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ANALYSIS OF FACTORS ASSOCIATED WITH RECENT ILLNESS IN KYOTERA

BY

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DECLARATION

I, MUGERA RICHARD, confirm that this work is entirely my original effort. It has not been submitted, in whole or in part, for any academic award in this institution or any other institution. Where the work builds on or references other sources, appropriate acknowledgment has been made, and the remaining content represents my own contribution.

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APPROVAL

I certify that the student MUGERA RICHARD 2300700806 (23/U/0806) has been under my supervision and this dissertation has been submitted as an original copy for the final examination with my approval as his supervisor for the award of a degree of Bachelor of Statistics.

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DEDICATION

I dedicate this research work to my family and my friends for their unwavering love and support. I also express my special gratitude to my supervisor, Mr. Mutungi Gilbert, for his invaluable words of encouragement and for guidance throughout the entire degree program.

May the Almighty God bless you all abundantly.

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ABSTRACT

This study analysed the factors associated with recent illness among residents of Kyotera Rural Community using secondary data from the 2024 Community Health Survey conducted by the Rakai Health Sciences Program (RHSP). A sample of 500 adult respondents was examined, with recent illness within the previous 14 days as the binary dependent variable and age, sex, education level, smoking status, alcohol consumption, physical activity, and Body Mass Index (BMI) as the independent variables.

Both bivariate (Chi-square tests and Independent Samples t-tests) and multivariate (Binary Logistic Regression) analytical techniques were employed. The findings revealed that age, smoking status, alcohol consumption, education level, and Body Mass Index (BMI) were significant determinants of recent illness. Older individuals were more likely to experience recent illness (OR = 1.212), while smokers had substantially higher odds of reporting recent illness compared to non-smokers (OR = 4.498). Alcohol consumers were also more likely to experience recent illness (OR = 2.361). Higher BMI was associated with increased odds of recent illness (OR = 1.126), whereas higher levels of education reduced the likelihood of recent illness (OR = 0.685). Sex and physical activity were not significant predictors in the multivariable model.

The study concludes that demographic, lifestyle, and anthropometric factors significantly influence recent illness among residents of Kyotera Rural Community. Smoking emerged as the strongest modifiable risk factor, while higher educational attainment offered a protective effect. The study recommends strengthening smoking cessation programs, promoting responsible alcohol consumption, encouraging healthy weight management, and enhancing health education initiatives to reduce the burden of recent illness and improve community health outcomes.

CHAPTER ONE: INTRODUCTION

1.0 Background of the study

Access to good health and reducing the burden of disease are essential for improving human well-being and fostering sustainable development. At the global level, morbidity remains a significant public health concern, particularly in developing countries burdened by both communicable and non-communicable diseases (Organization, 2016). For this study, recent illness, or recent morbidity, in the Kyotera rural community is defined as "any reported episode of disease or health conditions experienced by a person within two weeks of the survey interview. A person is said to have experienced a recent illness if, within this period, they reported having felt unwell and visited a health provider, practiced self-treatment for a reported illness, such as taking medication or relying on home remedies, or were unable to carry on daily activities for a period of one or more days due to illness or injury" (Tian et al., 2016). This two-week recall period is widely used in community health research as it minimizes recall bias. The World Health Organization notes that many such diseases are preventable, with occurrence linked to demographic and lifestyle factors including age, sex, education, hygiene, diet, alcohol use, and physical activity, as well as social disparities and limited health awareness (Vos et al., 2020).

In Sub-Saharan Africa, the prevalence of preventable illnesses remains high, with demographic factors such as age, sex, education, and occupation significantly shaping exposure to health risks(Tessema et al., 2022). Rural poverty further limits access to health information, nutrition, and care services, compounding the disease burden (Organization, 2017). Poor dietary habits, alcohol consumption, smoking, and physical inactivity have also been identified as key contributors to illness in developing-country populations (Adugna, Nabbouh, Shehata, & Ghahari, 2020).

In Uganda, despite government efforts to expand and decentralize health services, a significant illness burden persists, especially in rural communities, where inequalities in healthcare access, health awareness, and service utilization remain pronounced (Kiwanuka et al., 2008). The Uganda Demographic Health Survey confirms that illness prevalence varies by age, sex, education level, and household socio-economic status (Udhs, 2011). Kyotera District, being predominantly rural, reflects these national trends. While national and regional data provide a broad picture of illness

patterns, district-level statistical evidence identifying the specific determinants of recent illness in Kyotera remains limited, hence the need for this study.

1.1 Problem Statement

Recent illness is still an issue of concern in many rural areas of Sub-Saharan Africa, where people lack basic healthcare services, health education, and experience high levels of poverty and poor sanitary conditions (Organization, 2019). According to the World Health Organization, despite advances in healthcare, preventable diseases still contribute to a large number of cases of morbidity in low-income countries, with the main causes of illness being socio-economic disparities and the quality of primary healthcare. In the case of Sub-Saharan Africa, differences in healthcare and high out-of-pocket healthcare expenditure have been more pronounced in rural areas (Organization, 2017).

