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Empirical relationship between housing insecurity and mental health outcomes among residents of informal settlements in Zambia: The case of Misisi compound

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Abstract

With decent housing being a human right, insecurities centered around housing may lead to mental ill-health (Talmatzky, Nohr, knaevelsrud, & Niemeyer, 2023). This study aimed at establishing the relationship between housing insecurity and mental health among residents of unplanned settlements in Zambia the case of Misis compound. A cross-sectional survey design was used in this study with a convenient sample of 126 (N=126). Three measuring instruments were used; a housing insecurity scale with 5 dimensions on a five-point Likert scale anchored by 1(strongly disagree and 5 (strongly agree). Depression was measured using the 9-item patient health questionnaire (PHQ-9) on a four-point Likert scale ranging from 1(Not at all) to 4(Nearly every day). The scale has acceptable reliability coefficients of 0.75. Anxiety symptoms were assessed using the generalized anxiety disorder scale (GAD-7) with a Cronbach alpha of 0.78. The seven items are anchored on a 4-point Likert scale ranging from 1(Not at all) to 4 (Nearly every day). Correlational analysis results have shown a significant but negative relationship between housing insecurity and mental health outcomes. Independent t-test and Anova results have shown that there are significant differences in the means attributed to respondents' demographics. Lastly regression analysis results indicate that housing insecurity is a predictor of negative health outcomes.

Keywords: Housing Insecurity; Mental Health Outcomes; Informal Settlements; Misisi Compound and Zambia

1. Introduction

A healthy positive thinking mind is an antecedent to physical health which will eventually lead to a productive personal life due to inner resources that will help individuals cope up with stresses of life (Marsburg, 2022). Mental health is a very important aspect of our overall well-being, influencing every facet of our lives, from relationships and productivity to physical health and happiness. Mental health enables individuals to cope with adversity, adapt to change, and overcome obstacles because it helps individuals to develop inner resources such as hope and resilience (Alabi et al., 2021). Resilience is critical for peak performance in work, education, and other areas of life. By managing stress and maintaining focus, individuals achieve greater happiness, life satisfaction, productivity, creativity and innovation (Laranjeira & Querido, 2022). Individuals with good mental health tend to experience happiness, confidence, and hope, and to be generally satisfied with their lives (Geldenhuys & Henn, 2017). They may also experience a sense of connection with others, have a sense of purpose and feel at peace. Mental health problems can significantly predict life satisfaction as it may be reasoned that mental health plays an important role in shaping an individual's life satisfaction and well-being (Fergusson et al. 2015). Research has consistently shown that mental health issues are linked to low levels of happiness and reduced life satisfaction (Jradi & Abouabbas, 2017; Murphy et al., 2005).

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If mental well-being is such an important determining factor for health and living, it is important to determine its predictors. Mental health is influenced by several factors. Supportive relationships and strong social connections can buffer against stress and adversity and hence lead to psychological well-being (Hostinar & Gunnar, 2015). Social isolation, poverty, and unemployment can exacerbate mental health concerns. Additionally, individuals with low self-esteem, perfectionism, or rigid thinking patterns are more vulnerable to mental health issues (Santini, et al., 2020).

Housing insecurity and poor housing quality can have a significant impact on mental health (Talmatzky,2023). Informal settlements are characterized by poor infrastructure, overcrowding, environmental degradation, inequality, illegal or unplanned housing and lack of basic services making residents vulnerable to mental health issues (Omotoye, 2023). Housing insecurity includes diverse situations such as living under the threat of eviction, squatting, or having to live with family or friends for economic reasons (Carrere et al., 2022). Housing insecurity is associated with several mental health effects. Affected people are at higher risk of depression, anxiety, psychological distress, post-traumatic stress and suicide (Tomita & Gibbs, 2023).. Housing insecurity is not an isolated phenomenon but can coexist with other problems, including food security, energy poverty, and unemployment. These problems can aggravate poor mental health (Carelon Behavioral Health,2022; Carrere et al., 2022).

Demographic variables are also determinants of well-being (Addai et al., 2014; Ngoo et al., 2015). According to Diener et al. (2003) differences exist in terms of how people experience well-being. In this regard demographic differences can also play a role in how housing insecurities affect mental well-being among residents in informal settlements. Moreover, more research on how people experience well-being has been conducted in developed countries than in the African contexts (Addai et al., 2014; Ngoo et al., 2015).

There are several determinants of mental health as disclosed in literature, yet due to practical and theoretical reasons, as well as narrowing the research framework to a feasible extent, there is need for selection of latent variables to be included in the study. Two considerations were used; firstly, we considered known antecedents of mental health, secondly, we examined available literature on mental health for future direction. Based on the above criteria housing insecurity and demographics were considered.

