median age at discharge with improvement, unimproved discharge and death were 73.5 years, 71 years and 73 years respectively. We chose to use the median in representing age as we had few patients who were enrolled in the study and who had in-hospital stay of more than 2 months and likely to influence the mean.

65 (34.2%) only were discharged during the first week. After 1 month, 169 (88.8%) were discharged. There was no difference in statistics comparing patients at CHUK and CHUB except in transfer where 2 patients were transferred from CHUB to be reviewed by cardiologist in Kigali. The other two patients were transferred to be managed in cancer treatment centers.

4.7. Causes of death

Malignant neoplasms, pneumonia and CKD were the most causes of mortality in this study responsible for 27.2%, 22.7% and 11.3% deaths respectively. NCDs were found to be responsible of 26 (59.0%) deaths.

The causes of deaths are found in the detailing table below.

Table 6: **diseases responsible for death**

ICD-10 codes	Diagnosis	Total n=44		Female n=24		Male n=20		P-value
		Frequency	%	Frequency	%	Frequency	%	
C22 - 95.9	Malignant neoplasms	12	27.27%	8	33.33%	4	20.%	0.516
J18	Pneumonia	10	22.73%	4	16.67%	6	30%	0.472
N18	CKD	5	11.36%	3	12.50%	2	10.%	1.000
	Others	4	9.09%	1	4.17%	3	15.%	0.316
E11	Diabetes mellitus	4	9.09%	4	16.67%	0	0.%	0.114
I63 & I61	Stroke	4	9.09%	2	8.33%	2	10%	1.000
B94.8	Covid-19 sequellae	3	6.82%	1	4.17%	2	10.%	0.583
N17.9	AKI	1	2.27%	1	4.17%	0	0.%	1.000
K74	Cirrhosis	1	2.27%	0	0.00%	1	5.%	0.455

Factors associated with hospital outcome

4.8. Morbidity

In this study, morbidity was significantly found to be associated with different independent factors like depression (GDS-score>5), adjusted OR 3.927, 95% CI: 1.195-12.902 (p=0.024), malignant neoplasms adjusted OR 12.127, 95% CI: 3.269-44.981 (p<0.001), stroke adjusted OR 40.381, 95% CI: 2.916-559.198 (p=0.006) and duration of hospital stay OR 1.062, 95% CI 1.016-1.111 (p<0.001).

4.9. Mortality

Using the binary logistic regression, there was a statistically significant association between being malnourished (MNA score less than 17) adjusted OR 16.403, 95% CI: 1.101-244.33 (p=0.042) or having malignant neoplasms adjusted OR 3.861, 95% CI: 1.062-14.040 (p=0.04) or having Chronic kidney disease adjusted OR 9.418, 95% CI: 1.767-50.195 (p=0.009).

Table 7: **Morbidity associated factors**

Variables	Morbidity n=49	OR (95% CI)	P-value	Adjusted OR(95% CI)	P values
Ubudehe category					
Category 1	16(30.2%)	2.638(1.084-6.42)	0.033	0.984(0.126-4.490)	0.959
Category 2	23(35.4%)	3.340(1.442-7.738)	0.005	1.157(0.302-4.424)	0.983
Category 3	10(14.1%)	1		1	
Malnutrition indicator score (MNA)					
Malnourished	25(27.8%)	2.615(0.919-7.444)	0.072	0.385(0.068-2.189)	0.385
At risk of malnutrition	19(31.1%)	3.076(1.041-9.094)	0.042	0.949(0.184-4893)	0.951
Normal	5(12.8%)	1		1	
Activity of daily living score (Katz ADL)					
Dependent	22(39.3%)	4.242(1.754-10.256)	0.001	1.946(0.412-0.884)	0.400
Partially dependent	19(28.3%)	2.592(1.055-6.365)	0.038	3.422(1.195-12.902)	0.075
Independent	9(13.2%)	1		1	
Depression score (GDS-Short form)					
Depressed	19(42.2%)	3.697(1.682-8.12.7)	0.001	3.927(1.195-12.902)	0.024*
Normal	17(16.5%)	1		1	
Hypertension					
Yes	1(5.6%)	0.152(0.020-1.173)	0.071		
Diagnosis Malignant neoplasms					
Yes	20(48.8%)	3.941(1.891-2.214)	0.000	12.127(3.269-44.981)	0.000*
Diagnosis Stroke					
Yes	15(62.2%)	8.445(3.132-22.343)	0.000	40.381(2.916-559.198)	0.006*
Covid19 sequelae					
Yes	0(0.0%)	0.000	0.999		
Chronic Kidney Disease					
Yes	0(0.0%)	0.000	0.999		
DVT					
Yes	0(0.0%)	0.000	0.999		
Neurological conditions					
No	44(24.3%)	1			
Yes	5(55.6%)	3.891(1.001-15.133)	0.05	0.199(0.009-4.390)	0.306
Duration of hospital stay		1.041(1.012-1.071)	0.005	1.062(1.016-1.111)	0.008*