In Uganda, the improvement of health outcomes is a priority under the National Planning Authority Uganda, specifically in the National Development Plan (NDP) policy, which focuses on human capital development and strengthening primary healthcare systems in the country. In addition, at the regional and global levels, the United Nations Sustainable Development Goals, specifically SDG 3: Good Health and Well-Being, highlight the need to reduce preventable illness and ensure universal access to quality healthcare services. However, rural districts in the country are characterized by high levels of illness in recent times (Cygu et al., 2024).National statistics from the Uganda Bureau of Statistics show that recent illness spells are common in Uganda, but little attention has been given to the demographic and lifestyle factors driving them. In Kyotera Rural Community, limited health services, sanitation, and health education further highlight this gap. The lack of local evidence on determinants of recent illness may hinder effective planning and resource allocation. Therefore, there is a need to statistically examine the factors associated with recent illness in Kyotera to support evidence-based health interventions.

1.2 Main Objective

To assess the factors associated with recent illness among residents in Kyotera Rural Community.

1.3 Specific Objectives

1. To determine the prevalence of recent illness and examine its association with key demographic characteristics in the Kyotera Rural Community.
2. To determine the association between lifestyle behaviors and recent illness in Kyotera Rural Community
3. To determine whether Body Mass Index (BMI) significantly influences the probability of recent illness among adults, controlling for demographic and lifestyle factors.

1.4 Research Questions

1. What is the relationship between demographic factors and recent illness among residents of the Kyotera Rural Community?
2. What is the relationship between lifestyle factors and the occurrence of recent illness among residents of the Kyotera Rural Community?
3. What effect does Body Mass Index (BMI) have on the probability of recent illness among adults in the Kyotera Rural Community?

1.5 Significance of the Study

The importance of the research is that it enhances academic knowledge about determinants of recent illness among people in rural areas in Uganda and adds to the body of literature on morbidity and health disparities using statistical modeling. The results from the study will help in the determination of risk groups and help health planners and policymakers in the Kyotera district make health-related decisions regarding planning for interventions and distribution of health care resources. Also, by determining the determinant of recent illness, the study will contribute to enhancing health status, improving household productivity and welfare.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature on the determinants of recent illness, focusing on various aspects such as demographic, and lifestyle factors. This review is consistent with the research aims of estimating the prevalence of recent illness and its association with various factors. This chapter ends with a discussion of research gaps, justifying the need for this research.

2.1 Demographic factors

Age is a key determinant of morbidity, with prevalence rising sharply as populations grow older. A meta-analysis of 15 million adults found overall multimorbidity prevalence at 37.2%, increasing to 51.0% among those aged 60 and above (Chowdhury, Das, Sunna, Beyene, & Hossain, 2023), while country-level studies from Scotland and Japan confirm a consistent age gradient, with prevalence reaching up to 81.5% among the oldest age groups (Barnett et al., 2012).

Females consistently report higher multimorbidity than males (39.4% vs. 32.8% globally) (Mossadeghi et al., 2023), a pattern confirmed in Denmark and the United Kingdom (Schiøtz et al., 2017). Education also plays a significant role, with lower educational attainment linked to higher morbidity burden; in Denmark, prevalence among those with lower secondary education (26.9%) was nearly double that of postgraduate holders (13.5%) (Schiøtz, Stockmarr, Høst, Glümer, & Frølich, 2017), and similar patterns were observed in Germany (Puth, Weckbecker, Schmid, & Münster, 2017).

2.2 Lifestyle factors

Lifestyle factors including smoking, alcohol consumption, and physical inactivity are well-established contributors to multimorbidity. Smoking significantly elevates risk, with current smokers nearly twice as likely to have multimorbidity compared to non-smokers (OR 1.91), and former smokers also at elevated risk (OR 1.46) (Niebuur et al., 2023); European cohort evidence further links smoking to higher odds of hospital admission due to multimorbidity (OR 1.86) (Luben, Hayat, Wareham, Pharoah, & Khaw, 2020). High alcohol consumption is similarly associated with increased multimorbidity risk, particularly among individuals with existing

chronic conditions, though the relationship varies by consumption level and individual health status.

Physical inactivity is an independent predictor of multimorbidity, associated with a 33% increased risk among older adults in England (aHR 1.33), rising to nearly four times among those with additional risk factors such as obesity (aHR 3.98) (Dhalwani et al., 2017). Similar findings from the Netherlands and Norfolk confirm this association (Luben et al., 2020), and evidence from Singapore shows that over half (53.8%) of multimorbid primary care patients reported low physical activity levels (Subramaniam et al., 2019).