The primary impetus for this study stems from the increasing concern over the mental health challenges faced by individuals residing in informal settlements, such as Misisi compound in Lusaka. Despite rapid urban population growth and evident housing challenges in these communities, there remains a paucity of empirical research within the Zambian context exploring how housing insecurity influences mental health outcomes, including anxiety and depression. This study is therefore motivated by the need to generate localized evidence that can inform targeted mental health and housing interventions. It aims to address this gap by examining not only the relationship between housing insecurity and mental health but also how demographic factors may moderate this association ultimately contributing to improved policy formulation and public health planning.

1.1. Research Initiating Question

80 % of people in low-income levels in the country live in slums (UN Habitat,2023). In Lusaka alone an estimated 70 % of the population live in informal settlements (UN Habitat,2023). Like many governments in the global south, Zambia struggles to provide affordable housing due to ineffective policies that fail to address key issues such as land access, housing finance, and security of tenure, building materials, skilled labor, infrastructure and urban services (Phiri, 2016). Zambia's existing housing stock is estimated at 2.5 million units of which 64% is traditional housing while 36% is urban housing (Phiri, 2016). Forty percent of the urban housing in Zambia is good quality, while 60% is substandard housing with 70% of all housing stock in Lusaka being substandard and informal accommodating over two thirds of the city's population (Habitat for Humanity, 2022; Phiri, 2016). Since informal settlements are characterized by high poverty levels, poor provision of sanitation and basic water services as well as poor infrastructure, they cumulatively affect one's mental health. The research initiating question for this study is therefore: why variance exists in mental health, with specific reference to the role that housing insecurities and demographics play in this regard not to the exclusion of other factors.

1.2. Main Objectives

To examine the relationship between housing insecurity and mental health outcomes among residents of Misisi Compound in Zambia, and to explore how demographic factors influence this relationship.

1.2.1. Objective of the study

- To investigate the relationship between housing insecurity and mental health outcomes

- To examine significant differences in the relationship between housing insecurity and mental health outcomes attributed to demographics
- To find out whether housing insecurity predicts mental health outcomes

2. Literature review

2.1. Theoretical Framework

2.1.1. Maslow's Hierarchy of needs

In 1943, Abraham Maslow came up with a psychological theory which became known as Maslow's hierarchy of needs (Maslow, 1948). This hierarchy ranges from physiological needs, safety needs, belongingness and love need, esteem needs, to self-actualization. The theory posits that each stage of needs cannot be met until the previous stage has been fulfilled. This study focuses on the first stage of physiological needs, which includes food, water, sleep, and shelter; and which sets the foundation for the following four stages. Housing insecurity disrupts this hierarchical progression by threatening basic physiological needs (shelter) and undermining safety needs (security) thereby compromising psychological well-being. This disruption exacerbates depression, anxiety and other mental health issues. By examining the relationship between housing insecurity and mental health through this theoretical lens, this study will illustrate the complex interplay between environmental factors, psychological well-being and human needs.

2.1.2. Conceptualizing hosing insecurity

Housing insecurity is conceptualized as the limited or uncertain availability of stable, safe, adequate, and affordable housing and neighborhoods; limited or uncertain access to stable, safe, adequate, and affordable housing and neighborhoods; or the inability to acquire stable, safe, adequate, and affordable housing and neighborhoods in socially acceptable ways (Cox et al., 2016). Hulse and Saugeres (2008) developed a six-dimension framework that captures the extent to which households predominantly among low-income, are housing insecure. The framework comprises endangered personal safety due to outside relationships, a feeling of detachment or not belonging because of exclusion in social and community support groups, threatened physical comfort amounting to structurally insufficient housing, which affects mental well-being. In this framework, the concerns regarding personal privacy due to unwanted intrusion in the environment, housing mobility due to continued resident movements and housing instability rising from uncertainty caused by living arrangements stipulated by landlords and other factors beyond resident's control are also acknowledged as components of housing insecurity.