Table 8: **Mortality associated factors**

Variables	Mortality n=44	OR (95% CI)	P-value	Adjusted OR(95% CI)	P values
Time to nearest healthcare consultation					
Less than a week	23(21.3%)	1			
More than one week	21(25.6%)	1.272(0.647-2.503)	0.486		
Respiratory rate					
Normal	28(20.4%)	1			
Elevated	16(30.2%)	1.683(0.821-3.454)	0.262		
Malnutrition indicator score (MNA)					
Malnourished	32(35.6%)	6.621(1.889-23.210)	0.003	16.403(1.101-244.33)	0.042*
At risk of malnutrition	9(14.8)	2.077(0.526-8.206)	0.297	2.564(0.808-8.136)	0.163
Normal	3(7.7%)	1		1	
Cognitive function score (O3DY)					
Impaired cognitive function	25(30.9%)	3.23(1.505-6.961)	0.003	2.564(0.808-8.138)	0.11
Normal cognitive function	12(12.1%)	1		1	
Activity of daily living score (Katz ADL)					
Dependent	19(33.9%)	2.978(1.248-7.107)	0.014	1.543(0.336-7.086)	0.577
Partially dependent	12(20.0%)	1.45(0.577-3.647)	0.43	2.433(0.695-8.520)	0.669
Independent	10(14.7%)	1		1	
Depression score (GDS-Short form)					
Depressed	9(20.0%)	1.265(0.516-3.101)	0.608		
Normal	17(16.5%)	1			
Acute Kidney Injury					
No	44(23.9%)	1			
Yes	0(0.0%)	0.000	0.999		
Hypertension					
No	42(24.4%)	1			
Yes	2(11.1%)	2.585(0.571-11.707)	0.218		
Malignant neoplasms					
No	30(20.1%)	1		1	
Yes	14(34.1%)	2.057(0.962-4.396)	0.063	3.861(1.062-14.040)	0.04*
Pneumonia					
No	32(20.6%)				
Yes	12(34.3%)	2.005(0.902-4.459)	0.088		
Stroke					
No	40(23.8%)				
Yes	4(18.3%)	1.406(0.45-4.497)	0.558		
CKD					
No	38(21.2%)	1		1	
Yes	6(54.4%)	4.453(1.289-15.382)	0.018	9.418(1.767-50.195)	0.009*
Heart failure					
No	43(24.3%)	1			
Yes	1(7.7%)	3.851(0.487-30.477)	0.201		

CHAPTER 5: DISCUSSION

5.1. Introduction

Elderly patients comprised 34.5% of all admissions in internal medicine department at CHUB and CHUK despite constituting 4.9% of share in rwandan population (15). The observed proportion of elderly in hospital admissions is double of what was observed in 1993 at CHUB which was 17.5% (32). This finding is closer to what was found at JKCI and MNH medical wards in Tanzania but higher than what was found by E. O. Sanya et Al. in Nigeria where elderly patients comprised only 11.1% (21) and P. Srivinas et Al. in Malaysia of 19.1%. The numbers are higher in developed countries where the population ageing phenomenon is marked, as example of 53.6% of the total admissions at Lodz in Poland (6).

Even though there is variability of the share and proportion of elderly patient's admissions among various studies, the high proportion found in our study can be explained as a probable consequence of continuous improving life expectancy of rwandans at birth and a high health insurance coverage allowing people to consult easily but also of an ongoing increasing burden of NCDs that elderly people are facing currently.

5.2. Socio-demographic characteristics

5.2.1. Age

The patients' ages ranged from 60 to 97 years with a mean of 72.8 (± 8.8) years. Seventy nine of them (41.58%) were within the age bracket 60 to 69 years. The mean age of this study participants looked similar to other recent study findings among elderly patients in Africa (21). Exemple of similar findings are other studies like the studies done at the hospital of University of Ilorin Teaching in Nigeria, Groote Schuur Hospital, Cape Town in South Africa and two tertiary hospitals in Tanzania (9, 13, 21). Advanced age being reported as a non-modifiable risk factor for mortality in hospitalized elderly patients, our study didn't statistically confirm it as it was found by L A Adebusoye & S Z Kalula in South Africa (9).

5.2.2. Gender

This study demonstrated that elderly female patients predominated among admissions with a percentage of 59.5% (n=113) females, this giving a male to female ratio of 1:1.47. Studies in the domain of diseases of elderly done in Saudi Arabia, Uganda and Ghana found also this female predominance (43, 46, 49). Other studies found male sex predominance like those done at Lodz/Poland, in Kuala Lumpur University Hospital and in Nigeria (6, 23, 21); while a study done in Tanzania showed a balanced male to female sex ratio (13). This finding reflects the common female advantage in life expectancy and a superior share of older women number compared to older men in the total Rwandan population (15, 28). This finding also might be explained by the fact that women make greater use of preventive and diagnostic services more frequently than their counterpart men but also the current change in social dynamics such as improved gender equity in access to health care.

5.2.3. Marital status, education background and ubudehe

54.5% of participants in this study were married with 85.7% of male patients being married compared to female patients who were married at 33%. The findings also showed 39.9 % of all participants to be widowed mostly female at 93%. In the context of Rwanda, this is one of the consequences of what the country passed through in the 1994 genocide. It is also explained by the still under-theorised female social disadvantage in old age associated with typically greater longevity which is at its own a greater risk to be widowed and living alone while men are much more likely to remarry if they are widowed (11, 28). However, similar findings have been reported in Tanzania and in Ghana (13, 43). Almost all the patients in this study were having caretakers in hospital but some were informally reported to be alone mainly the widows. Even if not statistically found to be a risk for morbidity or mortality in this study, to be a widow was seen to cause some complaints in caretakers reporting some cases of iatrogenic accidents related to not take medications as prescribed at discharge.

We have seen in this study that 40% of elderly patients had no formal education especially in female patients. 53% of participants were no longer able to work due decreased functional capacity and chronic disease and 27.8% of participants were found in group of people living in poverty status as ubudehe category 1. This reflects the findings of Ubudehe survey which classified elderly as one of the most vulnerable categories of the population in Rwanda, with

households having members aged above 65 years being among the poorest in the country (28). This finding is comparable to be similar to what found previously in 1993 at CHUB where the majority of elderly patients admitted in that time were subsistence farmers and living in large families (32). Even if health insurance is provided for free for people in this category, they need a continuous support given the high prevalence of disease and disability found in this age category in general. Similar data were reported in Ghana (43).

5.3. Comorbidities of admitted patients

67.9% of our study participants were having at least a single comorbidity at time of admission to the hospital. This number was low compared to findings in European studies like in Turkey where patients with comorbidities represented 90.3% (24). The most comorbidity found in this study was hypertension and diabetes mellitus respectively or together combined; showing the importance of NCDs prevalence in this group of population. Similar findings have been reported in various studies from other countries in sub-Saharan Africa and Asia (13, 21, 22, 23, 42). This finding suggests of morbidity in cardiovascular conditions that elderly patients are facing as consequence to those two above great cardio-vascular risks.

At least 60% of participants were on chronic medications among them 16.7% were taking polypharmacy. This finding goes in the same way as what was found in one study in Togo where almost 57.6% of elderly were found to be multimorbid, using conventional drugs at 78.4% and the prevalence of polypharmacy being of 22.7% (42). The use of herbal medicine which was found to be at a percentage of 17% in that study done in Togo was not studied among participants in this study.

