

Managing Fire Safety Among Religious Schools: Issues and Policies



By

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Abstract

In recent years, there were several incidents of fire in religious schools among them were Sekolah Menengah Agama Al-Attas, Sekolah Menengah Agama Sultan Zainal Abidin and Sekolah Menengah Agama Nurul Islam. A study conducted by the Ministry of Education has found there were outbreaks of fire in 22 primary and secondary schools as well as in institutions of higher learning for the year 1999 resulting in losses of RM 534,400. This study was carried out to identify fire safety conditions in among religious school hostels in Kedah. An audit approach as well as the use of questionnaire was adopted to collect primary data for the study. The audit results showed that the overall fire safety condition was at 63% compliance level. The audit results also revealed that there was significant difference among the religious school hostels in term of fire safety compliance level. The items reported were portable fire extinguishers, fire hose reels and fire alarm system. The survey identified two important dimensions in the study to improve fire safety at religious school hostels in ranking order are (i) positive **attitude** towards fire safety and (ii) **access** to fire fighting.

1.0 Introduction

Fires cause fatal and serious injuries to occupants of buildings and inflict direct material damage to buildings and their household goods. Some fires cause indirect consequential losses such as loss of production, unemployment and lowering of exports, although at the national level, these losses do not contribute significantly to the total fire loss (Ramachandran, 1999). Humanity has had to live with potential dangers from time immemorial. Just about any human endeavor entails some degree of risk (Granot, 1988). Religious school hostels may be perceived as low fire risk buildings due to the designation of purpose group in the Uniform Building By Laws . Designation of purpose group classifies the buildings according to its use or intended use falling within one of the purpose group set out in the Fifth Schedule to the By-laws. The consequences of fire occurrence in religious school hostels might be low but the severity of each incidence will be high. This is due to the number of occupants in religious school hostels at any time.

The occupants normally rely on the developer of the building to provide an adequate fire protection system. Besides, they also assume that the fire system is in working order. The occupants are expected to know how the system operates and how to operate the system when required. The design, construction and layout of each hostels in any religious school vary according to age and number of occupants. In practice, several factors influence involvement in a fire emergency situation, which can be described as a strange environment. Sime (1990) has discussed the panic behavior of some people in emergencies and Wood (1990) has analyzed the way people react to fires. For example in findings reported by Wood, some people went only short distances through the smoke, but many of them advanced farther than they could see. Knowing the fact that people navigate through smoke, it is a responsibility to provide evacuation systems that are visible in smoke, wherever feasible. Exit signs are essential components of evacuation systems (Ouellette, 1993).

This study seeks to identify the current fire safety condition among religious school hostels in Kedah. Besides that, it also seeks to identify important human involvement elements that need concentration to achieve a higher standard in fire safety. The main objective of this paper is to determine the current fire safety conditions of hostels among religious schools in Kedah. Besides that, it also identifies the human involvement dimensions that need to be improved to achieve higher standards of fire safety management at hostels among religious schools.