2.2. Conceptualizing Mental Health

Mental health is conceptualized as the state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and cope with adversity. Mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society (Galderisi et al.,2015. Basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; and harmonious relationships between body and mind represent important components of mental health (Galderisi et al., 2015)

2.3. Relationship between Housing Insecurity and Mental health

Housing insecurity can have profound negative effects on mental health. When individuals face the threat of eviction, homelessness, or inadequate housing, they experience significant stress that can wear down their physical and mental well-being (Jones & Grigsby-Toussant, 2020). There is a growing body of literature to suggest that the experience of housing insecurity may be associated with negative physical and mental health outcomes. A study by Alabi & Balogun (2021) in Nigeria found that the type and quality of housing units in informal settlements significantly affected the mental health of residents. The impact of overcrowding on mental health was pronounced among those living in a tenement building, commonly referred to as Brazilian face-me-I-face-you. Approximately 42.8% of these residential structures housed 5-6 households. Issues such as unaffordable rent and insecurity of rental housing tenure worsen the mental health of 46.9% and 40% of residents respectively. The most common mental health issues identified were anxiety, depression, stress, sleeping problems, substance abuse. Schizophrenia, manic depression, phobias and panic disorders occur rarely among the residents. A cross-sectional study by Carrere et al. (2022) was conducted via a survey among individuals attending the Platform for people affected by mortgages or the Alliance against Energy poverty in Barcelona for the first time between June 2017 and December 2019, focusing on those who reported experiencing housing insecurity. The dependent variables included the risk of poor mental health, self-reported anxiety and/or

depression, and the use of psychotropic medications. Age-adjusted robust Poisson regression models were applied to each dependent variable to estimate adjusted prevalence ratios. The sample included 256 women and 104 men. The prevalence of poor mental health was 89% in women and 85.3% in men, which was much higher than that in the general population of Barcelona. Among women, mental health was worse in those living in a squat and those with food insecurity. Among men, the results showed no clear pattern. Poor mental health was highly prevalent in people with housing insecurity and was exacerbated by the coexistence of life insecurities.

Quantitative research conducted among Organization for Economic Co-operation and Development (OECD) countries by Talmatzky et al. (2023), explored housing insecurity by analyzing at least one independent variable linked to housing affordability and/or instability, and included at least one mental health-related outcome among adult renters. Due to the diversity of the findings, they utilized a narrative synthesis. A total of 22 studies met the inclusion criteria, with 14 using a longitudinal design, five a cross-sectional design, and three a quasi-experimental design. Of the nine studies that looked at housing affordability, six found significant links between unaffordable rent and poor mental health among low-income renters. In terms of housing instability, 12 out of 14 studies indicated significant connections between unstable housing and mental health issues in renters. Further studies by Yong et al. (2014) analyzed data from the 2009 behavioral risk factor surveillance system across 12 states. Housing insecurity and food insecurity were defined as experiencing worry or stress at times, usually or always within the past year regarding the ability to afford rent or mortgage payments or to buy nutritious meals. The results of this study showed that of 68,111 respondents, 26.4% reported frequent insufficient sleep, 28.5% reported housing insecurity, 19.3% reported food insecurity, and 10.8% reported frequent mental distress. The prevalence of frequent insufficient sleep was significantly greater among those who reported housing insecurity (37.7% vs 21.6%) or food insecurity (41.1% vs 22.9%) than among those who did not. The prevalence of frequent mental distress was also significantly greater among those reporting housing insecurity (20.1% vs 6.8%) and food insecurity (23.5% vs 7.7%) than those who did not.

Empirical studies in the UK by Mason et al. (2024) used longitudinal survey data (2009-2019, n=11,164 individuals with annual data) from the UK Household Longitudinal study. The study focused on outcomes such as probable mental disorder (GHQ-12), sleep disturbances caused by worry, and new hypertension diagnoses. The main factor examined was housing payment problems in the past year. By applying doubly robust marginal structural models with inverse probability of treatment weights, the researchers estimated both the absolute and relative health effects of housing payment problems, and population attributable fractions. They found that housing payment issues were linked with a 2.5 percentage increase in the risk of developing a common mental disorder (95% CI 1.1%,3.8%) and 2.0% rise in the risk of sleep disturbances (95% CI 0.7%, 3.3%). The estimates were more pronounced among renters, young people, less educated individuals, households with children, and people living in areas most affected by austerity-related reductions in housing support services.

Ludlow et al., (2024) investigate how housing insecurity affects mental health. They measure housing insecurity directly through missed rental payments due to financial shortages and utilize a difference-in-difference framework to separate the effect of housing insecurity from the broader effects of financial hardship. The researchers also investigated heterogenous effects of housing insecurity on mental health by the length of prior exposure to financial hardship to determine whether a prolonged exposure history increases the effect of housing insecurity on mental health. Their findings reveal that housing insecurity negatively affects the mental health of renters who previously experienced a two-year spell of financial hardship, resulting in an additional decline of 0.22 standard deviations in their mental health. They find a smaller effect of 0.14 standard deviations for those previously experiencing one year of financial hardship, while no effect was observed for individuals who had not previously experienced financial hardship.

Pierse et al. (2016) explored the cross-sectional relationships between housing factors and psychological distress, employing fixed-effects modelling of longitudinal data to analyze how changes in specific housing factors influenced changes in psychological distress. The findings revealed significant cross-sectional associations between housing circumstances and psychological distress.

