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(USBET) 2023**

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THE HEALTH IMPACTS OF SICK BUILDING SYNDROME ON SEKOLAH PONDOK USERS IN BALING, KEDAH

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ABSTRACT

Sick building syndrome is the symptoms that are experienced by occupants due to indoor environmental problems in the building. There is a high risk of being infected for the occupants who stay inside the building for a long period of time. Sekolah pondok is a religious school that spreads the knowledge of Islam to community. It is the earliest Islam education centre founded in Malaysia. However, previous researchers revealed that sekolah pondok is lack of maintenance, do not follow the building specifications which increases the risk of Sick Building Syndrome and educational institution has received less attention to be as a research topic especially in Malaysia. This paper aims to investigate the health impacts that are caused from Sick Building Syndrome on sekolah pondok users in Baling, Kedah. The objectives are to identify the factors causing SBS at sekolah pondok, to investigate the health impacts of SBS on the users of sekolah pondok and to propose possible solutions that can prevent or reduce SBS at sekolah pondok. Questionnaires be distributed to the users of sekolah pondok which are teachers and management staff in Baling, Kedah. The research finding revealed that poor and irregular maintenance as the main factor that cause Sick Building Syndrome at sekolah pondok. On the other hand, general symptoms as the major health impact of Sick Building Syndrome to the users of sekolah pondok. Besides, periodic, and good maintenance is the most agreed solution that be selected by the respondents to reduce or prevent Sick Building Syndrome at sekolah pondok.

Keywords: Sick Building Syndrome (SBS), sekolah pondok, health impacts, indoor air quality

INTRODUCTION

Sick Building Syndrome (SBS) has been around for a long time. World Health Organization (WHO) have been acknowledged the existence of SBS and identified the associated symptoms in 1893 (Alias, 2017). SBS is the symptoms that experienced by occupants due to indoor environmental problems in the building. According to Lu et al. (2018), SBS is known as a set of symptoms that occur because of illness issues inside the building. There is a high risk of being infected to the occupants who stay inside the building for a long period of time. According to Sarkhosh et al. (2021) when people enter the building, the symptoms will start to appear. These symptoms can increase the risk of adverse health impacts for the occupants through mucosal, general, and skin symptoms.

Sekolah pondok is a religious school that exists to spread the knowledge of Islam to community especially Muslims. According to Wahab & Ahmad (2022) pondok institution is the earliest Islam education center founded in Malaysia and a legacy of Malay-Islamic civilization in field of education. Traditional pondok institution was constructed with poor infrastructure and its education was limited only to Islamic knowledge which is fard ain. It was originally built like sheds with supporting column that made from bamboo walls or palms trees where the education focuses more on religious knowledge such as Tauhid and Fiqh (Setiawan, 2020). Modern pondok institution is one of development of Islamic educational institutions which also known as Madrasah. Wahab & Ahmad (2022) state, due to the amendment of new law by the State Council of Kedah, on 20th October 1921 to observe the school life, Madrasah is called as reformation and modernization of pondok institution in term of improved infrastructure and added with acquired knowledge.

However, several researchers revealed that, there are pondok institution that do not follow the building specifications which can causes SBS. Ishak et al. (2019) state that the issue that usually arises from pondok institution is mostly about buildings do not comply with the specification of premises approved by the local authority. Refusal to register under Jabatan Agama Islam Negeri (JAIN) make it difficult for them to monitor the management of pondok institute (Fazial & Bahari, 2018). Besides that, the problem that also commonly arise in sekolah pondok is lack of maintenance on the building. Mas'ud et al. (2019) state, most of pondok institution do not have solid and fixed funds which only depends a lot on donations from community and fee collection from student's parents where the expenditure will focus on paying the salary to staff and purchasing learning tools instead of maintenance on building. The aim for this research is to investigate the health impacts that are caused from SBS on sekolah pondok users in Baling, Kedah. In line with this aim, research objective were established which are to identify the factors that cause SBS at sekolah pondok and to investigate the health impacts of SBS on the users of sekolah pondok. It is hoped that the establishment of both objectives helps to achieve the main purpose of this research.