2.0 Methodology

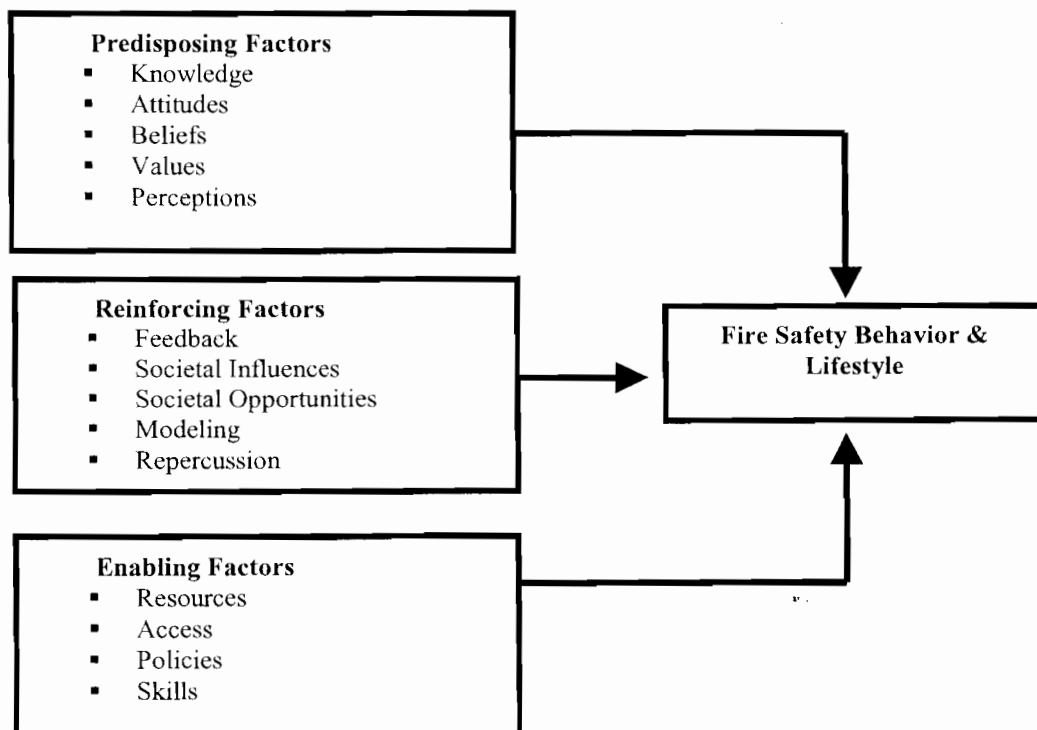
An inspection form was developed to identify the current fire safety measures existing in residential colleges. The inspection process was done through a sampling method. The checklist used for the study was adopted from a study on fire protection for Government boarding schools (Ibrahim, 2000). Furthermore, research efforts in the recent years indicate that a robust system of fire safety management consisting of regular checks on all equipment, and full induction and training of all staff and occupants especially in relation to fire safety, supports the physical fire protection aspects (Roberts and Chan, 2000). Since fire safety audit is meant to measure fire risk impact on levels of fire safety

In individual buildings, it is essential to assess an overall building risk (Watts, 1997). The assessment of fire safety features focused on five main safety features installed in residential colleges namely: -

- i. Portable fire extinguisher,
- ii. Hose reel system,
- iii. Fire alarm system, and
- iv. Exit sign

The survey instrument was adopted from Dejoy (1996) as a planning framework from which health education and health promotion programs were designed. Subsequently this study adopted the model for fire safety education and fire promotion program. Figure 1 below explains the variables that influence the fire safety behavior and lifestyle of students among religious school hostels in Kedah. The predisposing factors are the characteristics of the individual such as belief, attitudes and values that facilitate or hinder self-protective behavior. Predisposing factors are conceptualized as providing the motivation for a specific behavior. Meanwhile, reinforcing factors involve any reward or punishment that follows or is anticipated as a consequence of the behavior. Performance feedback and the social approval/disapproval received from occupants, religious school hostels management would qualify as reinforcing factors in hostels settings. Enabling factors that refer to objective aspects of the environment or system either inhibits or promotes self-protective action. Enabling factors are defined as factors antecedent to behavior that allow motivation or aspiration that is to be realized. Availability of fire fighting resources, fire policies and having the required skills in fire fighting would enhance self-protective behavior.

Figure 1 Conceptual Framework



The primary data for this research was divided into two main parts. The first part involved collection of data through a fire safety audit checklist. The fire safety audit method is to identify the current fire safety conditions in religious school hostels. The fire safety audit checklist is designed to gather quantitative information. The data for the fire safety audit was collected from the population, which means all the blocks for male and female was audited. A total of 16 residential colleges representing 2 male and 2 female blocks for a school were identified for the fire safety audit data collection. The fire safety audit conducted was suited for hostels in schools. The researcher had to suit the fire safety audit and limit to the required fire fighting equipment in a school hostel. The data collection was conducted by the researcher and was assisted by the school wardens especially for the female blocks. The fire safety audit was divided into four sections to make this study easier for analysis purposes. All the blocks selected were audited in the same manner to maintain consistency in collecting data for the study.

The second part involved gathering data from a questionnaire survey administered to a sample population. The questionnaire was divided into five sections where in section 1, the question solicited fire safety lifestyle and behavior while in section 2, the questionnaire solicited predisposing factors. In section 3, information on reinforcing factors was gathered while in section 4, information on enabling factors was collected. Finally, in section 5, the questionnaire solicited on collecting demographic data. Such data will help describe the characteristics while writing the report after data analysis. It is also a wise policy to ask for classified information by providing a range of response options. The respondents in the research were given questionnaires with time provided for self-administration at convenient locations. In brief, the primary data were collected through a self-conducted fire safety audit and the use of a self-administered questionnaire.