5.4. Characteristics of admission

This study found that the majority, 66.1%, of the patients admitted and enrolled was referred for further investigations and management from district hospitals while 31.2% were admitted from home. This is understandable considering that most of them were having mutuel de santé (CBHI) as insurance and CHBI users in Rwanda's healthcare system have to go through the referral system from health center to tertiary hospital via district hospital. A study done in a university hospital in Kuala Lumpur where a referral system is different to our context stated that the majority of patients were admitted from home (23).

The commonest presenting complaint necessitating admission to hospital was shortness of breath in 30.5% followed by neurological symptoms dominated by altered mental status in 20%. Non-specific symptoms such as not eating, refusal to collaborate and generalized body weakness were present in 12.6%. Apart from the difference in the presentation of non-specific symptoms where they were found in 24%, similar findings were found in patients admitted in the one university hospital in Kuala Lumpur (23). In our study, non-specific symptoms were noted in 24 (12.6%) patients and this number is near 15% which was found in elderly patients in Netherlands (4). This last highlights that elderly patients may differ from young adults in the mode of disease presentation and this requires more patience in history taking and physical examination to establish the correct diagnosis that all healthcare givers must offer to them.

5.5. Malnutrition, dependence, cognitive dysfunction and depression in elderly inpatients

In this study, we found that 90 (47.3%) admitted elderly patients were having malnutrition and 56 (30.4%) were living dependently. Our findings showed also that 45% of elderly patients enrolled in this study were having impaired cognitive function at admission while 30.4% among 148 elderly patients who were screened for depression were found to have it. This finding of high prevalence of malnutrition among admitted elderly patient was found in different studies worldwide and according to WHO, the prevalence of malnutrition is globally between 1.3-47.8% in elderly people (41, 44). A study in non hospitalized elderly people in India showed a lower percentage of malnutrition as it was present only in 15% and was associated with female gender and increased age (41). MUST study in Italy found that malnutrition was present in 24.6% of admitted geriatric population and was found to be an independent predictor of hospital length of stay and mortality (45). Similar to our results, malnutrition was found also high in admitted elderly patients at King Abdulaziz University Hospital, Jeddah in Saudi Arabia, with a total of 76.6% patients categorized malnourished or at risk of malnutrition, showing increased tendency to stay longer in the hospital and increased mortality (46).

The prevalence of depression at 30.4% found in our study was lower than what was found using the same clinical tool in Ethiopia where it was found to be elevated at 45% but higher than the prevalence of 9.3% found using symptom-based algorithm in Ghana (51, 52). Cognitive dysfunction was found to be high in our study population compared to the findings of different

cross-sectional reviews in Africa published in between 1995 and 2011 where it ranged from 6.3% in Nigeria to 25% in the Central African Republic (50).

Despite being more prevalent, having big impact on quality of life and being highly associated with morbidity and mortality, malnutrition, functional decline and pyscho-social problems are not assessed and addressed systematically either when admitted or in outpatient and this can have an impact in clinical decision for management and prognostication. This is also responsible for maintenance of the vicious cycle of mortality-malnutrition & functional decline (41). A geriatric assessment clinic and ward may help to overcome this challenge.

5.5. Causes of admission

Our study showed the top five leading diagnoses were malignant neoplasm, pneumonia, stroke, hypertension and diabetes mellitus. NCDs alone represented 71.5% of causes of admission were found in 80.5% of the total admissions either as principle diagnosis or as secondary diagnosis. Comparative findings were reported in a study done in Southwestern Uganda (47). The reasons that can make malignant neoplasm taking the lead among the diagnosis are many and among others we can mention the fact that all cancer suspects are referred in tertiary hospitals which are centers equipped to provide cancer services including diagnosis and management. There are also reports that cancer incidence and mortality are nationally becoming high (33, 48). Some other studies across Africa reported NCDs to be the major causes of morbidity and mortality reporting hypertension, diabetes mellitus, stroke, heart failure, ischemic heart disease and chronic kidney disease to be the predominant causes of hospitalization (13).

Infectious diseases like tuberculosis and HIV were found in rare cases in this study and no case of malaria diagnosed among our study population. So many studies reported this current rarity of infectious disease among admitted elderly patients across Africa (13). In the context of Rwanda, this can be taken as a continuous success on infectious diseases which are now being increasingly controlled. This study finding also shows that disease pattern in elderly patients has changed in these past 3 decades where infections were taking 37.5% of the diagnosis followed by liver cirrhosis 31.8% (17).

5.6. Hospital outcome, causes of death and duration of stay

146 (76.8%) of the participants were discharged, among them 97 (51.1%) were discharged with improved admission status and 49 (25.8%) were discharged without unimproved. These patients classed as unimproved at discharge were mostly the patients who were in need of long rehabilitation or palliative care and the majority of them were sent back to referred district hospitals. This is mainly due to the rarity of rehabilitation home based care services of elders and expensive nursing home care in our country. Studies done in Tanzania and Malaysia showed also a big proportion of discharged elderly patients from hospital to continue home based care or rehabilitation care near families (13, 23).

Hospital mortality was found to be 23.2% with a median hospital length of stay of 11 days. This is a very high mortality compared to the general hospital mortality reported to be around 5% in the study centers. This also is mentioned in the data recorded by CRVS web system on death rate in Rwanda, showing a sharp increase among the elderly people aged 60 and above and high (33). This may be explained by multiple irreversible age-related morbidities that elderly patients present with but also to possible lack of needed special care and attention. A little bit elevated mortality at 25.6% but with short length of stay was found in two centers in Tanzania (13). This mortality can be taken as similar to what was found in Nigeria of 22.8% (22) but higher than that found in South Africa of 15.1% (9). However, it was three times higher when compared to in-hospital mortality in Turkey (24). There was no difference in sex ratio regarding mortality despite other studies reporting more death rate in male (9, 22).

Malignant neoplasms, pneumonia and CKD were the most causes of mortality in this study responsible for 27.2%, 22.7% and 11.3% deaths respectively. In total, NCDs were found to be responsible of 26 (59.0%) deaths. This concords with the national data on NDCs of 2016 where NCDs were estimated to cause 44% of all deaths (53). Factors found to be highly associated with mortality in our study were malnutrition, cancer and chronic renal failure were found described in different other studies (13).

