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## THE IMPACT OF SICK BUILDINGS ON THE HEALTH AND WELL-BEING OF RESIDENTS IN LOW COST APARTMENT BUILDINGS; (A CASE STUDY OF GITHURAI 44, NAIROBI COUNTY)

CHRISTIAN OCHOME OWOKO



# INTRODUCTION

According to WHO (2015), "sick building syndrome" (SBS) refers to circumstances in which building occupants have acute health and comfort consequences that appear to be related to time spent in the building, but no particular sickness or cause can be established. The complaints might be concentrated in a single room or zone, or be found across the structure.

We spend nearly 90% of our time indoors, according to the Consumer Product Safety Commission (2020), and our environment is the most important factor contributing to our overall health. That implies that our health starts at home, at work, and anywhere else we spend time indoors on a regular basis.

Sick Building Syndromes (SBS) are caused by a variety of factors (Popay et al, 1993). The United States National Institute of Occupational Safety and Health (US NIOSH, 2003) lists poor air quality, inadequate ventilation, outside air pollutants, biological agents, indoor pollution, building materials, noise, and illumination as some of the factors





# INTRODUCTION cont.

SBS is difficult to diagnose because of the vast variety of symptoms that might be mistaken for other illnesses, such as the common cold. SBS is distinguished by the fact that symptoms lessen after leaving the location in issue, yet recurrent symptoms occur anytime you enter that building. SBS symptoms can impact your skin, respiratory, and neurological systems (Zhang, 2004).

The United States Protection Agency (1991), emphasizes on the need to distinguish SBS from building related illnesses (BRI). The agency defines BRI as exposure to chemicals in modern airtight buildings with insufficient ventilation causes diseases that affect the lungs as well as other regions of the body. It is important to note that similar complaints may also result from other causes. These may include an illness contracted outside the building, acute sensitivity like allergies, job related stress or dissatisfaction, and other psychosocial factors. (Zhang, 2004).

According to Lahtinen (1998), Sick building syndrome (SBS), has prompted academics to concentrate their efforts on the workplace and its psychological aspects. The gains from the researchers in the work environment cannot be overemphasized however; SBS in the home environment remains neglected. O'Neil & John (1985), state that the need for adequate home environment is unexplored and emphasis only remain on their affordability.



# INTRODUCTION cont.

According to Mutegei (2020), there is still a demand for housing in Kenya's metropolitan regions, and the failure to completely address housing supply has resulted in demand reaching 250,000 housing units each year, totaling over two million units. It is for this reason that the government of Kenya launched the affordable housing project that seeks to build 500,000 low cost housing units by the year 2022 ( Daily Nation, 2017).

The project's focused on lowering mortgage costs, obtaining low-cost financing in both the private and governmental sectors for large-scale house construction, and minimizing construction costs via the use of new technologies and materials.

Goldman (1996), argues that SBS, which were originally noticed in the 1950s, were linked to the creation of post-war, energy-efficient, airtight structures, at a period when the architects' primary goal was to keep costs low. Focusing only on low cost of the housing units is insufficient but rather the health and wellbeing of the residents is critical. Shelter is one of the three basic needs, which every individual must satisfy (Smith, et al, 2012). It should aid the activities of the habitants protecting them from internal and external threats. Provision of housing without looking at the threat of SBS, which will label the housing units as 'sick buildings' thus undermines the need for calling that shelter a basic need.





# INTRODUCTION cont.

In Kenya, cases of condemned building are on the rise (Housing and Land Rights Network, 2016) and 58% of Kenya's buildings are unfit for habitation (NCA, 2016). However, the parameter of condemning the buildings put more emphasis on the structural integrity of the buildings rather than the health and wellbeing of the occupants.

An audit ordered by President Uhuru Kenyatta revealed that most buildings collapse because of poor quality concrete, weak foundation and low-quality building stones. This followed a series of collapsing buildings; ten in Nairobi, two in Kisumu and each in Meru, Mombasa, Nyamira and Kericho ( (Daily Nation, 2019).

