

# KNOWLEDGE, ATTITUDES AND PRACTICES ON FIRE SAFETY AMONGST OFFICE WORKERS AT GOVERNMENT OFFICES IN THAMANKADUWA DIVISIONAL SECRETARIAT

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Knowledge, attitude and practices on fire safety at the working place play a major role in accident prevention. This study aims to find the current level of above amongst government officers in the Thamankaduwa Divisional Secretariat area (DS). A descriptive cross sectional study was carried out from September 2013 to January 2014, where 462 government workers were selected and data gathered by an interviewer administered questionnaire and check list. Result analysis via SPSS showed that, 427 (92.4%) have poor knowledge on fire safety, without statistical correlation to age, education level or rank/grade of officer. 435 (94.2%) officers agreed that their office should have a fire safety plan. 300 (64.9%) officers worked in an office without a fire safety plan. 357 (77.3%) officers worked in an office without a fire exit. Therefore it is an immediate necessity to develop a fire prevention plan and establish a fire safety drill for government offices in Thamankaduwa DS in the Polonnaruwa district.

**Introduction:** Fire is one of the most destructive and costly causes of damage to personnel and property; where knowledge, attitude and practices on fire safety at the working place, play a major role in minimization and/or prevention of such damage. Minimal fire prevention facilities and lack of water resources prevalent in the Polonnaruwa District can worsen any fire hazard. This study aims to find the current level of knowledge, attitude and practices on fire safety at the working place amongst government officers in the Thamankaduwa Divisional Secretariat (DS) in the Polonnaruwa district.

**Methodology:** A descriptive cross sectional study was carried out from September 2013 to January 2014 in government offices in the Thamankaduwa DS in Polonnaruwa district. Permanent workers who worked for more than 1 year at the present working place were included while school, field workers and officers who worked where staff was less than 10 were excluded from this study. 462 government workers were selected using the cluster sampling method and data was gathered by an interviewer administered questionnaire and check list.

**Results:** The study population included personnel ranging from 21 to 60 years of age, with 258 (56%) below 40 years of age. There were 257 (55.8%) females

included in the study. Result analysis via SPSS showed that, 427 (92.4%) have poor knowledge on fire safety, without statistical correlation to age, education level or rank/grade of officer. 435 (94.2%) officers agreed that their office should have a fire safety plan. 446 (96.5%) officers were eager to learn about fire safety and 442 (95.7%) requested for a revision of the current fire safety plan. 300 (64.9%) officers worked in an office without a fire safety plan. 357 (77.3%) officers worked in an office without a fire exit. Only a limited number of officers (56/12.1%) had practical experience on fire safety.

**Conclusion:** Therefore it is an immediate necessity to develop a fire prevention plan and establish a fire safety drill for government offices in Thamankaduwa DS in the Polonnaruwa district. Comprehensive and contemporary educational seminars should be launched at the above government offices with routine fire safety drills for reinforcement of knowledge, attitude and practices.

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## CHAPTER 1

### 1.1 Introduction

Fire is one of the most destructive, disruptive and costly cause damage to the people and property. Many fires start because of momentary acts of carelessness, ignorance or failure to take account of fairly obvious hazards.

The American National attention focused on the importance of life safety (e.g., adequate emergency exits) following the 1911 Triangle Shirtwaist Factory Fire in Manhattan. This fire spread from the eight to the tenth floor as young female garment workers, unable to escape because of a locked door; jumped to their deaths, some while their clothes were on fire, others while holding hands. Although firefighters rushed to the scene, their ladders reached only to the sixth floor. The fire resulted in 146 deaths and prompted New York to draft numerous laws to promote safety ([Matthews, 2011](#)).

Most fires can be prevented by a few simple precautions and maintenance of fire safety measures. These measures can be incorporated in to buildings either during construction or renovation works. In addition, well trained staff with their knowledge appropriate attitude can play an equally important role in preventing and tackling fires. Fire can be responsible for the loss of jobs, loss of businesses and loss of life as well as serious damage to the environment.