2.3 Body Mass Index

High body mass index (BMI) is strongly linked to a higher risk of chronic and long-standing illnesses, poorer self-rated health, and complex multimorbidity in adults, even after considering demographic and lifestyle factors. High BMI increases the risk of non-communicable diseases such as hypertension, cardiovascular disease, type 2 diabetes, osteoarthritis, and certain cancers. A large Chinese study found that higher childhood BMI increases the number of selves-reported non-cancer illnesses and long-standing disability in adulthood. In older Chinese adults, each standard-deviation increase in BMI was associated with a 24% higher expected count of chronic diseases, even after adjusting for socioeconomic and living conditions (Pan & Hao, 2025). Cohort data also showed that higher BMI raised the incidence of hypertension, diabetes, and heart disease, with a clear dose–response trend. Studies from Finland, the UK, and the U.S. found that obesity (BMI $\geq$30 kg/m^2) greatly increases the risk of multiple obesity-related diseases, even after controlling for lifestyle factors (Kivimäki et al., 2022). Globally, high BMI contributes to a rising share of deaths and disability-adjusted life years (DALYs), especially from stroke, heart disease, and diabetes

2.4 Summary of Literature Review

From the reviewed literature, recent illness appears to be a function of the interaction between various socioeconomic, demographic, and lifestyle variables. For example, age, gender, and education level affect vulnerability, exposure, and the availability of health care services, whereby older people, women, and those without adequate education tend to suffer from more illnesses.

Besides, behaviors such as smoking, alcohol drinking, and lack of physical activity play a key role in the occurrence of illnesses, sometimes in conjunction with other conditions such as obesity. Thus, the conclusion that can be drawn from the review of the literature is that recent illness is indeed a multidimensional phenomenon.

CHAPTER THREE: METHODOLOGY

3.1 Research design

This study will adopt a quantitative research design utilizing cross-sectional study to examine the associations between demographic factors (age, sex, education), lifestyle factors (smoking, alcohol consumption, physical activity), anthropometry (weight, Height, BMI) and the prevalence of recent illness in the community.

3.2 Data Source

The study will employ secondary data from the 2024 Community Health Survey conducted by Rakai Health Sciences Program (RHSP) Kalisizo, which obtained data from households in the rural Community of Kyotera District. The data will provide individual-level data on demographic factors, lifestyle factors, anthropometry (weight, height and BMI) and self-reported recent illness. The data set is appropriate for the study since it has variables that represent the determinants of recent illness, including age, sex, education, smoking, alcohol, and physical activity, which will enable a thorough examination of the determinants of recent illness in the population.

3.3 Description of Study Variables.

This table summarizes the key variables, including the dependent outcome (recent illness) and in dependent demographic, lifestyle, and anthropometric factors that may influence it.

Table 3.1: Description of Study Variables

Variable Category	**Variable**	**Description/Measurement**	**Type of Variable**	**Coding/Scale**
Dependent Variable	Recent illness	Self-reported illness experienced within the past 14 days	Binary	Yes = 1, No = 0
Demographic Factor	Age	Age of respondent measured in years	Continuous	Actual age in years
Demographic Factor	Sex	Biological sex of respondent	Categorical	Male = 1, Female = 0
Demographic Factor	Education level	Highest level of education attained	Categorical	None, Primary, Secondary, Tertiary
Lifestyle Factor	Smoking status	Whether respondent smokes tobacco	Binary	Yes = 1, No = 0
Lifestyle Factor	Alcohol consumption	Whether respondent consumes alcohol	Binary	Yes = 1, No = 0
Lifestyle Factor	Physical activity	Number of days physically active per week	Discrete	0 –7 days
Body Measurement	Height	Height measured in centimetres	Continuous	Centimetres (cm)
Body Measurement	Weight	Weight measured in kilograms	Continuous	Kilograms (kg)
Body Measurement	Body Mass Index (BMI)	Weight divided by height squared	Continuous	kg/m^2

These independent variables were selected based on evidence from previous studies showing their influence on recent illness and multimorbidity. Anthropometric measures are included because

BMI and related indicators are consistently associated with both short-term and chronic health conditions.

3.4 Data Preparation and Preprocessing

Before statistical analysis will be conducted, the dataset will undergo several preparation procedures to ensure accuracy and consistency

3.4.1 Data Organization

The dataset will be imported into Stata and will be organized by variable type and measurement scale. Continuous variables, such as age, will be labeled and categorized as necessary, while categorical variables, including sex, education, and lifestyle behaviors, will be numerically coded to facilitate analysis.

3.4.2 Data Cleaning

The dataset will be checked for possible issues such as missing values, inconsistencies, or data entry errors. Where necessary, missing observations will be verified from alternative sources or addressed using appropriate data handling techniques.

3.5 Data Analysis Methods.

3.5.1 Descriptive Analysis

Descriptive statistics will first be used to summarize the characteristics of the study variables. Quantitative variables such as age, height, weight, and Body Mass Index (BMI) will be summarized using measures of central tendency and dispersion, including the mean, standard deviation, minimum, and maximum values.