The power to bring down unfit buildings by NCA was short down by parliament. On its own initiative or upon receipt of a written complaint addressed to the board by or on behalf of any person claiming flaws in a building approved by a registered person, the NCA wished to launch an investigation into the deficiencies and determine the cause of the problems.



# INTRODUCTION cont.

Because of the coronavirus epidemic in 2019, schools closed down, all religious and social activities became prohibited and residents advised to stay home. Indications reveal working from home could be the new norm until the pandemic is controlled. The home working environment and the effects of the health and wellness of the building on its occupants becomes a great concern (Analytica Oxford, 2020).

With people spending most of their time at home, there is the problem of them unknowingly experiencing SBS. It is crucial to figure out whether sick building syndrome exists in Kenya's low-cost apartment complexes, and if so, what effect it has on inhabitants' health and well-being.

Marete (2016), confirmed the presence of sick building syndrome in Kenya but his focus remained in the work place. This created an opportunity to investigate SBS in the home setting and assess its influence on residents' health and well-being.





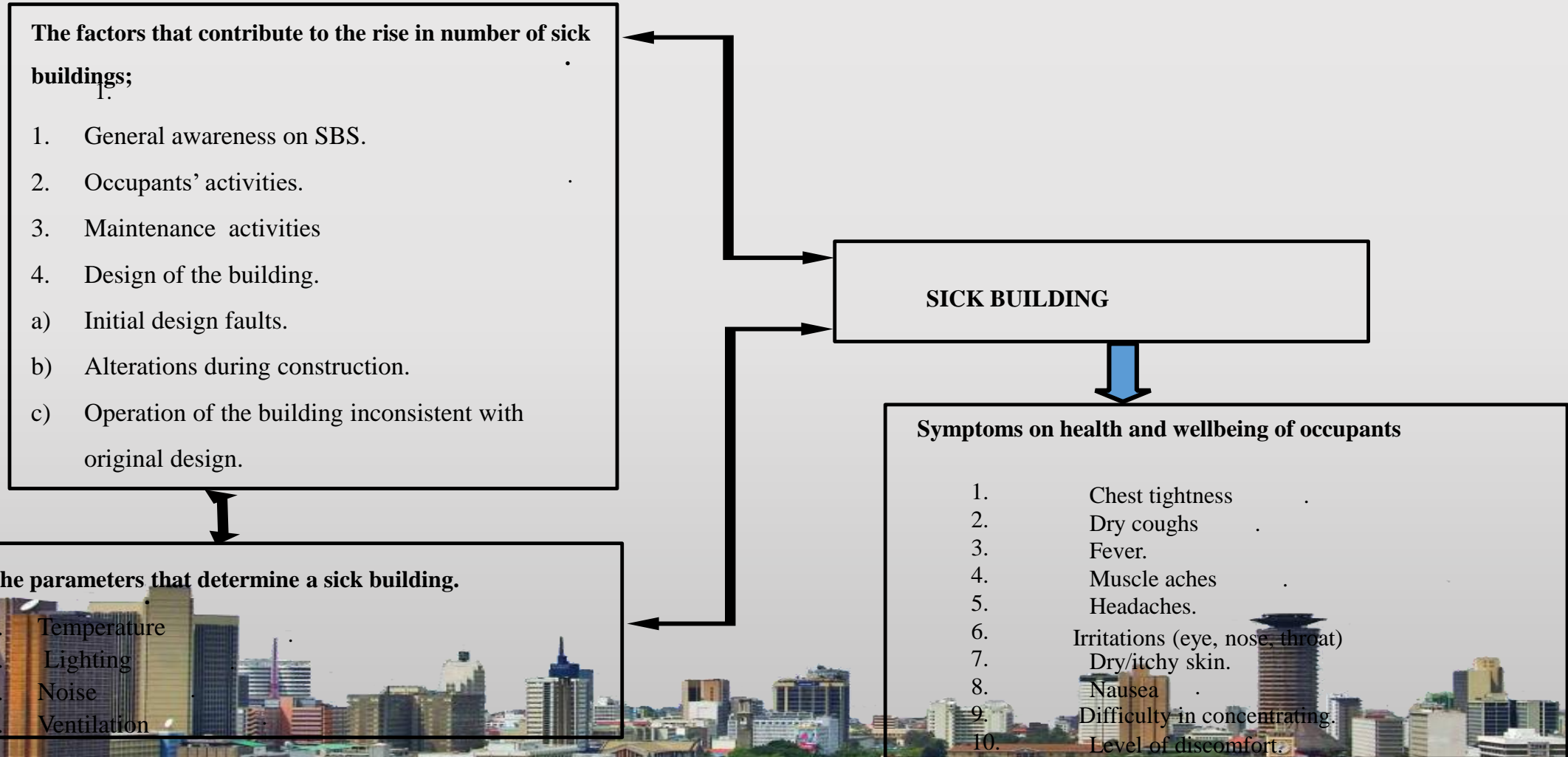
# THEORY

Theoretical frameworks of The well building Standard, LEED certification Program and The Health and Wellness framework was reviewed to formulate a conceptual framework. This included variables and indicators of; Protection and improvement of health; Comfort for building Users and Harmony between nature and the built environment. Molhave (1987), referenced by Potter (1988), came up with a refined set of five "symptoms criteria," that defined the health and well-being indicators.



# THEORY

## Conceptual Model





# RESEARCH METHODS

This study adopted a descriptive research design, which is suitable to deduce and describe the features of various variables that are relevant in any given situation (Agarwal & Sridhar, 2016). This aimed at guiding the researcher to describe some key aspects of the topic of study from the point of view of the tenants or developers feedback. The study area was Githurai 44 in Roy Sambu Sub County of Nairobi County. It is a residential area that habits the middle and lower income earning citizens.