Based on the above discussion it is hypothesized that:

2.3.1. Housing insecurity negatively influences mental health.

Housing Insecurity and Mental health attributed to demographics

Differences in how people experience mental well-being can be attributed to demographic variables (Addai et al., 2014). Age and gender are the most explored demographics in well-being research.

- **Age**

Bhat (2021) investigated the effects of housing insecurity on the mental as well as physical health of older adults. The study used data from the midlife study (MIDUS; N=2,532; M age=63.42; 57% women; 16% black). Participants shared their experiences of anxiety/depression over the past year, along with their self-rated mental health, self-rated physical health, and the number of chronic health conditions experienced during that time. Participants also reported on their experiences of housing insecurity since the 2008 recession (e.g. homelessness, threatened with foreclosure or eviction, missed rent payment). Higher levels of housing insecurity were experienced by younger participants and black participants. The study indicated that, even when accounting for previous health status, housing insecurity was linked with significantly increased odds of anxiety/depression, poorer self-reported mental and physical health and a higher number of chronic health conditions. While neighborhood support measures were assessed as potential moderators and predicted lower odds of negative health outcomes, they increased the likelihood of experiencing these health issues when combined with housing insecurity. The results of the analysis suggest that experiences of insecure housing have midlife and aging adults vulnerable to compromised mental and physical health.

A prospective cohort study conducted by Keen, et al., (2023) investigated the relationship between childhood housing insecurity and subsequent anxiety and depression symptoms considering time varying measures of childhood poverty. The study included individuals aged 9,11 and 13 years at baseline from the Great Smoky Mountains study in western North Carolina. Participants were evaluated up to 11 times from January 1993 to December 2015. Among the 1339 participants (mean [SD] age, 11.3 [1.63] years), 739 (55.2%; 51.1% weighted) were male; 1203 individuals assessed up to the age of 30 were included in the adulthood outcome analyses. Standardized mean baseline anxiety and depression symptom scores were higher among children who experienced housing insecurity than among those who never experienced housing insecurity (anxiety: 0.49 [1.5] vs 0.22 [1.02]; depression 0.20 [1.08] vs -0.06 [0.82]). Individuals who experienced childhood housing insecurity had elevated anxiety symptom scores (fixed effects: standardized mean difference [SMD], 0.21; 95% CI,0.12-0.30; random effects: SMD, 0.25; 95% CI, 0.15-0.35). In adulthood, childhood housing insecurity was linked to higher depression symptom scores (SMD, 0.11; 95% CI 0.00-0.21).

- **Gender**

Disparities exist in how men and women perceive housing insecurity and how it affects their well-being mentally. Studies have found that women are prone to experiencing higher levels of depression when living in overcrowded housing than men (Kim & Kang, 2023). A study by (Vasquez-Vera, Fernandez, & Borrell, 2024) aimed to analyze the differences in work-life balance between and within genders (1159 women, 1077 men, and 5 trans), and their effects on health outcomes, according to housing insecurity and social class. They measured five health outcomes: mental health, self-perceived health, sleep quality, chronic headaches, and chronic backpain. The explanatory variables were productive, reproductive workloads and their interactions. Among women without housing insecurity, those with no productive workload and moderate reproductive workload had the poorest mental health, self-perceived health and sleep quality. Among women without housing insecurity of non-manual social class, those with productive workload and high reproductive workload had the poorest mental health and sleep quality. Among men with housing insecurity, those with no productive workload and high reproductive workload had the poorest sleep quality and chronic back pain. The health effects of work-life balance vary according to housing situation and gender.

A survey by Audet et al. (2018) conducted across 14 districts in central Mozambique in 2014 gathered information from 3543 female heads of household (100% response rate) on > 500 variables, including a depression screening tool (PHQ-8), found that among female heads of household, 14% screened positive for depression (PHQ-8 score > 10). Their adjusted models show increased odds of depression per additional year of age (aOR: 1.02 [1.01, 1.04]; p= 0.002), additional year of education (aOR: 1.06 [1.02, 1.11]; p= 0.006), and additional kilometers from nearest clinic (aOR: 1.05 [1.02,1.07]; p= < 0.001). Experiencing food insecurity (aOR: 1.05[1.02, 1.08]; p= 0.003) was associated with increased odds of depression. Being single (aOR: 0.42 [0.29, 0.60]) or divorced/widowed/separated (aOR: 0.57 [0.34, 0.98]; p< 0.001) vs. married was protective against depression, as was a perceived sufficient household income (aOR: 0.37 [0.19, 0.69]; p= 0.008).