### 1.2 Global picture

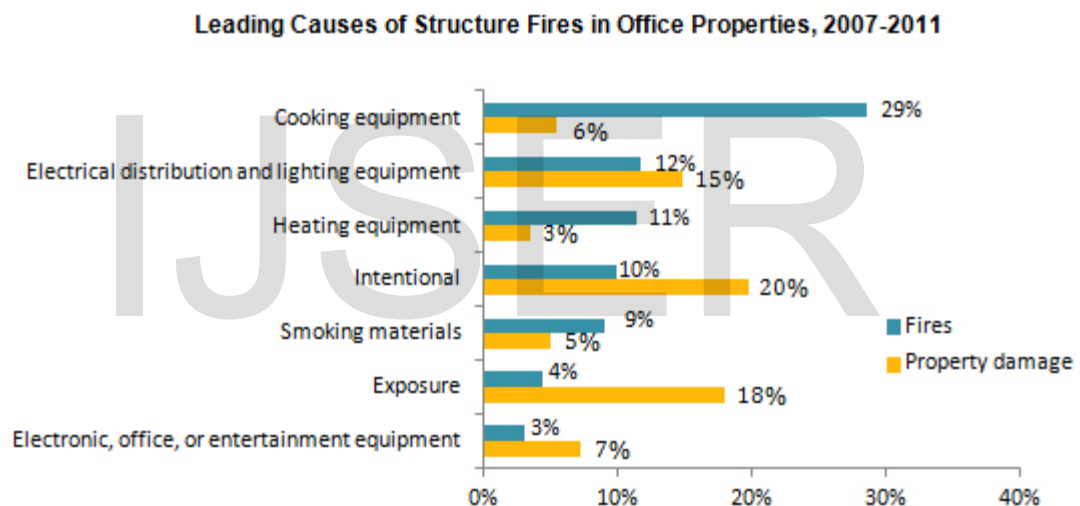
Each year, fires cause about 300,000 deaths in the world. ( Guicheng Z,2006).

The report contains information about structure fires in office properties, which include general business offices, banks, veterinary or research offices, engineering, mailing firms and post offices. During the five-year period of 2007-2011, it estimates that U.S. fire departments responded to an average of 3,340 fires in office properties per year. These fires caused an annual average of four civilian deaths, 44 civilian fire injuries, and \$112 million in direct property damage. The vast majority of the fires in this category were in business offices. Reported fires in this occupancy group fell 71% from 10,570 in 1980 to 3,050 in 2011.

Fewer fires occur in this occupancy on the weekends since they are less likely to be fully populated. The peak times of day for these fires were between noon and 2:00 PM. Less than one-third of the fires (31%) occurred between 7 p.m. and 7 a.m., but

these fires accounted for 67% of the direct property damage. Similarly, 19% of fires occurred on weekends, but these incidents caused 31% of the associated property loss. These findings highlight the need for automatic detection and extinguishing equipment to protect these properties when they aren't occupied.

More than one in every four office property fires (29%) was caused by cooking equipment, but these fires accounted for just 6% of the direct property damage experienced by office properties. Fires that were intentionally set caused the largest share of direct property damage (20%), while causing 10% of office property fires. Electrical distribution and lighting equipment was the second leading cause of office property fires (12%) of fires, while causing 15% of direct property damage (Campbell.R. 2013)



### United state leading causes of structure fires in properties, 2007-2011

#### 1.3 Justification.

In Sri Lanka, the occupational pattern has been changed from being primarily agricultural to service provision sector. The current work force of government office workers has gradually increased. In 2006, there were 334,277 the government servants. Currently, there are around 1.2million employees in the government sector in Sri Lanka. (Sri Lanka Labor Force Survey Annual Report – 2011)

According to the Sri Lankan Law, each and every office building should have a fire prevention plan. In construction of any public building, every building shall confirm to fire safety requirements applicable to area or type of building or as may be specified by the Authority. (The gazette of the Democratic Socialist Republic of Sri

Lanka 2009) Fire can result due to many reasons; it can be incidental or accidental. Electrical leakage, bomb blast, civil unrest, thunderbolts, wild fires are some of the examples. In recent history, there were many fire incidents reported at government offices from many parts of the country, such as: fires at Colombo kachcheri, Colombo harbor and Sathosa head office with estimated Rs 30 million economic losses.