The sample mean will be computed as:

$$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n} \qquad (3.0)$$

Where:

- $\bar{X}$ = Sample mean
- X_i = Observed Values
- n = Sample size

The standard deviation will be calculated as:

$$s = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{n-1}} \tag{3.1}$$

For categorical variables such as sex, education level, smoking status, alcohol consumption, and physical activity, frequencies and percentages will be computed and presented using tables.

The prevalence of recent illness will be determined using:

$$\text{Prevalence} = \frac{\text{Number of Individuals with recent illness}}{\text{Total number of individuals studied}} \times 100 \tag{3.2}$$

Graphical methods will also be used to aid interpretation of the data. Histograms will assess the distribution of continuous variables, bar charts will summarize categorical variables, and box plots will compare BMI distributions across categories such as sex and illness status.

3.5.2 Bivariate Analysis of Associations

To examine the relationships between recent illness and each independent variable, bivariate analysis will be conducted. This will involve statistical tests to determine whether observed differences between groups are statistically significant.

(a) Chi-Square Test of Independence

The Pearson Chi-Square test of independence will be used to examine the association between categorical independent variables (such as smoking, alcohol consumption, physical activity, sex, and education level) and recent illness.

The hypotheses for the Chi-Square test will be:

- H_0: There is no association between the variables.
- H_1: There is an association between the variables.

The Chi-Square statistic will be computed using:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad (3.3)$$

Where:

- $0_{ij} = \text{Observed Frequency}$
- $E_{ij} = \text{Expected Frequency}$

The expected frequency will be obtained using:

$$E_{ij} = \frac{(\text{Row Total})(\text{Column Total})}{\text{Grand Total}} \quad (3.4)$$

Decision Rule

At a 5% level of significance:

- Reject H_0 if the p-value < 0.05, Otherwise, fail to reject H_0

This would imply a statistically significant association between the variables.

(b) Independent Samples t-Test

For continuous variables such as age and BMI, the independent samples t-test will be used to compare mean values between individuals with recent illness and those without recent illness.

The hypotheses will be:

$H_0 : \mu_1 = \mu_2 \quad H_1 : \mu_1 \neq \mu_2$

The t-statistic will be computed as:

$$t = \frac{(\overline{X_1} - \overline{X_2})}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}} \tag{3.5}$$

Where:

$\overline{X_1}, \overline{X_2} = \text{Sample Means}$

s_1^2, s_2^2 = Sample Variance

$n_1, n_2 = \text{Sample sizes}$

Decision Rule

At the 5% level of significance:

- Reject H_0 if p-value < 0.05
- Otherwise fail to reject H_0

3.5.3 Data Analysis in Relation to Research Questions.

The study will employ appropriate inferential statistical techniques to examine the relationships between the study variables, with statistical significance determined at the 5% level ($p < 0.05$).

The relationship between demographic factors and recent illness in Kyotera Rural Community will be analysed using the Pearson Chi-Square test of independence for categorical variables (sex and education level) and the Independent Samples t-test for the continuous variable (age). These tests will determine whether significant differences or associations exist between demographic characteristics and recent illness.

The relationship between lifestyle factors and recent illness will be examined using the Pearson Chi-Square test of independence for smoking status, alcohol consumption, and physical activity. This will assess whether there is a statistically significant association between lifestyle behaviours and recent illness in the study population.

The Chi-Square statistic is:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \tag{3.6}$$

The effect of Body Mass Index (BMI) on the probability of recent illness among adults will be analysed using binary logistic regression, appropriate for the binary nature of the dependent variable. The model will estimate the likelihood of recent illness as a function of BMI, expressed as:

$$\log\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 BMI_i \tag{3.7}$$

Where;

P_i = Probability of recent illness

β_0 = Intercept

β_1 = regression coefficient for BMI

Wald Test Statistic

The significance of BMI will be tested using the Wald statistic:

$$W = \left(\frac{\hat{\beta}}{SE\hat{\beta}}\right)^2 \tag{3.8}$$

Reject H_{03} if:

- p-value < 0.05

This would indicate that BMI significantly affects the likelihood of recent illness.

3.5.3 Multivariable Analysis Using Logistic Regression

To examine the combined effect of demographic, lifestyle, and anthropometric factors on recent illness, binary logistic regression analysis will be employed. This method is appropriate because the dependent variable (recent illness) is binary in nature.

The logistic regression model will be specified as:

$$\log\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Smoking}_i + \beta_5 \text{Alcohol}_i + \beta_6 \text{Physical Activity}_i + \beta_7 \text{BMI}_i + \varepsilon_i \quad (3.9)$$

Where;

P_i= Probability that an individual i experiences recent illness

B_0= Intercept

$\beta_1 - \beta_7 = \text{regression coefficients}$

$\varepsilon_i = \text{Error term}$

The Wald test will be used to determine the significance of each predictor.