Given the discussion above it is therefore hypothesized that the influence of housing insecurity on mental health outcomes can be attributed to demographics.

2.3.2. Significant differences exist in the relationship between housing insecurity and mental health outcomes attributed to personal demographics

Although the existing literature extensively documents the adverse effects of housing insecurity on mental health and identifies significant demographic differences influencing this relationship, these studies predominantly focus on contexts outside Zambia. There remains a critical gap in understanding how housing insecurity affects mental health within the unique socio-economic, cultural, and housing environments of Zambia. Factors such as informal housing markets, traditional social networks, and local economic conditions may shape these experiences differently compared to other regions. Moreover, much of the current research emphasizes broad population trends without fully capturing the nuanced, localized dynamics that influence both housing insecurity and mental health outcomes in Zambian communities. Addressing this gap is essential for developing contextually relevant interventions and informing policy frameworks tailored to Zambia's specific challenges. This study, therefore, seeks to explore the interplay between housing insecurity and mental health in the Zambian context, considering demographic variables and localized factors that have been underexplored in previous research.

3. Materials and methods

To address the study objectives, a quantitative cross-sectional survey design was employed, allowing data collection at a single point in time. This approach enabled the investigation of associations between housing insecurity and mental health outcomes among residents of an informal settlement, without altering their natural environment (Wegner, 2007).

The study targeted adult residents of Misisi Compound, one of Lusaka's most prominent informal settlements. This population was selected due to their heightened vulnerability to housing-related challenges, making them an appropriate group for examining the relationship between housing insecurity and mental health.

Given the logistical constraints and lack of a comprehensive sampling frame, a non-probability sampling method, specifically convenience sampling, was used to recruit participants. Out of 200 distributed questionnaires, 126 were completed and returned, resulting in a response rate of 63%.

Data was collected through a structured questionnaire comprising three sections. The first section captured demographic information such as age, gender, education level, employment status, and income. The second section assessed housing insecurity using items adapted from existing validated scales, covering five dimensions: housing affordability, housing quality, housing and neighborhood safety, housing stability, and neighborhood quality. Responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item is: *"I find it difficult to pay the full amount of rent due to financial problems."*

The third section measured mental health outcomes, specifically depression and anxiety. Depression was assessed using the Patient Health Questionnaire (PHQ-9), a nine-item instrument with a four-point Likert response scale ranging from 1 (not at all) to 4 (nearly every day). The scale demonstrated good internal reliability, with a Cronbach's alpha of 0.75 (Logie et al., 2024). Anxiety was measured using the Generalized Anxiety Disorder Scale (GAD-7), which consists of seven items rated on the same four-point Likert scale. The GAD-7 showed acceptable reliability with a Cronbach's alpha of 0.78 (Logie et al., 2024).

4. Data Analysis

Data was analyzed quantitatively by using SPSS (SPSS Inc., 2013). Data was screened for outliers, typing errors and inconsistencies. Descriptive statistics were analyzed (means, standard deviation, skewness and kurtosis to describe the characteristics of the sample. Item analysis was also performed to confirm the consistency or reliability of the measurement items on the sample.

Pearson product moment correlations were analyzed to determine the linear relationships between the variables (Maxwell & Moores, 2007). Total scores for each variable were computed and used in the correlation and regression analyses. Effect sizes were determined according to guidelines given by Cohen (1988).

Correlation coefficients, significance was set at $p \leq 0.05$, with r values categorized as follows: small correlations ($0.10 \leq r < 0.29$), medium correlations ($0.30 \leq r < 0.49$), and large correlations ($0.50 \leq r \leq 1.00$). According to Cohen (1992), a correlation is only practically significant if it is statistically significant.

An independent samples t test was performed to compare the mean score differences of the two latent variables based on gender. The Levene's test for significance was used to determine whether equal variance based on gender is assumed (Pallant, 2011). In addition, Cohen's d was also examined as an addition to the t-test result in inferential statistics (Cohen, 1992). According to Geldenhuys and Henn (2017), Cohen's d presents the distance between the two groups being compared based on the standard deviation score. Cohen (1992) suggests that a value of 0.1 is a small effect, 0.3 is a medium effect and 0.5 is large effect.

Analysis of variance (ANOVA) was performed to determine inter group differentiation.

Multiple regression analysis was used to determine the amount of variance explained in anxiety and depression.

Data was inspected to ensure that the assumptions of normality, linearity and homoscedasticity were met. Multicollinearity values (tolerance and Variance Inflation Factor [VIF]) were within recommended limits (Pallant, 2011).