In the past two years, there were twelve fire incidents reported in Thamankaduwa divisional secretariat (TDS) area resulting in five death with major economic losses (Fire brigade Log book Polonnaruwa 2011-2012,).

Most of the main government offices (GOs) in Polonnaruwa are situated in the Thmankaduwa divisional secretariat area, these offices deliver service to the people in Polonnaruwa, and store vital legal documents at office buildings. Government Agent of Polonnaruwa with his letter on 2<sup>nd</sup> July 2013 has ordered to prepare emergency management plans to all government office in Polonnaruwa. (DMU/POLO/02-07)

To protect in a fire incident, it is important to understand the basic characteristics of fires. Fire spreads quickly and there may be no time to gather valuables or waste time. Within just two minutes, a fire can spread and become life-threatening. In five minutes, a building can be engulfed in flames.

The office workers knowledge, attitudes on fires safety and fire safety practices can be used to overcome exposure to accident fires. Because, the end result of uncontrolled fire is catastrophic. Minimal fire prevention facilities and lack of water sources in Polonnaruwa can worsen the fire hazard. Knowledge, attitude regarding fire safety among office workers and their practices towards prevention of accidental fire has not been assessed.

#### **1.4 General Objective**

To describe the knowledge, attitudes and practices on fire safety among office workers at Government offices in Thamankaduwa Divisional Secretariat area.

#### **1.5 Specific objective**

1. To describe the knowledge on fire safety among workers at government offices at Thamankaduwa DS area.
2. To describe the attitude on fire safety among workers at government offices at Thamankaduwa DS area.

3. To describe practices on fire safety at government offices at Thamankaduwa DS area

## CHAPTER 2.

### 2.1 Literature review

Many studies were done on fire safety, knowledge and human behaviors.

“In 2008, Surrey Fire Services, British Columbia, commenced a firefighter-delivered, door-to-door Fire-prevention education and smoke alarm examination/installation initiative with the intention of reducing the frequency and severity of residential structure fires in the City of Surrey. There high-risk zones within the city were identified and 18,473 home visits were undertaken across seven temporal delivery cohorts (13.8% of non-apartment dwellings in the city). The frequency and severity of fires pre- and post- the home visit intervention was examined in comparison to randomized high-risk cluster controls. In the intervention cohorts represented a 63.9% reduction in the rate of fires per 1,000 properties, per year, while the control group experienced a 14.6% reduction over the same period. When fires did occur within the intervention cohorts, smoke detectors were activated more frequently and the fires were confined to the object of origin more often post-home visits ( $P < .05$ ). No equivalent pattern was observed for the cluster control. With this result it is confirmed that fire fighters can reduce the frequency and severity of residential fires through targeted, door-to-door distribution of fire prevention education” (Clare J 2012).

“In 2008, approximately 403,000 residential structure fires in the United States, 2780 deaths and 13,560 injuries resulted. For children less than 14 years of age, 509 children died which accounted for 13% of the fire deaths. Senior baccalaureate nursing students in their pediatric clinical rotation taught burn prevention techniques using Hazard House, a model house filled with common household fire hazards (Hazard House, 2006, Ref. 1). Elementary school

Students were encouraged to identify the hazards and discuss ways in which the house could be made safer. Local firemen then briefly presented what to do if a fire occurred, how firemen may look during a rescue, and the importance of working smoke alarms in the home. A pretest–posttest design was used to examine the effectiveness of an educational intervention. The three groups of participants

included 128 kindergarten students, 311 students in grades 1–2, and 61 students in grades 3–4. The tests and interventions were tailored appropriately for each age group. There was no difference in pre- and post-test scores for the students in kindergarten and grades 3–4 ( $p > 0.05$ ). However, there was a significant difference for students in grades 1–2 ( $p < 0.001$ ). The results suggest that the educational intervention was effective in improving the understanding of fire safety for students in grades 1–2. And suggest Future studies to include a larger sample of students for the other grades” (Lehna.C2013)

Both studies reveal that the knowledge on fire safety is important. With this study the current fire safety knowledge will be described and it will sensitize office workers to seek for fire safety knowledge.