The majority of the participants were having morbidities that were difficult to diagnose and treat in a short time in our settings due to different issues; this resulted in a long length of stay of 11 days. Other studies found a shorter length of stay such as 6.8 ± 8.6 days in Nigeria and 3 days in

Tanzania (13, 22). For some cases in our study, especially those with high degree of dependency, the length of stay was influenced by patient himself or family especially refusing outpatient care.

Being often a trade-off between the standard of care and socio-economic burden to the patient and hospital, the long length of stay associated with elderly patients has to be addressed in order to find strategies of reducing it. On this point, there is a need of guideline on discharge criteria and development of more available and affordable nursing and rehabilitation outpatient care. Another study to assess more on factors affecting long stay may help to find good solutions.

5.7. Strength of the study

This was among the few studies that looked the medical problems of elderly people in Rwanda. The prospective active enrollment of the study participants ensured completeness of all needed data and the use of ICD-10 allowed for standardized coding and reporting of diseases. The sample size needed was reached to provide current data on disease burden, diagnosis, and factors associated with hospitalization outcome in elderly patients admitted in the two hospitals. The use of clinical validated tools to assess malnutrition, depression, dependency and cognitive dysfunction which have impact on mortality in elderly patients has been successful and helped in having all basic clinical informations of elderly patient status.

5.8. Study limitations

The study period of 3 months was short to assess possible seasonal variations of the diseases pattern. More participants also would be good for the strength of this study. In fact, the Covid-19 pandemic disturbed data collectors and patients were changing wards because of being suspects contributed to some data incompleteness and study exclusion. Being not designed to follow-up individuals outside the hospital, the readmission rates and post-discharge mortality were not studied.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

Elderly patients constituted almost one third of the total patients admitted for medical reasons at CHUB and CHUK and their share is expected to increase as effect of improving rwandan life expectancy. Their management is challenging and elderly patients are decrying lack of special in-hospital care with some health care givers reporting uncomfortable to manage them. Conclusions and recommendations from this study are given below

6.2. Conclusions

- Elderly patients were taking 34.5% of all admissions in internal medicine department at CHUB and CHUK.

- The mean age of admitted elderly patients was 72.8 (± 8.8) years, with a male: female ratio of 1:1.47

- 62.5% of female participants were widow and 99% of admitted elderly patients were having medical insurance.

- 67.9% of participants were having prior comorbidity, hypertension leading among those comorbidities. 60% were on prior chronic medications including 16.7% on polypharmacy.

- 47.3% of admitted elderly patients were having malnutrition and 30.4% were having impaired self-caring capacity. 45% of participants in this study were having impaired cognitive function at admission while 30.4% were depressive.

- NCDs comprised of 71.5% of total diagnosis. Malignant neoplasm, pneumonia, stroke, hypertension and diabetes mellitus were the top 5 diagnosis

- Mortality was elevated to 23.2% and the median hospital length of stay was 11 days

- Malnutrition status, malignant neoplasm and chronic renal failure were found to be associated with worse prognosis

6.3. Recommendations

This study showed that the increasing number of elderly patients being admitted is challenging to hospital and healthcare givers who look not well skilled to manage them because of the complexity of their social vulnerabilities, disabilities, comorbidities and atypical presentations of disease that need special attention and more time.

- **Healthcare givers**: To take a geriatric patient as special and take more time for assessment, check for atypical disease presentation

- **Hospital/department**: develop guideline for managing and discharge

    o Plan a specialized clinic and ward

    o Train personnel in caring elderly patients

    o Avail NCDs medications

- **Ministry level**: train the CHWs in basic care of vulnerable elderly people

    o Set a nutritional program that address especially elderly people

    o Help in creating available and affordable nursing home care system and outpatient rehabilitation services

    o Keep the fight against NCDs and support in availing medications

6.4. Further researches

This study was done on short period and focused on hospitalized patients. A long period with a big sample would add some clarifications mainly on seasonal influences. A study focusing on long term follow up and outcome, readmissions and factors associated with recurrent readmissions would complete this study. There is a need to study how elderly people are presenting when they consult as outpatient and problem related to caring elderly people at home.

REFERENCES

1. Global health and aging. WHO, 2017. Available at: http://esa.un.org/unpd/wpp

2. Dr. Natalia Kanem. Statement at the Global Symposium on Ageing, Seoul 2017. https://www.unfpa.org/press/statement-global-symposium-ageing-seoul-2017

3. www.uptodate.com/contents/hospital-management-of-older-adults.

4. M.R. Hofman et al. Elderly patients with an atypical presentation of illness in the emergency department. The Netherlands Journal of Medicine. 2017

5. Martha Therese Gjestsen, Kolbjørn Brønnick and Ingelin Testad. Characteristics and predictors for hospitalizations of home-dwelling older persons receiving community care: a cohort study from Norway. BMC Geriatrics. 2018 https://doi.org/10.1186/s12877-018-0887-z

6. Kardas, P., & Ratajczyk-Pakalska, E. (2003). Reasons for elderly patient hospitalization in departments of internal medicine in Lodz. Aging Clinical and Experimental Research, 15(1), 25–31. doi:10.1007/bf03324476

7. Ahmad Ahmadi et al. Towards Age-Friendly Hospitals in Developing Countries: A Case Study in Iran. Health Promotion Perspectives. 2015. doi: 10.15171/hpp.2015.006

8. LA Adebusoye, MO Owolabi, SZ Kalula, A Ogunniyi. All-cause mortality among elderly patients admitted to the medical wards of hospitals in Africa: A systematic review. Niger J Health Sci. 2015. DOI: 10.4103/1596-4078.171372

9. L A Adebusoye & S Z Kalula. Mortality among older patients admitted to the medical wards of Groote Schuur Hospital, Cape Town, South Africa, 2010 – 2013. S Afr Med J 2019. DOI:10.7196/SAMJ.2019.v109i2.13275

10. Debajyoti Banerjee et Al. Mortality pattern of elderly patients at a tertiary care hospital: A study from Sub-Himalayan region, Uttarakhand, India. J Family Med Prim Care. 2019. doi: 10.4103/jfmpc.jfmpc_416_18

11. Aboderin, I. A. G., & Beard, J. R. Older people's health in sub-Saharan Africa. The Lancet. 2015. doi:10.1016/s0140-6736(14)61602-0

12. Fathia Ehmouda. Pattern and outcome of medical admission among elderly people in Libya. IJMBS. 2011

13. Basil T., Patricia M., Kisali P. Disease spectrum and outcomes among elderly patients in two tertiary hospitals in Dar es Salaam, Tanzania. doi: http://dx.doi.org/10.1101/554972.