The odds ratio will be computed as:

$$\text{OR} = e^{\beta} \quad (3.10)$$

Interpretation

$OR > 1$: Increased likelihood of illness

$OR < 1$: Reduced likelihood of illness

$OR = 1$: No effect

Results will be presented using Crude Odds Ratios (COR), Adjusted Odds Ratios (AOR), 95% Confidence Intervals, and p-values.

3.5.4 Model Diagnostics and Goodness of Fit

a) Multicollinearity Test

Multicollinearity among independent variables will be assessed using the Variance Inflation Factor (VIF).

The VIF is computed as:

$$\text{VIF} = \frac{1}{1 - \text{R}^2} \tag{3.11}$$

where R^2 is the coefficient of determination obtained when one predictor is regressed against others? According to Damodar N. Gujarati (2004), a VIF value exceeding 10 indicates serious multicollinearity. In this study, VIF values greater than 10 will be considered indicative of serious multicollinearity, values between 5 and 10 will suggest moderate multicollinearity, and values below 5 will indicate that multicollinearity is not a major concern.

(b) Hosmer-Lemeshow Goodness-of-Fit Test

The Hosmer-Lemeshow test will be used to assess the goodness of fit of the logistic regression model.

The hypotheses are:

- H_0: The model fits the data well
- H_1: The model does not fit the data well

The test statistic is:

$$\chi^2 = \sum \frac{(O_g - E_g)^2}{E_g} \tag{3.12}$$

Where;

$O_g = \text{Observed Frequency}$ $E_g = \text{Expected Frequency}$

Decision Rule

- Fail to reject H_0 if p-value > 0.05
- Reject H_0 if p-value < 0.05
- A p-value greater than 0.05 will indicate that the model fits the data adequately.

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CHAPTER FOUR: RESULTS

4.1 Introduction

In this chapter, results of the analysis of the 2024 Community Health Survey data collected from 500 adult respondents from Kyotera Rural Community are presented. The presentation of the results is structured along the framework described in Chapter Three including descriptive analysis, bivariate analysis, testing of hypotheses, multivariable logistic regression, and diagnostics of the models. All the analyses have been done at 5% level of significance using Stata (version 16.0).

4.2 Descriptive Analysis

4.2.1 Data Cleaning and Preparation

Before the analyses, the dataset was carefully scrutinized to ensure that there were no issues with data integrity or any missing values. It was noted that all of the variables were completely populated with complete cases, meeting the criteria for further analysis.

4.2.2 Distribution of Continuous variables

Table 4.1: Summary Statistics for Age, Body Mass Index and Physical Activity

Variable	Obs	Mean	Std. Dev.	Min	Max
age	500	50.538	18.758	18	82
Body Mass Index	500	25.979	6.664	9.7	48.2
Physical activity(days)	500	2.974	1.966	0	6

Table 4.1 presents the descriptive statistics for the continuous variables included in the study. The mean age of the respondents was 50.54 years, indicating that the study population was predominantly middle-aged. The mean Body Mass Index (BMI) was 25.98 kg/m², which falls within the overweight category according to the World Health Organization (WHO) classification. Additionally, respondents reported an average of 2.97 days of physical activity per week, suggesting relatively low levels of regular physical activity among the study population.

4.2.3 Distribution of Categorical variables

Table 4.2: Distribution of Respondents by Categorical Characteristics (N = 500)

Variable	Category	Frequency (n)	Percentage (%)
Education Level	None	132	26.4
	Primary	136	27.2
	Secondary	105	21.0
	Tertiary	127	25.4
Smoking Status	No	263	52.6
	Yes	237	47.4
Alcohol Use	No	255	51.0
	Yes	245	49.0
Gender	Female	331	66.2
	Male	169	33.8

Table 4.2 presents the distribution of respondents by selected categorical characteristics. The largest proportion of respondents had attained primary education (27.2%). Alcohol consumption was almost evenly distributed among respondents, with a slight majority (51.0%) reporting no alcohol use. Similarly, a small majority of respondents (52.6%) were non-smokers. The study population was predominantly female, accounting for 66.2% of the respondents.

4.2.4 Prevalence of recent illness

The 14-day period prevalence of recent illness was calculated as follows:

$$\text{Prevalence} = \frac{\text{Number of Individuals with recent illness}}{\text{Total number of individuals studied}} \times 100$$

$$\text{Prevalence} = \frac{159}{500} \times 100$$

$$\text{Prevalence} = 31.80\%$$

Table 4.3: Tabulation of Recent illness

	Freq.	**Percent**	**Cum.**
No	341	68.20	68.20
Yes	159	31.80	100.00
Total	500	100.00	

Recent illness prevalence within 14 days was 31.8%, meaning that almost one out of three respondents suffered from some form of disease within two weeks before the survey. Therefore, there is a significant level of morbidity in the Kyotera rural population. Among 500 respondents, 159 respondents reported their experience of suffering from some illness recently, whereas 341 did not report any illness recently. Thus, 159 illness incidents were sufficient to conduct multivariable analysis in regression modeling, meeting the recommendation of events per variable ratio.