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## CHAPTER 3

### 3.1 METHODOLOGY

#### 3.1.1 Study type

Descriptive cross sectional study.

#### 3.1.2 Study setting

Government offices situated in Thamankaduwa divisional secretariat area.

#### 3.1.2 Study duration

1<sup>st</sup> of September to 31<sup>st</sup> of January

#### 3.1.3 Study population.

All office workers of government offices, in Thamankaduwa DS area.

#### 3.1.4 Inclusion criteria

Permanent workers who work more than one year at present working place.

### 3.2 Sample size calculation

$N = z^2 (PQ) / d^2$ , (Lwanga and Lemeshaw 1991)

N-sample size,

D-desired absolute precision which 5%,

P-proportion to be estimated 50% of office workers having good knowledge,

Q-100-p,

Z-1.96 for 95% confidence interval,

$$N = 3.841 \times 0.5(0.5) / 0.0025,$$

So n=384

Considering the non response rate 5%,

Sample size will be  $384 \times 100 / 95 = 404$ ,

Therefore the final sample would = 404

Design effect of 1.2 will be used,

Therefore the final sample would = 485

### 3.3 Sampling technique

Sampling was done by using cluster sampling method. There were 28 Government offices in Thamankaduwa divisional secretariat area. The sample of 485 were divided proportionately among 28 GOs according to the number of office works in



each GO (Each GO has a list of workers in their office). The samples relevant to each GO were selected randomly from the list of office workers in that office.

### **3.4 Study instruments**

Interviewer administered questionnaire and check list was used with following sections

Part 1-Socio demographic information of office workers in the sample.

Part 2- Knowledge on fire safety.

Parts 3- Attitudes on prevent accident fire.

Part4- practices to prevent accident fire at office premises.

Pre testing of questionnaire was done at an adjacent divisional secretariat area (Hingurakgoda area) to find out the acceptability of the questionnaire

### **3.5 Data collection**

This was a interview based questionnaire. Five university students including the principle investigator collected the data. Each participant was visited individually and their informed verbal consent was taken, and then filled the form.

### **3.6 Method of data analysis:**

Knowledge was assessed by giving eighteen questions to answer. Out of eighteen questions those who had less than four correct answers categorize as having very poor knowledge. Those who had four to eight correct answers categorized as poor knowledge. Who had more than nine correct answers categorized as average knowledge on fire safety.

Data analysis was done with standard Statistical Package for Social Sciences version 17. For descriptive statistics frequencies with means and standard deviations were used. Comparisons was done using Chi Squared test with 95% confidence interval.

### **3.7 Administrative requirement.**

Permission was obtained from district secretary and Head of the each Government office

### **3.8 Ethical issues:**

This was not an invasive study and there was no risk or adverse effect to the participants. Ethical clearance was obtained from ethical review committee of NIHS Kaluthara. Confidentiality and privacy of participating office workers were ensured.

## CHAPTER 4.

### 4.1 Results

Descriptive Cross sectional study

### 4.2 Study population and the sample

This community based descriptive cross sectional study was conducted to assess the knowledge, attitudes and practice regarding fire safety among office workers in Thamankaduwa divisional secretariat area.

The study sample consisted of ( 462 ) office government workers from Thamankaduwa Divisional secretariat Area in Polonnarwa District selected using cluster sampling technique with probability proportionate to the size of the government workers population in that area. Study achieved 99% respondent rate. Data was checked with Epi data soft ware and data was analyzed by SPSS 17 version .Categorical data were described using frequency distribution of percentages. Chi square test was used to identify associations between socio demographic characteristics and knowledge.