In this research, the survey was done based on non-probability sampling method. An unrestricted non-probability sampling method called convenience-sampling method was used in the research. Although a convenience sampling method has no controls to ensure precision, it may still be a useful procedure (Cooper and Schindler, 1998). A five point Likert scale was used with 'five' for strongly agree and 'one' being strongly disagree. The interviewees then responded to each item appearing in the questionnaire. The items are assumable and it is possible to sum up the scores to conduct profile comparisons of different groups. This reliable technique is popular because of its ease of construction and simplicity in administration (Bedekar, 1994).

3.0 Results

An audit was conducted on both the male and female blocks. A total number of 144 portable fire extinguishers, 69 fire hose reel systems, 8 fire alarm and panels, 66 breakglass panels and fire alarm bells and 92 exit routes were inspected. Every item was audited based on the Uniform Building By Laws 1984. The items that met the requirement were given a score of one (1) and items that does not meet the requirement were given a score of zero (0). The score of each item was than converted into percentage. The results obtained are presented in Table 1.

Table 1
Fire Safety Measures of Religious School Hostels: Compliance Rate

Inspected College	Inspected Item	Compliant Level	Non Compliant Level	Total
		(%)	(%)	(%)
School 1	Portable Fire Extinguishers	7.29	92.71	100
	Fire Hose Reel	97.22	2.78	100
	Fire Alarm System	89.82	10.18	100
	Exit Sign	53.34	46.46	100
School 2	Portable Fire Extinguishers	83.34	16.66	100
	Fire Hose Reel	80.56	19.44	100
	Fire Alarm System	75	25	100
	Exit Sign	0	100	100
School 3	Portable Fire Extinguishers	99.79	0.21	100
	Fire Hose Reel	72.92	27.08	100
	Fire Alarm System	0	100	100
	Exit Sign	61.54	38.46	100
School 4	Portable Fire Extinguishers	99.31	0.69	100
	Fire Hose Reel	84.03	15.97	100
	Fire Alarm System	60.42	39.58	100
	Exit Sign	40.84	59.16	100

Note: These schools were audited represents the population of the study

Table 1.1
Compliance Rate by Religious School Hostels: A Summary

Overall College			
Inspected Residential College	Compliant Level (%)	Non Compliant Level (%)	Total (%)
School 1	61.92	38.08	100
School 2	59.73	40.27	100
School 3	58.56	41.44	100
School 4	71.15	28.85	100
Overall Religious School	62.84	37.16	100

Note: These schools were audited represents the population of the study

Table 1.2
Compliance Rate by Item: A Summary

Inspected Item	Overall Item		Total (%)
	Compliant Level (%)	Non Compliant Level (%)	
Portable Fire Extinguishers	72.43	27.57	100
Fire Hose Reel	83.68	16.32	100
Fire Alarm System	56.31	43.69	100
Exit Sign	38.93	61.07	100
Overall Religious School	62.84	37.16	100

Note: These schools were audited represents the population of the study

The compliance rate of overall fire safety condition in religious school hostels in Kedah is around 63% (see Table 1.1). With regards to the various religious schools ¹ indicated in Table 1, it was found that school number 4 is 71% compliant followed by the school number 1 62% compliant. Next is school number 2 at 60% compliant and finally school number 3 is 59% compliant. As per the items inspected all the schools, 73% of the college's portable fire extinguishers are compliant (see Table 1.2). As per the hose reel systems 84% are compliant followed by the fire alarm systems, which are 57% compliant level and finally Exit Sign is 39% compliant.

The analysis of variance results shown in Table 2 reveals that only 'KELUAR' Sign compliance level is not significantly different among the religious schools in Kedah. Meanwhile the other three items of inspection comprising of potable fire extinguisher, hose reel system and fire alarm system compliance level are statistically significant. Which means that there are significant difference in compliance level of these items among the religious schools in Kedah. Based on the mean table it can be concluded that for the item portable fire extinguishers school 3 (99.79%) is highest in compliance level as compared to school 1 (7.29%) lowest in compliance level. Meanwhile for hose reel system, school 1 (97.22%) is highest in compliance level as compared to school 3 (72.92%) lowest in compliance level. Finally for item fire alarm system, school 1 (89.82%) is highest in compliance level as compared to school 3 (7.29%) lowest in compliance level.