14. Irene Korkoi Aboh and Andrew Adjei Druye. A Review of the Evidence of Care for the Ghanaian Aged. Journal of Gerontology & Geriatric Medicine. 2020. DOI:10.24966/GGM-8662/100052

15. National Institute of Statistics of Rwanda (NISR), Ministry of Finance and Economic Planning (MINECOFIN) [Rwanda], 2012. Rwanda Fourth Population and Housing Census. Thematic Report: Socio-economic status of elderly people

16. Rwanda Elders Advisory Council. Senior citizens decry lack of specialized health-care. https://en.igihe.com/spip.php?page=mv2_article&id_article=37513

17. Mets TF. The disease pattern of elderly medical patients in Rwanda, central Africa. J Trop Med Hyg. 1993 Oct;96(5):291-300. PMID: 8411304.

18. Rwabihama Jean Paul et Al. Prophylaxis of Venous Thromboembolism in Geriatric Settings: A Cluster-Randomized Multicomponent Interventional Trial. Journal of the American Medical Directors Association. 2018

19. Elias Ali , MD , Mirkuzie Woldie, MD, MPH. Reasons and outcomes of admissions to the medical wards of Jimma University Specialized Hospital, Southwest Ethiopia. Ehtiopian Journal of Health Science. 2010

20. Kalyesubula R. Et Al. Trends of admissions and case fatality rates among medical in-patients at a tertiary hospital in Uganda; A four-year retrospective study. PLOS ONE, 2019. http://doi.org/10.1371/journal.pone.0216060

21. E O Sanya, TM Akande, G Opadijo et Al. Pattern and outcome of medical admission of elderly patients seen at University of Ilorin Teaching Hospital, Ilorin. Article in African journal of medicine and medical sciences. 2008

22. Emmanuel O Sanya et Al. Profile and causes of mortality among elderly patients seen in a tertiary care hospital in Nigeria. Annals of African Medicine. 2011 http://www.annalsafrmed.org/Medline.

23. P Srinivas, S Ebrahim. Pattern of Medical Admissions Among the Elderly- A Prospective Review in University Hospital, Kuala Lumpur. The Medical journal of Malaysia. 1996

24. Teslime A., Serap B S., Osman Z S. et Al. Factors Affecting Mortality in Elderly Patients Hospitalized for nonmalignant Reasons. Journal of Aging Research. 2014. http://dx.doi.org/10.1155/2014/584315

25. Lior Fuchs et Al. ICU admission characteristics and mortality rates among elderly and very elderly patients. Intensive Care Med. 2012.

26. Choudhary R, Goel A, Pruthi S, et al. Profile of Patients Hospitalized through the Emergency Room to the Medicine Ward and their Short-term Outcome at a Tertiary Care Hospital in Delhi. Cambridge University Press. 2015. https://doi.org/10.1017/S1049023X15005312

27. Catherine Kyobutungi et al. The health and well-being of older people in Nairobi's slums. Global health action. 2010

28. R. Sabates-Wheeler et al. Population Ageing in Rwanda: Current Needs, Future Projections, and Implications for Policy. Final report, 2018

29. WHO. Global survey on Geriatrics in the medical curriculim. www.who.int

30. Dotchin CL, Akinyemi RO, Gray WK, Walker RW. Geriatric medicine: services and training in Africa. Age Ageing. PubMed 2013 Jan;42(1):124-8

31. Orit D, Ntege P, Nakayiwa D, Nambooze J, Olikira S, et al. (2021) Knowledge, Attitudes and Treatment Practices of Medical Doctors towards Care of Elderly Patients Accessing Clinical Care at Hospitals in Kampala Uganda. J Geriatr Med Gerontol 7:114. doi.org/10.23937/2469-5858/1510114

32. The disease pattern of elderly medical patients in Rwanda, central Africa. J Trop Med Hyg. 1993. Abstract accessed via internet

33. Rwanda Health Sector Performance Report 2019-2020. Ministry of Health, available on internet

34. Wendy L. Adams et Al. Primary Care for Elderly People: Why Do Doctors Find It So Hard? The Gerontologist. 2002

35. Francis Davis, Emmanuel Murangira, Madleina Daehnhardt. Ageing in Rwanda: challenges and opportunities for church, State and Nation. 2020. https://reliefweb.int/sites/reliefweb.int/files/resources/Ageing%20in%20Rwanda%20final version_original.pdf

36. https://uniprojectmaterials.com/view-blog/how-to-calculate-a-relaible-sample-size-using-taro-yamane-method

37. UNDP. Human development indices and indicators: 2018 statistical updates: Briefing note for countries on the 2018 statistical update. Rwanda: United Nations Development Programme; 2018.