The population was developers of low cost apartment buildings and tenants who stay in the low cost apartment block. According to the Kenya Property Developers Association (KPKDA, 2021), there are fifty-one registered property developers in good standing within Kenya with three based within the study area. Makori (2015), describes the sample size as a smaller set of the larger population. The population was small and viable hence no sampling was done. According to Adam (2017), when the population is small and viable, any sample drawn may not be a representative of the population from which it is drawn hence, the whole population was considered for the study.



# RESEARCH METHODS cont.

Purposive sampling method was used in this research. Purposive sampling is employed in opinion polls (Rodriguez, 2018) when the researcher wishes to learn more about a specific phenomenon rather than draw statistical conclusions, or when the population is tiny and specific. In order to be effective, a purposive sample must have explicit inclusion criteria and reasoning.

The population focused specifically on property developers who are registered by KPDA and operate within Githurai 44. The number of three developers (KPDA, 2021) was thus small and specific. The rationale for inclusion of the 112 tenants was squarely because they are specific to having proprietors registered as property developers by a credible association in Kenya. These are our key informants.

Both open-ended and close-ended questionnaires were used by the researcher to collect the primary data. The open-ended questions were useful in collecting subjective information whereas closed ended questions were used to gather quantitative information. Questionnaires give the researcher a door to get the actual feelings, experiences, perceptions, beliefs or attitudes of some of the sampled individuals (Mbusi, 2020).