Table 2
One Way Analysis of Variance Results

	N	F	Sig
Portable Fire Extinguishers	144	27.368	0.004
Hose Reel System	69	20.343	0.007
Fire Alarm System	66	10.585	0.023
KELUAR Sign	92	4.192	0.100

The statistical findings summarized in Table 3 shows the F value of 5.3 is significant at 0.001 level. From the analysis it is found that 41.4 percent of the variance in fire safety behavior and lifestyle has been significantly explained by the three independent variables represented by the fourteen dimensions. The three independent variables are predisposing factors, reinforcing factors and enabling factors. Furthermore, the coefficients table below identifies the elements among the independent variables that are most important in explaining the variance in fire safety behavior and lifestyle. The column Standardized Coefficients shows that the highest number in the beta is 0.337 for attitude, which is significant at the 0.001 level (see Table 3). From the analysis, it can be concluded that positive attitude towards fire safety is the most important element to be concentrated to achieve higher fire safety behavior and lifestyle. Besides that, the other element of the independent variable that is significant to the fire safety behavior and lifestyle is access for fire fighting. This indicates that improvement in both attitudes of the occupants and providing sufficient access for fire fighting for students at religious school hostels will further improve the fire safety standards. It also reflects the conceptual framework that these dimensions are from predisposing factors and enabling factors.

Table 3
Linear Regression Results

ANOVA

	Mean Square	F	Sig
Regression	0.577	5.300	0.000
Residual	0.109		

Coefficients

	T	Standardized Coefficients Beta	Sig
Attitude	3.709	0.337	0.000
Access	2.022	0.184	0.046

4.0 Discussions

The overall current fire safety condition is reported at 63 percent compliance and the critical non-compliant item have been identified as the exit sign (school 2) and fire alarm system (school 3) requirement as stipulated by the Uniform Building By-Laws, 1984. The non-compliance of having an Exit Sign can be associated with implementation of the Uniform Building By laws. The By-Laws were only issued in 1984 but that religious school hostel was built earlier in 1983 so there is a logical reasoning why these requirements were not met. At the same time, the findings contradict with Ouellette (1993) who indicated that exit signs are essential for evacuation processes. In order to be more considerate to the students there is a need to look into these matters more seriously as it directly relates to human lives. Over the years the management of religious school hostels can or could have taken the effort to equip their facilities with the requirements of the Fire and Rescue Department of Malaysia (FRDM). Meanwhile the fire alarm system

was not functioning for quite some time and the efforts of the hostel committee to set up a manual fire alarm system is appreciated but this school is a fully residential and is built according to existing building by-laws and specification. Further more, these schools receive annual grants from the ministry for maintenance but the fire alarm system was not maintained.

The audit on the portable fire extinguishers reveals that the area prone to non-compliance in ranking order are the difficulty in accessibility and visibility of portable fire extinguishers, unavailability of the safety pin, pressure and pressure gauge at rechargeable level, unavailability of Fire and Rescue Department certificate and not fitted or unavailability of wall bracket. Meanwhile, the audit on hose reel systems identifies the non-compliance on the element of hosereel nozzle box. The majority of the non-compliant area clearly indicates that it involves human involvement and this was explored through the survey conducted. The survey later explained why such issues occur among the students in residential colleges.

Findings also reveal that, portable fire extinguishers in school 1 were 7.3 percent compliant. The major concerns were the physical units of the portable fire extinguishers were missing. From the observation, it was found out that only 2 out of the 18 wall brackets were fitted with portable fire extinguishers. The religious school management gave comments that the extinguishers were sent for servicing. The reason given was not solid enough to impress the researcher. Upon further investigation the researcher found that these extinguishers were sent for servicing to an unauthorized dealer and this dealer went missing with the extinguishers. The religious school hostels management were not aware of the authorized dealer and the process of servicing (the extinguisher must be available at all time – replacement extinguishers).

Table 2 concludes that from the audit results, it is shown that there are differences in fire safety compliance level among religious schools hostels in Kedah. The elements of portable fire extinguishers, hose reel system and fire alarm system shows that the fire safety compliance level between these four schools in Kedah are significantly different. The item of portable fire extinguishers school 3 has the highest compliance level; meanwhile school 1 has the highest compliance level for hose reel system and fire alarm system. Meanwhile school 3 is reported having the lowest compliance level for hose reel system and fire alarm system. This highlights the inconsistency of fire safety among religious schools hostels that are placed under the same umbrella (Ministry of Education / Kedah State Education Department) and this clearly shows that there is no periodic checks or audits being conducted to monitor the fire safety conditions of respective religious schools by the relevant authorities.

The findings of the survey through regression analysis reveal that attitude among the occupants is the most important element in order to achieve higher fire safety standards. As a rule, the students do not appreciate the fire protection system, as they might not be knowledgeable on fire safety issues. Developing attitude on certain issues must start with knowledge where it will automatically be given priority by the occupants. This element of attitude could be shaped from as early as from the primary schools and at home.