LITERATURE REVIEW

Factors Cause Sick Building Syndrome (SBS)

According to Arzahar & Majid (2021) SBS was found to be affected by poor ventilation system. To get the better ventilation in the building, it needs to remove the deteriorated air so the occupants able to feel fresh. However, air conditioning inside the building is related with the higher prevalence of SBS. Improper maintenance of mechanical ventilation system can give health impact to the occupants due to air pollutants and the growth of microbiological. Nag (2019) states, poor maintenance of ventilation system causes allergy symptoms due to the pollen that enters into dwellings through air ducts. In addition, maintenance on structure of building should also be taken into account. Sarkhosh et al. (2021) state, maintenance on ceiling, walls and draining system of building must be done to ensure there is no water leakage because fungus will grow. Poor lighting is known as the aspect that can cause discomfort which lead to SBS. Tiredness, dry eyes and headaches can be caused by insufficient illumination, glare, flicker, and poor contrast (Shuang et al., 2014). Occupants who are exposed to low indoor air quality for a long period of time may be at risk for developing illnesses like asthma and migraine (Lu et al., 2018). Weak quality of indoor air will contain bacteria and fungus that can cause adverse health symptoms. The inappropriate level of air humidity can be included as one of the indoor issues that cause the prevalence of SBS. This is mentioned by Sarkhosh et al. (2021), the relative humidity is the indoor environmental problem that cause the symptoms of SBS such as irritation to nose, sneezing, coughing or fatigue which have been confirmed by the World Health Organization (WHO).

Health impacts of Sick Building Syndrome (SBS)

General symptoms are known as nonspecific symptoms which can be related with a variety of illness. According to Mentese et al. (2020) SBS includes general symptoms which are headaches, nausea, and drowsiness. From Zainal et al. (2019) their results show the general symptoms were caused by carbon dioxide, formaldehyde, ultrafine particles, and respirable dust. In addition, general symptoms are the most frequently reported compared to other symptoms for SBS. In primary school, general symptoms also have the highest rate that commonly occur among the students (Fard et al., 2018). Some of the mucus symptoms of upper respiratory in SBS are itchy throat, sore throat, eye irritation, swollen eyes, runny nose, nasal irritation and cough (Abdullah et al., 2019). Meanwhile, from Abdullah et al. (2019) SBS can cause mucus symptoms of lower respiratory system which are shortness of breath to occupants. Mucus symptoms that acquired from this syndrome are due to low quality of indoor air of the building. From Zainal et al. (2019) their results show the mucus symptoms were caused by carbon dioxide, air movement and respirable of fine particles such as dust. According to Nag (2019), skin symptoms are the one of symptoms that occurs in SBS which can cause itchy scalp, skin dryness and skin rash. Air pollution and poor ventilation inside the building are the cause of skin symptoms in this syndrome. Abdullah et al. (2019) mention, skin symptoms occur due to the indoor air contaminants that circulate the growth of microbial in the building which can give bad health effects to the occupants. Mansor & Sheau-Ting (2020) state, skin symptoms were found to have the less frequency symptoms that occur among the students at universities, but they are still remain especially for educational building.

The Possible Solution to Prevent or Reduce Sick Building Syndrome (SBS)