38. MOH. Fourth health sector strategic plan- July 2018 – June 2024. Ministry of Health; 2018.

39. Hartigan I. A comparative review of the Katz ADL and the Barthel Index in assessing the activities of daily living of older people. International Journal of Older People Nursing 2, 204–212. 2007

40. Barbic D, Kim B, Salehmohamed Q, et al. Diagnostic accuracy of the Ottawa 3DY and Short Blessed Test to detect cognitive dysfunction in geriatric patients presenting to the emergency department. BMJ Open 2018;8:e019652. doi:10.1136/bmjopen-2017-019652

41. Agarwalla R, Anku Moni Saikia, Rupali Baruah. Assessment of the nutritional status of the elderly and its correlates. Journal of Family and Community Medicine | January 2015 | Vol 22 | Issue 1 | 39-43. DOI: 10.4103/2230-8229.149588

42. Fifonsi A. G. K., Wendpouiré I. C. Z. C. , Ikpindi H. D. et Al. Medication Consumption Patterns and Polypharmacy among Community-Dwelling Elderly in Lomé (Togo) in 2017. Current Gerontology and Geriatrics Research. 2020. https://doi.org/10.1155/2020/4346035

43. Bashiru II Saeed1, Zhao Xicang, Alfred Edwin Yawson et Al. Impact of socioeconomic status and medical conditions on health and healthcare utilization among aging Ghanaians. BMC Public Health. 2015. DOI 10.1186/s12889-015-1603-y

44. WHO. Integrated care for older people (ICOPE). Evidence profile: malnutrition. 2017

45. Orlandoni P, Venturini C, Jukic Peladic N, Costantini A, Di Rosa M, Cola C, Giorgini N, Basile R, Fagnani D, Sparvoli D and David S (2017) Malnutrition upon Hospital Admission in Geriatric Patients: Why Assess It? Front. Nutr. 4:50. doi: 10.3389/fnut.2017.00050

46. Sami H. Alzahrani and Sultan H. Alamri. Prevalence of malnutrition and associated factors among hospitalized elderly patients in King Abdulaziz University Hospital,

Jeddah, Saudi Arabia. Alzahrani and Alamri BMC Geriatrics (2017) 17:136. DOI 10.1186/s12877-017-0527-z

47. Orikiriza P., Rukundo G. Z., Kayanja A., Bazira J. Clinical Conditions of Hospitalized Older Adult Patients and Their Outcomes in a Regional Referral Hospital in Southwestern Uganda. Journal of Aging Research. 2020. https://doi.org/10.1155/2020/6830495

48. MOH and RBC. Rwanda National Cancer Control Plan 2020-2024. Available on internet

49. F. Nawagi, M. Söderberg, V. Berggren et Al. Sociodemographic Characteristics and Health Profile of the Elderly Seeking Health Care in Kampala, Uganda. Current Gerontology and Geriatrics Research. 2018. https://doi.org/10.1155/2018/4147509

50. A. Mavrodaris, J. Powell & M. Thorogood. Dementia and cognitive impairment in sub-Saharan Africa. Bull World Health Organ 2013;91:773–783 | doi: http://dx.doi.org/10.2471/BLT.13.118422

51. Nebiyu Mulat, Hordofa Gutema and Gizachew Tadesse Wassie. Prevalence of depression and associated factors among elderly people in Womberma District, north-west, Ethiopia. BMC Psychiatry (2021) 21:136. https://doi.org/10.1186/s12888-021-03145-x

52. Lloyd-Sherlock, P., Agrawal, S., Amoakoh-Coleman, M., Adom, S., Adjetey-Sorsey, E., Rocco, I., & Minicuci, N. (2019). Old age and depression in Ghana: assessing and addressing diagnosis and treatment gaps. Global Health Action, 12(1), 1678282. doi:10.1080/16549716.2019.1678282

53. World Health Organization – Non-communicable diseases (NCD) country profiles, 2018

APPENDICES

Appendix **1: QUESTIONNAIRE/English version**

1. Questionnaire identification

Questionnaire number:	Enrollment date:
Hospital ID:	Patient initials:
Phone number	

2. Socio-demographic characteristics

Patient's provenance:	Home	District hospital	Other
Age			
Gender		Female	Male
Marital status		1. Married 2. Widow. 3. Separated/ Divorced 4. Other (to be specified)	
Care taker /Next of kin		To be specified if present	
Habitat		Home (own) Elsewhere (to be specified)	
Ubudehe category and health insurance		To be specified	
Alcohol drinking habits		Yes Non	
Smoking exposure	Smoker	Yes	
		No	
	Second smoker	1. Yes 2. No	
Education background		1. Nil 2. Primary 3. Post primary	
Working status	Yes	1. Own business 2. Public servant 3. Private business 4. Farmer 6. Other	
	No		
Source of income		1. Own 2. Family 3. Governmental or NGO help 4. RSSB/Pension 5. Other	
Presence of caretaker/next of kin		1. Yes 2. No	

3. Past clinical history

Past medical history	Known chronic disease	Yes (specify)	
		No	
	Previous hospitalisations in past 6 months	No One More than 1	
	Known disabilities	Yes (specify) No	
	Psychiatry/Psychological	Yes (specify) No	
Medication history	Home medication	Number of medications	

	No	
	New (recent) medications	1. Hospital 2. Officine3. Traditional
Past surgical history	Yes (major surgery)	In recent 6 months More than 6 months ago
	Non	

4. Clinical profile on admission

Chief complaints		Mention chief complaints here
Time from 1st symptom to nearest healthcare consultation.		Less than a week More than 1 week
Time from 1st symptom to CHUK/CHUB		Less than 1 week More than 1 week
Vital signs		BP: RR: HR: SPO2: Temperature:
Nutritional status (MNA) score		
OD3Y score		
KATZ ADL score		
Geriatric Depression Scale		
Clinical/physical findings		
Investigations results	Lab results	FBC: WBC HB: PLT: Blood sugar Serum Urea and Creatinine Serum Na+ Serum K+ Other contributive labs
	Imaging	Important findings

5. Hospitalization outcome

Diagnosis at discharge	
Duration of hospital stay	
Patient status at discharge	Improved Not improved/discharge home Not improved/counterrefered Transfered for advanced care Evaded/discharged against medical advices Death
Post discharge plan	Follow up in OPD Follow up in other department Follow up at DH Nursing home care
Immediate post discharge events	Specify if any

Apendix 2: INFORMED CONSENT-ENGLISH VERSION

<div align="center">

INFORMED CONSENT FORM

</div>

Introduction

I am, Protogène NGABITSINZE, a senior Internal Medicine Resident at University of Rwanda. I am carrying out a study on characteristics and outcome of elderly patients in Rwanda: current situation at CHUK and CHUB. I am going to give you information and invite you to be part of this study.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them to me, the study doctor or the staff.