5. Results

5.1. Demographics

A total of 160 questionnaires were distributed resulting in 126 complete responses. The sample consists of 70 female participants (55 %) and 56 male respondents (44.4%). It can be observed from table 1 that there were more females (55.6%) compared to males (44.4%). In terms of age distribution, the largest proportion of participants fell within the age range of 18-25, while the smallest proportion was observed in the age group of between 26-35. 55.6 percent of the respondents were single; 23 percent were married.

Table 1 Demographic Profile of Respondents

Item	Description	Frequency	Percent
Gender	Female	70	55.6
	Male	56	44.4
Age	18-25	51	40.5
	26-35	15	11.9
	36-45	35	27.8
	Above 45	25	7.8
Marital status	Single	70	55.6
	Married	29	23
	Other	27	21.4

5.2. Descriptive Statistics

Descriptive statistics is a summary statistic that quantitatively describes, summarizes, organizes and presents data concisely from a given dataset. Mean score interpretation was based on the following criteria: where 1-1.80 reflects very low mean score, 1.81- 2.60 reflects low mean score, 2.61-3.40 reflects moderate mean score, 3,41-4.20 reflects high mean score, and 4.21 -5 reflects very high mean score. Table 2 below gives a summary of descriptive statistics.

Table 2 Descriptive statistics

Variables	Mean	Standard Deviation	RANK
HOUSING INSECURITY	2.966	1.867	1
DEPRESSION	2.818	1.258	2
ANXIETY	2.678	1.195	3

Results in table 2 showed that there was a low attitude among respondents towards housing insecurity with a mean score of 2.966. Mental health outcomes had a mean score of 2.818 and were found to be low as well. Anxiety had a mean score of 2.678 an indication of very weak attitudes of participants.

5.3. Reliability Analysis

Item analysis is a reliability procedure that permits a user to identify and eliminate those items not contributing to a valid and dependable explanation of the latent dimensions in question (Chikampa, 2013). The justification behind executing an item analysis is that when it is performed, it gives information on any of the scales that are unreliable or fails to show expected levels of validity. The dependability and legitimacy of a scale can usually be made better by getting rid of bad items defined as items that do not mirror the latent dimension that the items have been tasked to replicate (Burger,2012).

Table 3 Reliability of scales

Scale	Items	Cronbach's alpha
HOUSING INSECURITY	5	0.953
DEPRESION	9	0.915
ANXIETY	7	0.818

The results of the item analysis are shown in table 3 above and all scales met the benchmark reliability standard of a>0.7. The Housing insecurity scale with 5 items had a Cronbach's Alpha of 0.953 which suggests reliability of the scale in measuring housing insecurity. Depression and anxiety had Cronbach Alpha's of 0.915 and 0.818 respectively.

5.4. Correlational Analysis

To assess the linear relationships between housing insecurity and mental health outcomes specifically depression and anxiety, Pearson correlation coefficients were calculated (Maxwell & Moores, 2007). Total scores for each variable were computed and used in the correlation and regression analyses. Following Cohen's (1988) guidelines for interpreting correlation coefficients, significance was set at $p \leq 0.05$, with r values categorized as follows: small correlations ($0.10 \leq r < 0.29$), medium correlations ($0.30 \leq r < 0.49$), and large correlations ($0.50 \leq r \leq 1.00$). The Pearson correlation results, as presented in Table 4, revealed the following key findings: A medium negative relationship was found between housing insecurity and mental health (depression) ($r = -0.438$; $p < 0.000$), indicating a medium practical effect. A negative relationship was identified between housing insecurity and mental health (Anxiety) ($r = -0.397$; $p < 0.000$). A large positive correlation between depression and anxiety was identified ($r= 0.669$; $p< 0.000$)

Table 4 Correlations coefficients for housing insecurity and mental health outcomes (Depression & Anxiety)

	HI	MH(DEP)	MH(ANX)
HI	1		
MH(DEP)	-.438**	1	
MH(ANX)	-.397**	.669**	1

HI, Housing insecurity; MH(DEP), Mental health (Depression); MH (ANX), Mental health (Anxiety)

Independent sample t-tests

Independent sample t-tests are reported for the demographic variable of gender in Table 5. It was found that male and female respondents experience significant differences in levels of mental health. More specifically, women experienced higher levels of negative mental health outcomes, there is a medium effect size for the difference between females and males respondents for the mental health variable.

Table 5 Independent t-tests of gender on housing insecurity & Mental health outcomes

Variable	Female Mean	Female SD	Male Mean	Male SD	t	p	Cohen's d
Housing Insecurity (HI)	53.94	17.88	59.38	18.21	-1.68	0.087	0.30
Mental Health (MH)	46.30	11.06	41.38	12.64	2.33	0.14	0.42

5.5. Analysis of Variance

To check if there was any difference in means in variables (housing insecurity and mental health- depression & anxiety) due to age, marital status, occupation, type of housing and length of stay among residents of Misisi compound one- way Analysis of Variance (ANOVA) test was performed. The results are shown in table 6.