# FINDINGS

## 1. Response rate

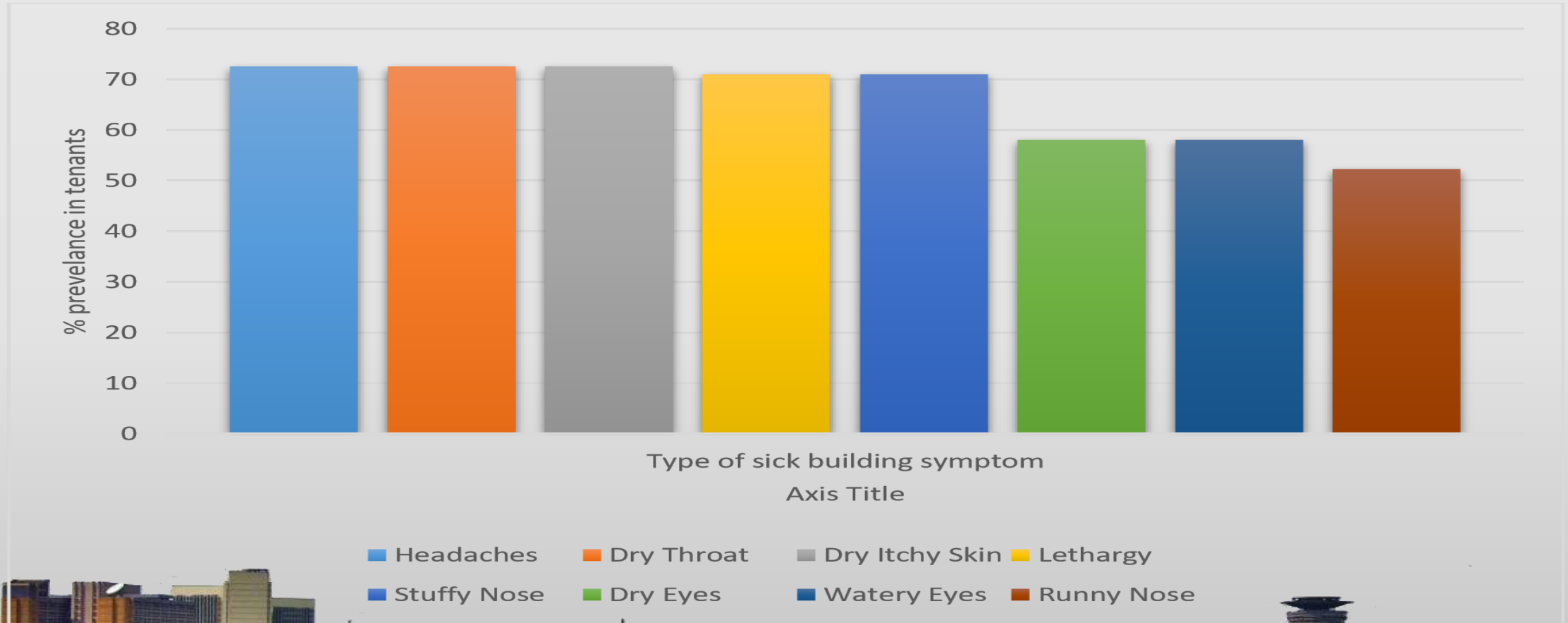
| <b>RESPONDENTS</b>  | <b>NUMBER OF QUESTIONNAIRES ADMINISTERED</b> | <b>NUMBER OF RESPONDENTS</b> | <b>PERCENTAGE RESPONSE RATE</b> |
|---------------------|--|------------------------------|---------------------------------|
| PROPERTY DEVELOPERS | 3  | 3                            | 100%                            |
| TENANTS             | 112  | 81                           | 72%                             |
| Total response      | 115  | 84                           | 73%                             |

The average response rate for this study was 73%. A good research project must obtain a response rate of 70% and above out of the total number of questionnaire issued (Mugenda and Mugenda, 2003). Therefore the average response rate for this study of 73% was good and sufficient for data analysis, reporting and drawing conclusions.