Indoor Air Quality (IAQ) assessment can help to maintain a healthy and comfortable environment inside the building for occupants. According to Mansor & Sheau-Ting (2020) IAQ program able to identify the issue of indoor air and develop a long-term solution to ensure the health of occupants are guaranteed. Good maintenance will reduce the risk for building to get this syndrome. From MZ & Saliluddin (2019) employers and employees from 80 office buildings had adverse health effects such as asthma due to improper maintenance in ventilation. Another that, the structure of building also needs to be maintained to prevent from defect such as leakage which in turn lead to SBS. Ketema et al. (2020) stated, mechanical and natural ventilation should be applied by follow the guidelines to have a proper system that can limit the concentration of indoor chemicals inside the building. These two types of ventilation systems are able to help in improving the indoor air quality that can prevent from this syndrome. Belachew et al. (2018) explained, the availability of windows as method of ventilation in building can naturally assists the external fresh air to the living quarters and remove amounts of microorganisms that can be seen as effective treatment. Vesitara & Surahman (2019) state, the occurrence of SBS was higher among the people that live inside in their homes without fans. The appropriate design of the building or structure will help in preventing the prevalence of SBS. This is because, Wang et al. (2022) pointed, design of the building as the one of the reasons that cause the prevalence of SBS. Therefore, the right building regulation should be implemented to protect the condition of the building.

RESEARCH METHODOLOGY

Sekolah pondok in Baling, Kedah was chosen as the scope for this study because Baling is a district that located in an area with less facilities. This is mentioned by Yahaya et al. (2020) which stated, Baling is known as the one of less developed district in Kedah. This research involved one type of research method which is quantitative method through questionnaires. For this study, the population is the teachers and management staff of sekolah pondok in Baling, Kedah. They were selected as respondents because they are the main users and more familiar with pondok institutions. From the total users of registered sekolah pondok in Baling, Kedah which are 122 from teachers and management staffs, 92 respondents will be used as sample. The numbers of respondents be selected by referring to the sampling table of Krejcie and Morgan (1970). The process of analysis of the data will be done by using Statistical Package for Social Sciences (SPSS) Version 26.

ANALYSIS OF FINDINGS

This section explains the analysis and findings from the questionnaires. Generally, the section is divided into three parts which are the factors cause SBS at sekolah pondok, the health impacts of SBS on the users of sekolah pondok and the possible solution to prevent or reduce SBS.

Factors that cause SBS at sekolah pondok

The respondents were asked about the factors that cause SBS at their pondok institutions in Baling, Kedah. The questions were asked to the respondents to know about the status of these factors at their pondok institutions. This section is important to know whether the factors that cause SBS is happening around the building.

Table 1: Factors that cause SBS at sekolah pondok

Factors	Likert Scale (Frequency)					Average Index	Rank
	1	2	3	4	5		
This building is not properly and regularly maintained	1	30	6	27	10	3.20	1
This building does not have a suitable air humidity	5	33	3	21	12	3.03	2
This building does not have a good ventilation system	8	29	10	14	13	2.93	3
This building contains indoor air contaminants	8	31	8	18	9	2.85	4
This building does not have a good lighting	20	37	5	10	3	2.15	5

Table 1 shows the findings for each factor that causes SBS at sekolah pondok. The results show that 'This building is not properly and regularly maintained' with (mean=3.20) which indicates the respondents mostly agreed with this statement. It also shows that, this statement has been found as the main factor that causes SBS at sekolah pondok in Baling, Kedah with the higher rate of agreement from the respondents.

The health impacts of SBS on the users of sekolah pondok

The respondents were asked about the health impacts of SBS that occurred to them at sekolah pondok in Baling, Kedah. It is important to identify the level of SBS through the symptoms faced by the users and common symptoms that occur among the users when living in the building.

Table 2: Health impacts of SBS on the users of sekolah pondok.

Health Impacts	Likert Scale (Frequency)					Average Index	Rank
	1	2	3	4	5		
Due to the condition of this building, I experienced general symptoms such as headaches, fever, nausea and exhausted.	3	9	2	39	21	3.89	1

Due to the condition of this building, I experienced mucus symptoms such as sore throat, eyes irritation, cough and runny nose.	4	12	6	36	16	3.65	2
Due to the condition of this building, I experienced skin symptoms such as itchy scalp, dry skin and red skin.	6	15	8	35	10	3.38	3

As presented in table 2, it shows the findings for each health impacts of Sick Building Syndrome to the users of sekolah pondok. The findings show the means, ranks, average index and category of health impacts of SBS to the users of sekolah pondok. The most selected health impact of SBS by the respondents is 'Due to the condition of this building, I experienced general symptoms such as headaches, fever, nausea and exhausted.' with (mean=3.89).