Table 6 ANOVA Test results of Age

Variable	F	Significance (0.05)
Housing Insecurity	12.082	0.000
Mental health (depression)	5.119	0.002
Mental health (Anxiety)	5.171	0.002

The results in table 6 show that there is a statistically significant difference in means due to age for the three variables, as the P values for all three variables are less than 0.05 level of significance.

Table 7 ANOVA Test results of Marital Status

Variable	F	Significance (0.05)
Housing Insecurity	12.082	0.000
Mental health (depression)	5.119	0.002
Mental health (Anxiety)	5.171	0.002

The results in table 7 also show that there is a statistically significant difference in means due to marital status for the three variables, as the P values for all three variables are less than 0.05 level of significance.

Table 8 ANOVA Test results of Occupation

Variable	F	Significance (0.05)
Housing Insecurity	7.914	0.000
Mental health (depression)	5.289	0.002
Mental health (Anxiety)	4.559	0.005

Significant differences in means due to respondent occupations for the three variables are observed, as the P values for all three variables are less than 0.05 level of significance.

Table 9 ANOVA Test results of Type of housing

Variable	F	Significance (0.05)
Housing Insecurity	7.394	0.000
Mental health (depression)	5.755	0.001
Mental health (Anxiety)	5.120	0.002

The results in table 9 show that there is a statistically significant difference in means due to type of housing for the three variables, as the P values for all three variables are less than 0.05 level of significance.

Table 10 ANOVA Test results of Length of stay

Variable	F	Significance (0.05)
Housing Insecurity	13.800	0.000
Mental health (depression)	3.833	0.012
Mental health (Anxiety)	3.302	0.023

Significant differences in means due to respondent length of stay for the three variables are observed, as the P values for all three variables are less than 0.05 level of significance.

5.6. Regression Analysis

Multiple regression analysis was conducted to examine the extent to which housing insecurity predicts mental health outcomes (depression & anxiety). The results of the model summary for the regression analysis are presented in Table 11. The R value of 0.459 suggests a moderate degree of correlation between the predictor variable and mental health outcomes. According to Satardien et al. (2019), the R value, or adjusted R, indicates the proportion of the total variance in mental health that is accounted for by the predictor variable in the model. The findings reveal that the model explains 20.5% of the variance in mental health.

Table 11 Model Summary

				Std. Error of the
Model	R	R Square	Adjusted R Square	Estimate
1	.459[a]	.211	.205	10.69533

a. Predictors: (Constant), HI

The analysis of variance (ANOVA) tests the null hypothesis that multiple R in the population equals 0, and reports how well the regression equation fits the data (predicts the dependent variable) (Pallant, 2010). Results in Table 12 indicate that the regression model is statistically significant (p < 0.05).

Table 12 Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3796.065	1	3796.065	33.185	.000[b]
	Residual	14184.38	124	114.390		
	Total	17980.44	125			

a. Dependent Variable: MH

b. Predictors: (Constant), HI

The third step of the analysis sought to determine whether housing is insecurity and could predict mental health. To assess potential multicollinearity among the predictor, tolerance and variance inflation factor (VIF) values were examined. According to Satardien et al. (2019), tolerance values below 0.10 suggest high correlations among the variables, which may indicate multicollinearity, while VIF values exceeding 10 would similarly signal multicollinearity. The results presented in Table 13 show that both the VIF and tolerance values fall within the acceptable range, suggesting that multicollinearity is not a concern in this model.

Further analysis in Table 13 reveals that housing insecurity made a statistically significant and unique contribution to mental health outcomes, with a standardized beta coefficient of β = -0.459, t = -5.769, and p < 0.001. This suggests that

housing insecurity demonstrated a significant negative predictive effect on mental health outcomes. These findings highlight the importance of housing insecurity as a stronger predictor of negative mental health outcomes. This aligns with prior research by Alabi & Balogun (2021) suggesting that housing insecurity can have a profound negative impact on mental health outcomes

Table 13 Regression Analysis: Housing insecurity, Mental health outcomes

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	61.212	3.118		19.633	<.001
	HI	-.303	.053	-.459	-5.761	<.001

a. Dependent Variable: MH

6. Discussions

This study aimed to investigate the relationship between housing insecurity and mental health outcomes among residents of Misisi compound, an informal settlement in Lusaka. The second objective was to examine significant differences in the relationship between housing insecurity and mental health outcomes attributed to demographics. The third objective was to determine whether housing insecurity could predict mental well-being.