4.3 Bivariate Analysis

According to the analysis process, the chi-square test was applied for categorical variables while the independent sample t-test was applied for continuous variables to analyze their relation with illness.

4.3.1 Chi-Square Test Results

Table 4.4: Summary of Chi-Square Tests for Association Between Selected Variables and Recent Illness (N = 500)

Variable	χ^2 Value	df	p-value
Sex	1.87	1	0.171
Education Level	5.11	3	0.164
Smoking Status	9.04	1	0.003
Alcohol Consumption	1.37	1	0.242

Only smoking status showed a statistically significant association with recent illness at the bivariate level ($\chi^2 = 9.04$, $p = 0.003$). This indicates that smoking behaviour is related to the occurrence of recent illness among the respondents. In contrast, sex, education level, and alcohol consumption were all not statistically significant at the bivariate level, suggesting that they do not have a measurable association with recent illness in this study population.

4.3.2 Independent Sample t-Test Results

Table 4.5: Independent Samples t-test Results for Age, BMI, and Physical Activity by Recent Illness Status (N = 500)

Variable	Recent Illness Status	N	Mean	Std. Deviation	t-value	p-value
Age (years)	No	341	41.72	14.72		
	Yes	159	69.46	10.81	-21.24	<0.001
BMI (kg/m²)	No	341	25.24	6.59		
	Yes	159	27.55	6.57	-3.65	0.0003
PhysicalActivity (days/week)	No	341	3.01	1.98		
	Yes	159	2.89	1.94	0.68	0.499

The results of the independent samples t-test show mixed relationships between continuous variables and recent illness. A statistically significant difference was observed for age, where respondents with recent illness were considerably older on average (Mean = 69.46 years) compared to those without illness (Mean = 41.72 years), indicating that age is strongly associated with recent illness ($t = -21.24$, $p < 0.001$). Similarly, BMI showed a significant difference between the two groups, with individuals reporting recent illness having a higher mean BMI (27.55 kg/m²) than those without illness (25.24 kg/m²), suggesting a positive association between higher body weight and illness occurrence ($t = -3.65$, $p = 0.0003$). In contrast, physical activity did not show a statistically significant difference between the two groups ($t = 0.68$, $p = 0.499$), indicating that it is not associated with recent illness at the bivariate level in this study

4.4 Analysis of Research Questions.

4.4.1 Demographic Factors and Recent Illness

Table 4.6: Results of Statistical Tests for Demographic Factors and Recent Illness

Variable	Test	Test Statistic	p-value
Age	Independent t-test	t = -21.24	0.0000
Sex	Chi-square test	$\chi^2 = 1.87$	0.171
Education level	Chi-square test	$\chi^2 = 5.11$	0.164

Conclusion

Age was the only demographic variable that showed a statistically significant association with recent illness ($p < 0.001$). Respondents with recent illness were older on average, indicating that increasing age is associated with a higher likelihood of illness in the study population. In contrast, sex and education level were not statistically significant, suggesting that recent illness does not vary meaningfully across gender or education categories in this context.

4.4.2 Lifestyle Factors and Recent Illness

Table 4.7: Results of Statistical Tests for Lifestyle Factors and Recent Illness

Variable	Test	Test Statistic	p-value
Smoking	Chi-square	$\chi^2 = 9.04$	0.0026
Alcohol consumption	Chi-square	$\chi^2 = 1.37$	0.2420
Physical activity	Independent t-test	t = 0.68	0.499

Conclusion:

Smoking was the only lifestyle factor that showed a statistically significant association with recent illness ($\chi^2 = 9.04$, $p = 0.0026$). This indicates that smoking is an important lifestyle determinant of recent illness in the study population. In contrast, alcohol consumption and physical activity were not statistically significant, suggesting that they do not have a measurable association with recent illness in this context.

4.4.3 BMI and Recent Illness

Logistic Regression Results

A binary logistic regression model was fitted to examine the effect of Body Mass Index (BMI) on the likelihood of recent illness.

Table 4.8: Logistic regression for BMI and Recent Illness

Predictor	Odds Ratio (OR)	Std. Error	z-value	p-value	95% Confidence Interval
BMI	1.054	0.016	3.56	0.0003	1.024 – 1.085
Constant	0.117	0.047	-5.29	0.000	0.053 – 0.259

The logistic regression model was statistically significant overall ($\chi^2 = 13.03$, $p = 0.0003$), indicating that BMI is a meaningful predictor of recent illness. BMI was found to be a statistically significant predictor of recent illness ($p = 0.0003$). The odds ratio of 1.054 indicates that each one-unit increase in BMI is associated with a 5.4% increase in the odds of experiencing recent illness (OR = 1.054, 95% CI: 1.024–1.085). This demonstrates a positive relationship between BMI and recent illness, where higher BMI increases the likelihood of reporting illness. The narrow confidence interval further supports the stability of this estimate.