Through knowledge which will enable them to understand the characteristics of fire, the components of fire, the preferred condition, the consequences of a fire outbreak situation and the correct method of extinguishing the fire. Defining knowledge accurately is difficult. However, it is well agreed that knowledge is an organized combination of ideas, rules, procedures and information. In a sense, knowledge is a "meaning" made by the mind (Marakas, 1999). Without its specific meaning, knowledge is inert and static. Knowledge, as embodied in human beings (as 'human capital') and in technology, has always been central to development (Beijerse, 1999).

Developments in the sense, more information are gathered on fire safety area among the occupants and this will contribute to better understanding of fire safety in school hostels and indirectly reduce the behavior and the lifestyle that contradicts with fire safety management. With adequate knowledge the religious school hostels can reduce costs on repairing the fire safety equipment and also reduce the consequences of fire safety non-compliant practices. The critical property of knowledge is that they need to be reviewed, revised, and reconfigured (Spender, 1996). Review and revision of knowledge is also important because a large part of knowledge, if not used, can easily be forgotten or ignored. This again, refers to fire safety training (drills) and promotion whereby there is a need to conduct them continuously. All schools and hostels should conduct a fire drill at least once a year. Schools should have their own fire safety committee to look into all aspects of fire safety. When fire safety information is conveyed frequently or repetitively then it becomes a norm among the occupants. Such

Access to fire fighting is the other significant dimension that needs to be improved in the current fire safety condition in religious school hostels. In the process of developing/shaping the occupant's through knowledge embarking occupants must be made aware of the access available for fire safety and for fire fighting in each of the religious school hostels. Having adequate number of equipment will enable quick and effective response to fire emergency. Religious school hostels should have met and importantly maintain the basic requirement in building by-laws 1984. Having equipment without knowing how the system operates and how the system is operated is another waste. Fire drills will be the main agenda again to put these things into practice and these needs to create awareness among occupants.

The 1989 fire in Kedah sparked off a debate on whether existing schools and hostels were potential death traps for our students. The government responded swiftly by setting up a Royal Commission of Inquiry to investigate which was headed by former Federal Court Judge Tan Sri Abdul Aziz Zain. The report that cost RM 3 million of public funds and took two years to complete after inspecting 832 schools made 95 recommendation as safety measures. These recommendations must be conveyed to all schools in Malaysia and put into practice as far as the recommendations are practical.

Besides that, the Fire and Rescue Department has also come up with many programs to guide schools and hostels but they have also reported only a handful of schools and hostels have adopted them. Among the suggestion were setting up a fire-fighting squads

in hostels and schools, having a Fire Services Cadet led by teachers, appointment of warden as person in charge of fire safety, having talks on safety measure, regular fire drills, conducting fire prevention orientation program for new batch students and inviting fire services department for regular fire safety auditing. All this efforts must be made practice as a measure to safeguard our future generation in schools.

5.0 Concluding Remarks

The findings of this study have several implications to religious school hostels and non-religious school occupants in Malaysia. The study enhances the understanding of the human involvement dimension on fire safety behaviour and life style. In order to improve the current fire safety condition there are dimensions that need to be stressed. Occupants must now recognise the importance of fire safety issues in school hostels. It is a shared responsibility to improve the fire safety condition in school hostels. When dealing with large occupants such as school hostels, it is not practical to rely entirely on the management staff to direct occupants to safety, as the number of personnel required would be too large. For such situations, it is more efficient to rely on a few well-trained staff members, the voice communication system and Closed Circuit Television (CCTV) (Proulx, 1999). Both the occupants and the school hostels management needs to actively collaborate and develop activities that will benefit the occupants, the school hostels and the school. The school hostels management and policy makers are responsible for the final outcome by making the right decisions. Rewards and punishment no longer have an impact on trying to get things in the right path. This is greatly facilitated by research knowledge. Therefore, knowledge heightens their understanding and makes all the difference in their perception on fire safety. Finally, this study also has implications on the academic frontier. The findings of this research will contribute to extend the knowledge of human involvement in fire safety and support earlier research on fire safety as well as human involvement elements globally.

Endnotes

1. Religious schools in Kedah
 - a. Sekolah Menengah Kebangsaan Agama Kedah.
 - b. Sekolah Menengah Kebangsaan Agama Yan, Kedah.
 - c. Sekolah Menengah Kebangsaan Agama Baling, Kedah.
 - d. Sekolah Menengah Kebangsaan Agama Sik, Kedah.

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