# FINDINGS

## 2. Rate of tenants complains on SBS

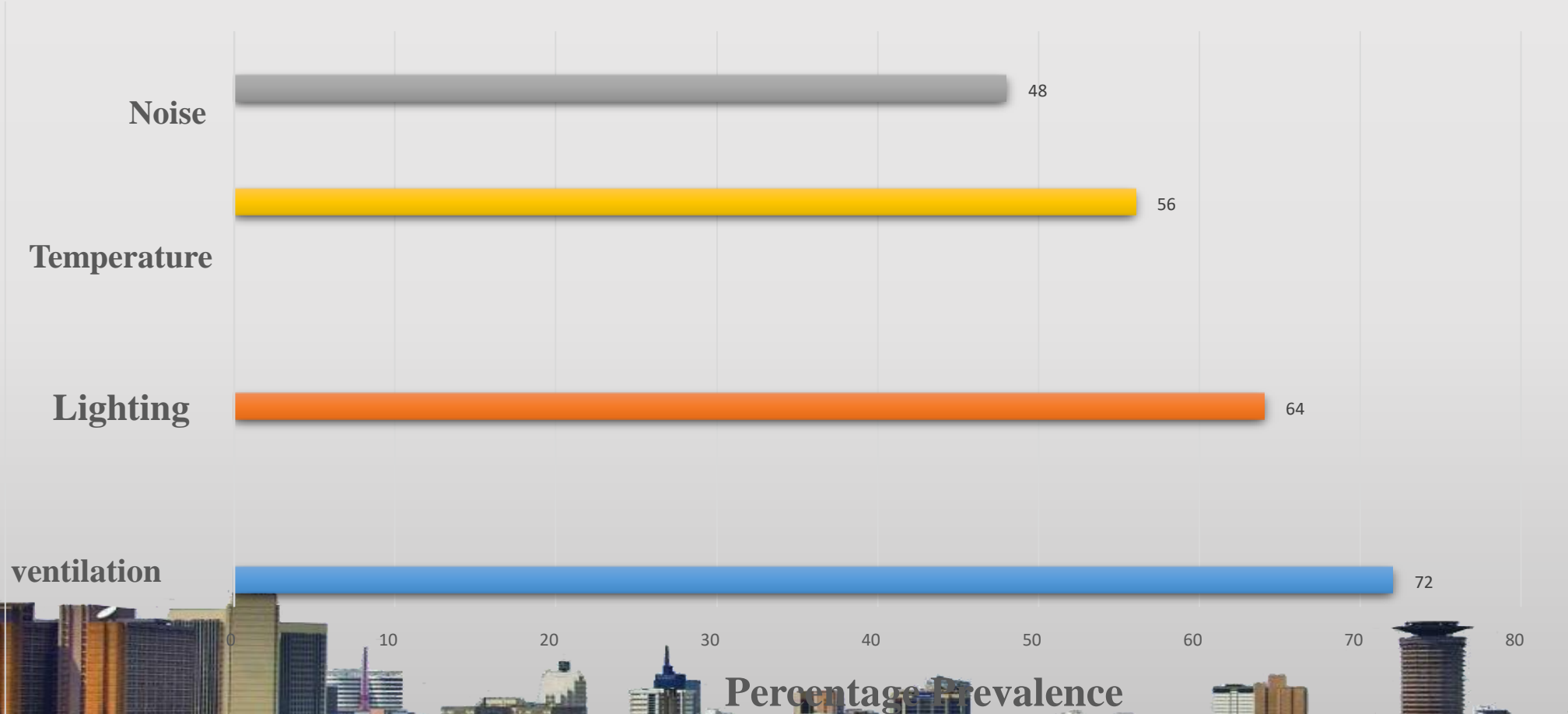


Source: Field Survey, (2021)