Purpose of the study

An increasing old and ill population will require treatment in medical wards more frequently and their management will pose a serious challenge to uninformed health care providers. This is why want to conduct this study at CHUK and CHUB in order to investigate the contribution and characteristics of elderly patients to the medical admissions, assess their socio-demographic characteristics and their associated clinical outcomes. From the findings, we will propose some interventions that can help to promote the health status of our senior patients in general and improve the in-hospital management of elderly in our settings by showing obstacles to develop elderly-friendly health care services.

Voluntary Participation

Your participation in this study is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this hospital will continue and nothing will change. If you choose not to participate in this research project, you will be offered the treatment that is routinely offered in this hospital as usual. You may change your mind later and stop participating even if you agreed earlier. Before you decide, you can talk to anyone you feel comfortable with about the study.

Risks

We do not anticipate any significant risk by being participant in this study as there is no special intervention you will undergo.

Benefits

The important benefit of this study is the promotion of the health status of rwandan elderly patients in general and improvement of their in-hospital management in our settings. It will show obstacles to good elderly-friendly health care services.

Reimbursements

No reimbursement will be provided for the participation.

Confidentiality

We will attempt to maintain privacy and anonymity. It is possible that if others in the community are aware that you are participating, they may ask you questions. We will not be sharing the identity of those participating in this study.

Right to Refuse or Withdraw

You do not have to take part in this study if you do not wish to do so. You may also stop participating in this study at any time you choose. It is your choice and all of your rights will still be respected.

Who to Contact

If you have any questions you may ask doctors who are involved in the case report now or later. If you wish to ask questions later, you may contact me any of the following address: Dr Protogène Ngabitsinze, e-mail: ngabitsinze@gmail.com, telephone: 0788425810. Any other person involved in this study also can help in giving explanations. You can also contact Mr. MUNYANEZA Emmanuel, telephone 0788213765 from CHUK Institutional Review Board and Mr. Elias Rwamugema, telephone 0788587016 from CHUB Institutional Review Board in case of any question regarding your rights in participating to this study.

You can ask me any more questions about any part of the research study, if you wish to. Do you have any questions?

Certificate of Consent

I have read the foregoing information, or it has been read to me and I understood the content. I have had a full explanation of the nature and purpose of the study, risks and benefits in a language that I understand. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I have understood that I have right to withdraw from the study at any time.

By signing this consent form, I consent voluntarily to participate as a participant in this study.

Name of Participant/Next of kin:

Signature of Participant/Next of kin:

Date:

KWEMERA KUGIRA URUHARE MU BUSHAKASHATSI

Nitwa Protogène NGABITSINZE, nkaba ndi umuganga uri gukora ubushakashatsi busoza icyiciro cya gatatu muri Kaminuza y'u Rwanda mu bijyanye n'indwara zo mu mubiri. Ubushakashatsi ndi gukora ni ukureba uko indwara zigaragaza mu barwayi bakuze bafite hejuru y'imyaka 60 ndetse no kureba ibiva mu mivurire yabo mu bitaro bikuru bya kaminuza bya Kigali n'ibya Butare. Ndifuza kubasobanurira mu ncamake ibijyanye nabwo hanyuma nimubyemera nzabashyire muri bwo.

Byashoboka ko hari ibyo mutaza kumva neza. Aho mutumvise neza mwambaza ibibazo nkabasobanurira cyangwa se mukaba mwabibaza undi muntu wese ufite uruhare muri ubu bushakashatsi cyangwa umuganga wundi ukora muri ibi bitaro.

Impamvu y'ubushakashatsi

Umubare w'abarwayi bakuze uragenda wiyongera mu bitaro bitandukanye bikaba bishobora kuzateza ikibazo igihe abazabavura bazaba batiteguye. Ni muri urwo rwego dushaka gukora ubu bushakashatsi kugira ngo tuzarebe uko indwara zigaragara mu barwayi bakuze, tukazareba n'ibiva mu mivurire yabo. Ibizava muri ubu bushakashatsi bizadufasha gufata ingamba zo kunoza imivurire y'abarwayi bacu bakuze ndetse kureba inzitizi zibangamira imivurire yabo ndetse no gufasha kuzikuraho.

Kujya mu bushakashatsi ku bushake busesuye

Ni ubushake bwanyu busesuye kwemera kugira uruhare muri ubu bushakashatsi. Nimuhitamo kwinjira muri ubu bushakashatsi cyangwa mubyanze, muzakomeza mwitabweho uko bisanzwe nta kizahinduka mu buryo buteganijwe bwo kuvurwa. Mufite kandi uburenganzira bwo guhagarika kuba muri ubu bushakashatsi n'ubwo mwaba mwarabyemeye mbere. Mbere yo gufata umwanzuro, mushobora gufata akanya mukabaza uwo mushaka wese wabagira inama yo kwemera kubugiramo uruhare.

Ingaruka

Nta ngaruka zishobora guterwa no kujya muri ubu bushakashatsi.

Inyungu z'ubu bushakashatsi

Ubu bushakashatsi buzatuma ubuzima bw'abantu bakuze mu Rwanda butera imbere kandi butume bajya bavurwa neza igihe bari mu bitaro kuko buzerekana ingorane ziva mu kubavura. Buzafasha mu kwiga neza uko bajya bahabwa ubuvuzi bunoze.

Ibihembo

Nta bihembo byo kwinjira muri ubu bushakashatsi biteganijwe.

Kugirirwa ibanga

Tuzakora uko dushoboye kose kugira ngo amakuru yanyu muri ubu bushakashatsi agume ari ibanga. Hari igihe hari abandi bakumva ko muri muri ubu bushakashatsi bakabibabazaho ibibazo ariko ntabwo twe tuzigera tuvuga abantu bemeye kuba muri bushakashatsi.

Uburenganzira bwo kwanga cyangwa kwikura mu bushakashatsi

Nta gahato na gake kariho kugira ngo mujye muri ubu bushakashatsi niba mutabishaka. Na none mushobora kwikura muri ubu bushakashatsi igihe icyo ari cyo cyose mwabishakira.