The possible solution that can prevent or reduce SBS at sekolah pondok

The respondents were asked about possible solution that can prevent or reduce SBS at sekolah pondok in Baling, Kedah. It is important for the researchers to know the solution that mostly selected by the respondents to achieve the third objective.

Table 3 : Possible solution that can prevent or reduce SBS at sekolah pondok

Solutions	Likert Scale (Frequency)					Average Index	Rank
	1	2	3	4	5		
To prevent or reduce Sick Building Syndrome (SBS), a periodic and good maintenance should be conducted on the building.	2	8	4	37	23	3.96	1
To prevent or reduce Sick Building Syndrome (SBS), the building should has a proper design.	1	11	7	37	18	3.81	2
To prevent or reduce Sick Building Syndrome (SBS), a proper and efficient ventilation system should be provided for the building.	8	26	4	29	7	3.01	3

To prevent or reduce Sick Building Syndrome (SBS), Indoor Air quality Inspections (IAQ Assessment) should be conducted on the building.	23	12	3	29	7	2.80	4
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Table 3 shows the findings for each possible solution that can prevent or reduce SBS at sekolah pondok in Baling, Kedah. 'To prevent or reduce Sick Building Syndrome (SBS), periodic and good maintenance should be conducted on the building' is identified as the higher solution that agreed by the respondents with (mean=3.96).

DISCUSSION OF FINDINGS

Discussion on the factors that cause SBS at sekolah pondok

After doing the data analysis, the main factor that cause SBS at sekolah pondok is poor and irregular maintenance. By referring to the result of the survey, this statement has the highest level of agreement by referring to the highest mean that obtained from the respondents. So, it indicates that maintenance at their pondok institution is not done properly and regularly. This finding is agreed by Emmanuel et al. (2018) that mentioned, maintenance is one of the major causes of SBS based on the results of their studies.

Discussion on the health impacts of SBS on the users of sekolah pondok

The majority of the respondents agreed with general symptoms such as the major health impact of SBS to the users of sekolah pondok. From this finding, it shows that the highest level of agreement by the respondents among the other impacts. It also indicates that most of teacher and management staff at pondok institution have been suffered with the general symptoms due to SBS. Therefore, it can be proven that general symptoms are the major health impacts of SBS as stated by the previous researchers. It is strengthened by finding of Sarkhosh et al. (2021) who stated, the prevalence rates of general symptoms are the highest and common symptoms that faced by men and women in their research.

Discussion on the possible solution that can prevent or reduce SBS at sekolah pondok

Periodic and good maintenance is the most agreed solution that be selected by the respondents to reduce or prevent or reduce SBS at sekolah pondok. From this finding, it indicates that most users of sekolah pondok believe that this solution is able to help in minimize this syndrome at pondok institution. This finding was mentioned by an author, Abdullah et al. (2019) who stated, occupants are exposed to health hazards due to the dampness issues derived from the building which occurred because of improper maintenance that can lead to SBS.

CONCLUSION

It can be concluded that the objectives of this research are achieved. The major factors that cause SBS at sekolah pondok is poor and irregular maintenance. It indicates that the maintenance at most of pondok institution is not done properly and regularly. It also shows the dissatisfaction of the users of sekolah pondok with the maintenance of their institution. Furthermore, the main health impacts of SBS to the users of sekolah pondok is general symptoms. Therefore, it indicates that majority of users at pondok institution have been suffered with the general symptoms due to SBS. So, rather than having impacts in terms of health, it will also disturb the learning and teaching process at sekolah pondok. For future research, a study to identify the level of awareness of Sick Building Syndrome (SBS) among the occupants of building and doing an interview to ensure the accurate information regarding the Sick Building Syndrome (SBS) could be carry out to minimize this syndrome on the building.

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Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
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Sekian, terima kasih.

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