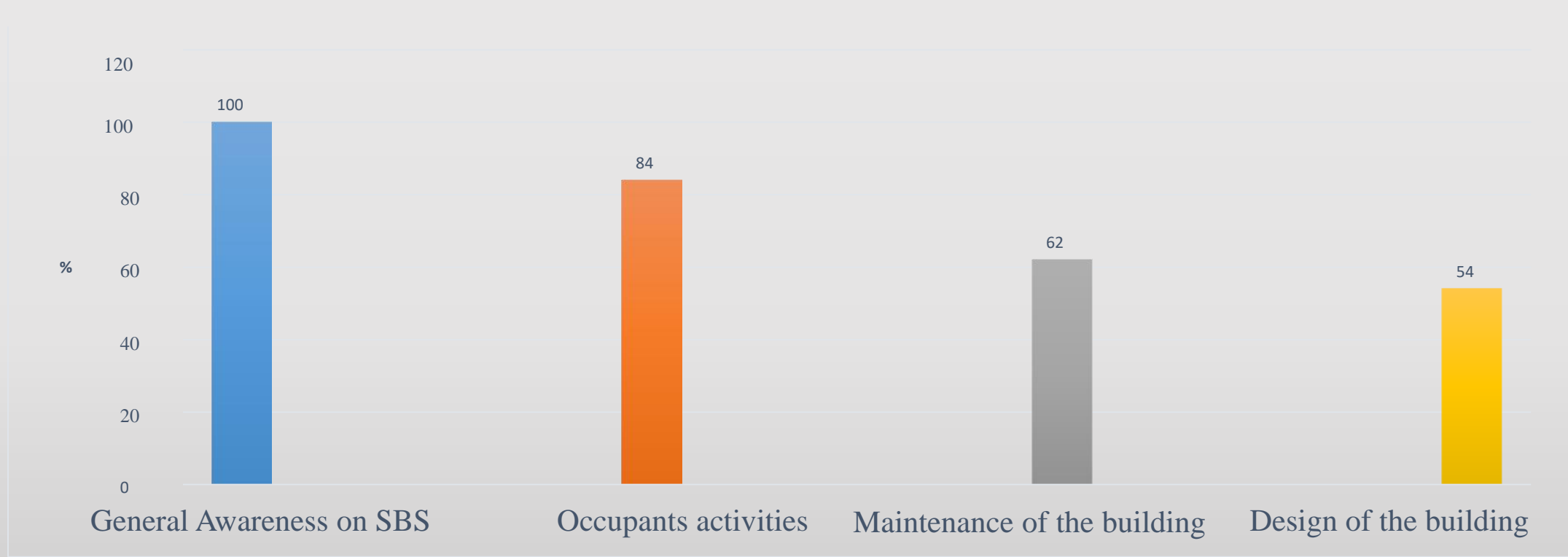
# FINDINGS

## 3. Parameters that determine sick buildings



# FINDINGS

## 4. Factors contributing to rise in number of sick buildings





# SUMMARY OF FINDINGS

The study found out that: The most predominant symptoms of SBS including headache, dry throat and dry itchy skin. Others include lethargy, stuffy nose, dry eyes, watery eyes and runny nose. The impact is huge due to the existence of more than four of the recommended symptoms among the tenants. The frequency of the symptom recurring is correlated to the time the tenant stays in the building. The longer time they spend in the building, the more frequent and persistent the symptom appears.

The second objective was to establish the parameters that determine sick buildings in the Kenyan low cost apartment buildings context. The literature review revealed that: Ventilation, lighting, temperature and noise are the parameters that determine sick buildings. The findings were; ventilation is the leading parameter determining sick buildings in Kenya. It is followed by lighting, temperature and noise respectively.

The third objective revealed was to establish the factors that contribute to the rise in number of sick buildings. The literature review revealed that general awareness on SBS,

occupants' activities, maintenance of the building and design are the factors that contribute to rise in number of sick buildings. The study findings were: General awareness is the most significant factor contributing to rise in number of sick buildings. Occupants activities like cooking fuels, smoking, cleaning and opening of windows was the second significant factor. Other factors were maintenance and design of the building.



# CONCLUSIONS AND RECOMENDATIONS

## Conclusion

There are sick low cost apartment buildings in Kenya and tenants' health and wellbeing are negatively impacted.

The symptoms include headaches, dry throat, dry itchy skin, lethargy stuffy nose, dry eyes, watery eyes and runny nose. Presence of a combination of any four of these symptoms indicates SBS and that the building is sick.

The parameters that determine a sick building in Kenya in order of significance include ventilation, lighting, temperature and noise. If these parameters are unsatisfactory, the building is declared sick and it leads to SBS. The factors that contribute to the number of rise in sick buildings include general awareness on SBS, occupants' activities and design of the building. If these factors are neglected, they make a building sick leading to SBS.





# CONCLUSIONS AND RECOMENDATIONS

## RECOMENDATIONS

- Create general awareness among the tenants, developers and designers on the existence of sick building syndrome so that it is averted in the inception stages.
  - Tenants will be able to avoid renting sick buildings at the same time moderating their activities in buildings that may influence SBS.
  - Developers will be able to make sound financial decisions at the inception, construction, operation, and maintenance phase that will avert SBS.
  - Designers will be conscious of SBS at the design thus avert possibility of designing sick buildings.
- Building standards should emphasize on lighting, ventilation temperature and noise that are parameters determining whether a building is sick or sick free.
- County governments and Property developers to carry out periodic surveys on SBS during the lifetime of ai; building.