Abo mwavugisha mugize ikibazo

Igihe cyose muzagira ikibazo mwamvugisha cyangwa se mukavugisha umwe mu baganga bari muri ubu bushakashatsi. Mukeneye kumvugisha nyuma y'aha, mwanshakira kuri uyu mwirondoro: Amazina:Dr Protogène Ngabitsinze, e-mail: ngabitsinze@gmail.com, numero ya telefoni ni 0788425810. Umuntu wabona uwo ari we wese uri muri ubu bushakashatsi yaguha kandi ubusobanuro burambuye. Mushobora kandi kubaza MUNYANEZA Emmanuel, tel: 0788213765, ushinzwe ibijyanye n'ubushakashatsi muri CHUK cyangwa RWAMUGEMA Elias, tel: 0788587016, Ushinzwe ibijyanye n'ubushakashatsi muri CHUB ku bijyanye n'uburenganzira bwanyu bwo kugira uruhare muri ubu bushakashatsi.

Kwemera kugira uruhare mu bushakashatsi

Numvise neza kandi nahawe amakuru ahagije kuri ubu bushakashatsi. Ibibazo nibaza byose byabonye ubusobanuro burambuye. Numvise kandi ko nava muri ubu bushakashatsi igihe cyose nabishakira.

Ku bushake bwanjye nemeye kwinjira muri ubu bushakashatsi.

Amazina:

Umukono:

Itariki:

UNIVERSITY of RWANDA

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DIRECTORATE OF RESEARCH & INNOVATION

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 9th /December /2020

Dr Protogène NGABITSINZE
School of Medicine and Pharmacy, CMHS, UR

Approval Notice: No 354/CMHS IRB/2020

Your Project Title *"Characteristics and Outcomes of Elderly Patients Admitted in Rwanda University Teaching Hospitals: Current Situation At CHUK & CHUB"* has been evaluated by CMHS Institutional Review Board.

Name of Members	Institute	Yes	Absent	Withdrawn from the proceeding
		Involved in the decision		
			No (Reason)	
Prof Kato J. Njunwa	UR-CMHS	X		
Dr Stefan Jansen	UR-CMHS		X	
Dr Brenda Asiimwe-Kateera	UR-CMHS	X		
Prof Ntaganira Joseph	UR-CMHS	X		
Dr Tumusiime K. David	UR-CMHS	X		
Dr Kayonga N. Egide	UR-CMHS	X		
Mr Kanyoni Maurice	UR-CMHS		X	
Prof Munyanshongore Cyprien	UR-CMHS	X		
Mrs Ruzindana Landrine	Kicukiro district		X	
Dr Gishoma Darius	UR-CMHS	X		
Dr Donatilla Mukamana	UR-CMHS	X		
Prof Kyamanywa Patrick	UR-CMHS		X	
Prof Condo Umutesi Jeannine	UR-CMHS		X	
Dr Nyirazinyoye Laetitia	UR-CMHS	X		
Dr Nkeramihigo Emmanuel	UR-CMHS		X	
Sr Maliboli Marie Josee	CHUK	X		
Dr Mudenge Charles	Centre Psycho-Social	X		

After reviewing your protocol during the IRB meeting of where quorum was met and revisions made on the advice of the CMHS IRB submitted on 9th December 2020, **Approval has been granted to your study.**

Please note that approval of the protocol and consent form is valid for **12 months.**

You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrolment of participants.
3. All consent forms signed by subjects should be retained on file. The IRB may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the IRB in a timely fashion and before expiry of this approval
5. Failure to submit a continuing review application will result in termination of the study
6. Notify the IRB committee once the study is finished

Sincerely,

Date of Approval: The 9th December 2020

Expiration date: The 9th December 2021

Dr Stefan Jansen
Ag. Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:
- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate Studies, UR

CENTRE HOSPITALIER UNIVERSITAIRE

UNIVERSITY TEACHING HOSPITAL

CENTRE HOSPITALIER UNIVERSITAIRE   Huye, 13/01/2021
DE BUTARE (CHUB)
OFFICE OF DIRECTOR GENERAL   N° Ref: CHUB/DG/SA/01/.Ω͖Ω../2021

Dr. NGABITSINZE Protogene
School of Health Sciences, CMHS, UR
Phone +250788425810
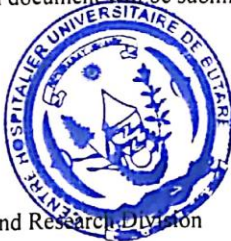**Email: ngabitsinze@gmail.com,**

Dear NGABITSINZE,

<u>Re:</u> **Your request for data collection**

Reference made to your Recommendation letter for permission to collect the data within University Teaching Hospital of Butare for your research project entitled *"Characteristics and outcomes of elderly patients admitted in Rwanda university teaching hospitals: Current situation at Centre Hospitalier Universitaire de Kigali and Centre Hospitalier Universitaire de Butare."*, based to the approvals **No:354/CMHS IRB/2020** from Institution Review Board of University of Rwanda and **No: REC/UTHB/008/2021** from our Research-Ethics Committee, we are pleased to inform you that you are accepted to collect data within University Teaching Hospital of Butare. Please note that your final document will be submitted in our research office.

Sincerely,

Dr. Augustin SENDEGEYA
Director General of CHUB
<u>Cc:</u>
    ➤ Head of Clinical Education and Research Division
    ➤ Director of Research
    ➤ Chairperson of Research-Ethics Committee
    ➤ Head of Pharmacy Department
    ➤ Ag. Research officer

         <u>**CHUB**</u>

E-mail : info@chub.rw   **B.P : 254 BUTARE**
Website: www.chub.rw   **Hotline: 2030**

13,Jan,2021   *Ref.:EC/CHUK/017/2021*

Review Approval Notice

Dear Protogene NGABITSINZE,

Your research project: ***"Characteristics and outcomes of elderly patients admitted in Rwanda University Teaching Hospitals: current situation at CHUK & CHUB "***

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 13,Jan,2021 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

You are required to present the results of your study to CHUK Ethics Committee before publication by using this link:www.chuk.rw/research/fullreport/?appid=239&&chuk.

PS: Please note that the present approval is valid for 12 months.

Yours sincerely,

Dr Emmanuel Rusingiza Kamanzi
The Chairperson, Ethics Committee,
University Teaching Hospital of Kigali

Scan code to verify.

" University teaching hospital of Kigali Ethics committee operates according to standard operating procedures (Sops) which are updated on an annual basis and in compliance with GCP and Ethics guidelines and regulations "