4.5 Multivariable Logistic Regression Analysis

To assess the joint influence of all predictor variables on recent illness while accounting for possible confounding effects, a forward stepwise binary logistic regression approach was used.

4.5.1 Reduced Model

However, when examined in conjunction under the multivariable framework, BMI, age, and smoking continued to prove themselves significant. In other words, the predictive ability displayed by the factors in question was not simply an indication of their independent relationship with the outcome but rather their real ability to affect it. Yet, this model still had its shortcomings since it lacked variables which could drive or moderate disease incidence.

4.4.3 Full Multivariable Logistic Regression Model

A full multivariable binary logistic regression model was therefore fitted, including BMI, age, smoking status, alcohol consumption, sex, education level, and physical activity. The model was statistically significant (LR $\chi^2 = 370.51$, $p < 0.001$), with a Pseudo R^2 of 0.5925, indicating strong explanatory power.

Table 4.9: Full Multivariable Logistic Regression Results for Recent Illness

Predictor	Odds Ratio (OR)	Std. Error	z-value	p-value	95% Confidence Interval
BMI	1.126	0.030	4.41	0.000	1.068 – 1.187
Age	1.212	0.023	10.25	0.000	1.168 – 1.257
Smoking	4.498	1.571	4.30	0.000	2.268 – 8.921
Alcohol use	2.361	0.783	2.59	0.010	1.233 – 4.524
Sex	0.593	0.204	-1.52	0.129	0.302 – 1.164
Education level	0.685	0.098	-2.63	0.008	0.517 – 0.908
Physical activity	0.890	0.073	-1.42	0.154	0.757 – 1.045

Equation

$$\log\left(\frac{P_i}{1-P_i}\right) = -15.138 + 0.192\text{Age}_i - 0.523\text{Sex}_i - 0.378\text{Education}_i + 1.504\text{Smoking}_i + 0.589\text{Alcohol}_i - 0.117\text{Physical Activity}_i + 0.119\text{BMI}_i + \varepsilon_i$$

The study adopted a stepwise binary logistic regression approach to identify the key predictors of recent illness. Initial bivariate analysis identified age, Body Mass Index (BMI), and smoking status as significant predictors, and these were included in a reduced model where all three remained statistically significant. Age was a significant positive predictor of recent illness (OR = 1.212, $p < 0.001$), indicating that the likelihood of illness increases with increasing age, while BMI also showed a significant positive association (OR = 1.126, $p < 0.001$), suggesting that higher body weight increases the odds of recent illness. Smoking exhibited the strongest effect (OR = 4.498, $p < 0.001$), with smokers being more than four times as likely to experience recent illness compared

to non-smokers. In the final multivariable model, additional covariates including sex, education level, alcohol consumption, and physical activity were included for adjustment purposes; however, sex and physical activity were not statistically significant at the 5% level, while smoking, age, BMI, alcohol consumption, and education level remained significant predictors of recent illness.

4.6 Model Diagnostics and Goodness of Fit

Table 4.10: Multicollinearity Diagnostics Using Variance Inflation Factors

	VIF	**1/VIF**
sex	1.02	.981
Physical activity	1.016	.984
smoke	1.012	.988
alcohol	1.008	.992
bmi	1.008	.992
education level	1.006	.994
age	1.002	.998
Mean VIF	1.01	.

Multicollinearity was assessed using Variance Inflation Factor (VIF) and tolerance values. The results show VIF values ranging from 1.00 to 1.02 with an average of 1.01, while tolerance values range from 0.98 to 1.00. Since these values are well within acceptable limits (VIF < 5 and tolerance > 0.10), there is no evidence of multicollinearity among the independent variables. This indicates that the predictors are not highly correlated and each contributes independently to the model, making the estimated coefficients and standard errors reliable

Table 4.11: Hosmer-Lemeshow Goodness-of-Fit Test

Logistic model for recent illness, goodness-of-fit test	
number of observations = 500	number of groups = 10
Hosmer-Lemeshow chi2(8) = 5.35	Prob > chi2 = 0.7198

Model calibration was assessed using the Hosmer-Lemeshow goodness-of-fit test, which generated a chi-square value of 5.35 with 8 degrees of freedom and a p-value of 0.720. The non-

significant result indicates that the predicted probabilities closely correspond to the observed frequencies of the outcome across the deciles of risk. Hence, there is insufficient evidence to suggest any lack of fit, implying that the model is well calibrated and capable of reliably estimating the probability of the outcome. This finding enhances confidence in the validity of the estimated coefficients and supports the suitability of the model for explaining variations in the outcome variable.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter interprets Chapter Four's main findings in light of what else is out there, talks about what this means for public health practice, admits the study's limits, and wraps up with some conclusions and suggestions. It's laid out based on the three study hypotheses.