Reliability estimates were calculated using Cronbach's alpha coefficients (α), and the results demonstrated a high level of internal consistency ($\alpha \geq 0.70$) for the three measuring instruments, in line with Nunnally and Bernstein's (1994) reliability standards.

Pearson product-moment correlation coefficients were used to examine the relationships among the key variables in this study. Correlation analysis results revealed that there is a significant negative correlation between housing insecurity and mental health outcome specifically depression ($r= -0.438$; $p < 0.00$). Correlational analysis results also revealed that there is a significant negative correlation between housing insecurity and mental health outcomes specifically anxiety ($r = -0.397$; $p < 0.000$).

These findings suggest that as housing insecurity increases, mental health tends to decline. In other words, individuals experiencing higher levels of housing insecurity are more likely to report poorer mental health outcomes. This finding is consistent with existing literature that highlights the negative impact of housing insecurity on mental health (Ludlow et al.,2024; Manson et al., 2024) The stress and uncertainty associated with housing insecurity can exacerbate mental health problems, such as anxiety and depression.

The first hypothesis, which posited a negative relationship between housing insecurity and mental health outcomes, was confirmed.

Independent sample t test and one-way Anova results have shown that there are significant differences in the means attributed to respondents' personal demographics hence confirming hypothesis number two

Regression analysis results revealed that housing insecurity was a significant predictor of mental health, with a beta coefficient of -0.459, $t = -5.769$, and $p < 0.001$. This suggests that as housing insecurity increases, mental health tends to decline. A 1-unit change in housing insecurity will lead to a 0.459 decrease in mental health, holding all other variables constant.

6.1. Contribution

Housing insecurity is a crucial latent variable that significantly influences various mental health outcomes such as depression and anxiety. From a practical standpoint, the implications of these findings are noteworthy for policy makers in government administrators and policy. By integrating this understanding into policy and practice, administrators are positioned to design and implement targeted interventions and strategies that enhance housing security, ultimately contributing to improved mental health outcomes among citizens in the country at large.

6.2. Limitation

In this study the relatively small sample size of 126 respondents limits the generalizability and strength of the findings. A larger sample size, ideally exceeding 200 participants as recommended by most statistical software packages, would allow for more robust statistical analyses, such as Confirmatory Factor Analysis (CFA) to control for measurement errors and Structural Equation Modeling (SEM) for path analysis. As it stands, the sample size in this study falls short of the requirements for these advanced methods, and future studies should aim to increase the sample size to enhance the reliability and validity of the findings. According to Geldenhuys & Henn (2017), a cross-sectional design precludes any conclusions regarding cause-and-effect relationships, as it captures data at only a single point in time. In this case longitudinal studies, which track participants over an extended period, would be better suited to uncover causal inferences and provide deeper insights into the dynamics of mental health outcomes and their predictors. The usage of self-administered questionnaires is another potential limitation. According to Satardien et al. (2019), they are prone to social desirability biases and may lead to underreporting of certain behaviors or attitudes, thus affecting the accuracy of responses. To mitigate such biases, future studies could incorporate alternative data collection methods, such as interviews or behavioral assessments, which could provide more reliable and comprehensive data. Cross-sectional designed studies do not account for maturational effects, which may influence mental health over time. Longitudinal studies, as suggested by Terre Blanche and Durrheim (1999) and Satardien et al. (2019), would provide a more nuanced understanding of how mental health evolves and is influenced by housing insecurity.

7. Conclusion

This study has provided valuable insights into the relationships between housing insecurity and mental health outcomes. The findings indicate that housing insecurity is negative but significantly correlated with depression and anxiety.

Understanding how these three variables interrelate is crucial for housing specialists in both the private and public sectors, as it provides a framework for designing effective housing interventions and policies. By recognizing the importance of housing security in fostering positive health outcomes. Government administrators and policy makers can develop strategies that enhance housing security leading to improved mental outcomes and well-being.

Recommendations

- Policy and Government Action

The government should prioritize affordable, secure housing policies to reduce housing insecurity and its impact on mental health.

- Community-Based Interventions

Establish localized mental health support systems to help residents cope with depression and anxiety linked to poor housing conditions.

- Capacity Building and Education

Train community leaders and health workers to identify mental distress and educate residents on available mental health services.

- Future Research and Data Collection

Conduct larger, longitudinal studies to explore the causal relationship between housing insecurity and mental health outcomes.

- Urban Planning and Infrastructure

Improve infrastructure and legal housing rights in informal settlements to promote residential stability and psychological well-being

Compliance with ethical standards

Disclosure of conflict of interest

There was no conflict of interest based on our study.

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