5.2 Discussion of Key Findings

5.2.1 Prevalence of Recent Illness

The study found a 14-day period prevalence of recent illness of 31.8% among adults in Kyotera Rural Community, meaning approximately one in three community members experienced an acute illness in the two weeks preceding the survey. This prevalence is substantially higher than the 14.3% 30-day illness prevalence reported in the 2016 Uganda Demographic and Health Survey (Kakama & Basaza, 2022). The higher prevalence in the current study may reflect the rural setting, where limited access to clean water and healthcare services increases infection risk, consistent with documented rural-urban health disparities across sub-Saharan Africa (Yaya, Uthman, Okonofua, & Bishwajit, 2019). The 31.8% prevalence represents a significant public health burden, placing substantial demand on both formal healthcare facilities and informal care providers. The high prevalence also has economic implications, including lost productivity and out-of-pocket healthcare expenditures.

5.2.2 Demographic Determinants of Recent Illness

Age as a significant predictor:

Age emerged as a statistically significant predictor of recent illness in both bivariate ($t = -21.24$, $p < 0.001$) and multivariable analyses (OR = 1.212, 95% CI: 1.168–1.257, $p < 0.001$). The mean age of respondents with recent illness was 69.46 years compared to 41.72 years among those without illness. This finding is consistent with extensive evidence demonstrating that advancing age is associated with increased susceptibility to infectious diseases due to immunosenescence the age-related decline in immune function (Mugisha et al., 2016)

5.2.3 Lifestyle Determinants of Recent Illness.

Smoking and alcohol consumption were both significant predictors of recent illness. Smoking showed a strong association in both bivariate and multivariable analyses, with smokers having about 4.5 times higher odds of recent illness compared to non-smokers (OR = 4.498, $p < 0.001$). Similarly, alcohol consumption was associated with increased risk, with drinkers having more than twice the odds of recent illness (OR = 2.361, $p = 0.010$). These findings suggest that both smoking and alcohol use significantly increase susceptibility to illness, consistent with biological evidence that these behaviours weaken immune and respiratory defences(Jiang, Chen, & Xie, 2020).

5.2.4 Body Mass Index as a determinant of Recent Illness

BMI showed a strong link to recent illness in early analysis, with stats that speak for themselves: $t = -3.65$, $p = 0.0003$, and OR = 1.054. Even in more complex models, it stayed significant (OR = 1.126, 95% CI: 1.068–1.187, $p < 0.001$). Those who were sick had an average BMI of 27.55 kg/m², while those who weren't was 25.24 kg/m². This lines up with what we know about obesity making people more prone to infections (Milner & Beck, 2012). This is often due to chronic low-grade inflammation and weaker immune responses. Since obesity rates keep going up in sub-Saharan Africa, there's a real need for programs that tackle nutrition and infection control together. Keep going up in sub-Saharan Africa, there's a real need for programs that tackle nutrition and infection control together.

5.2.5 Combined Effects of Multiple Risk Factors

The final multivariable model revealed that age, smoking, alcohol consumption, education level, and BMI each contribute independently to recent illness risk. Smoking exhibited the strongest effect (OR = 4.498), followed by alcohol (OR = 2.361), age (OR = 1.212 per year), BMI (OR = 1.126 per unit), and education (OR = 0.685 protective). The model demonstrated excellent fit (Hosmer-Lemeshow $p = 0.720$) and no multicollinearity (mean VIF = 1.01).

5.3 Conclusions

According to the study, 31.8% of Kyotera Rural Community members experienced recent illnesses, showing a significant health issue within the area. Being older, smoking, drinking, and having a higher BMI increased the chances of being sick recently. On the flip side, more education lowered illness risk. Notably, smoking proved to be the main adjustable risk, since smokers had

much higher odds of feeling unwell. Surprisingly, though the research looked at gender and physical activity, they weren't big factors for recent illness when adjusted for other stuff. The analysis also passed its tests; there was no issue with multiple variables influencing each other too much, and the model fit well overall.

5.5 Recommendations

The study recommends strengthening smoking cessation programs through community-based awareness and counseling, given that smoking emerged as a key modifiable risk factor for recent illness. It further recommends enhanced health education and community outreach to reduce harmful alcohol consumption and promote responsible drinking practices. Healthcare providers are encouraged to prioritize preventive services for older adults through regular screening and early detection, as this group showed a higher likelihood of recent illness. In addition, interventions promoting healthy body weight through nutrition education, physical activity promotion, and routine BMI monitoring should be encouraged due to the observed association between higher BMI and illness. Policymakers are also advised to continue investing in education, as higher educational attainment was found to be protective and supports improved health literacy and health-seeking behavior. Future research should adopt longitudinal designs and incorporate broader determinants such as socioeconomic status, healthcare access, environmental factors, and underlying health conditions to better understand the determinants of recent illness.

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