### 4.1 Basic demographic characteristics of the office workers in study population

**Table 4.1** Frequent distribution of participant office workers according to selected demographic characteristics

Demographic characteristic		No.	%
Age(completed years)	21-30	106	22.9
	31-40	153	33.1
	41-50	109	23.6
	51-60	93	20.1
Sex	Female	258	55.8
	Male	201	43.5
Religion	Buddhism	451	97.6
	Christianity	5	1.1
	Hinduism	2	0.4
	Islam	3	0.6
Ethnicity	Sinhalese	457	98.9
	Tamil	2	0.4
	Muslim	3	0.6

civil status	Married	376	81.4
	Unmarried	81	17.5
	Widowed	1	0.2
	No answer	1	0.2
job status/grade in the office	Senior Officials &Managers/Professionals	120	26
	Technicians & Associate Professionals	49	10.6
	Clerks & Related Workers	196	42.4
	Machine Operators & Related Workers	31	6.7
	Elementary Occupations	54	11.7
highest educational level	Up to Grades 10	36	7.8
	GCE (O.L)	55	11.9
	GCE (A.L)	181	39.2
	Diploma/ degree	172	37.2
	Post graduate	18	3.9
Total monthly family income	Rs.10, 000.00-.19, 999.00	68	14.7
	Rs.20, 000.00-29,999.00	135	29.2
	Rs.30, 000.00- 39,000.00	102	22.1
	Rs.40, 000.00-49,000.00	72	15.6
	Rs.50, 000.00 or above	80	17.3
Duration of worked in this office	less than 5 years	157	34
	6 years to 10 years	66	14.3
	11 years to15 years	48	10.4
	16 years to 20 years	46	10
	more than 20 years	142	30.7
engaged in extra duty after normal office hours	Yes	188	40.7
	No	199	43.1
	Occasionally	74	16
use computer at office	Yes	295	63.9
	No	124	26.8
	Occasionally	43	9.3

The study population comprised 21-60 years old male and female office workers. Majority(56.0%) were below 40years. Out of 462 sample female were55.8% and 43.5% were male.

The majority of workers were Sinhalese (98.9%) and all of them are Buddhist. According to job category majority were clerk and related workers (42.4%).out of total sample 41.1% has diploma/degree or postgraduate calcifications. there are 73.2% of office workers use computers as well.

#### 4.2 Knowledge on fire safety among selected office workers of Thamankaduwa divisional secretariat area.

**T able 4.2 Distribution of fire safety knowledge of the office workers**

Level of knowledge	No	%
very poor knowledge	109	23.6
poor knowledge	318	68.8
Average knowledge	35	7.6
Total	462	100.0

As shown in the table only7.6 %( n=35) has average knowledge on fire safety.

**Table4.3Association between socio-demographic characteristics and fire safety knowledge of office workers**

variable		Level of Knowledge					Significance
		Good		Poor		Total No	
		No	%	No	%		
Level of education	Educate up to AL	21	61.8	250	58.5	271	X <sup>2</sup> =0.134Df=1
	Above A/L	13	38.2	177	41.5	190	P=0.714
Age	≤45 years	27	81.8	289	67.7	316	X <sup>2</sup> =2.84Df=1
	>45years	6	18.2	138	32.8	144	P=0.092

Grade	Lower category	28	84.8	336	80.8	$X^2=0.332$ Df=1
	Managerial level	5	15.2	80	19.2	P=0.565

As shown in table 4.3, there is no association on fire safety knowledge with age education level or grade/rank of the office.

**Table 4.4 Distribution of Attitude on fire safety among office workers.**

variable	Highly agree		agree		No idea		Not agree		Highly disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
offices should have fire safety plans	213	46	222	48.1	13	2.8	8	1.7	6	1.3
involve in preparing fire safety plan of the office	207	45	205	44.4	46	10	2	0.4	2	0.4
review and aware on fire safety mechanism in the office	219	47	223	48.3	15	3.2	1	0.2	4	0.9
Fire safety should be taught to all office workers	201	44	245	53	14	3	0	0	2	0.4
Everyone should respond to fire alarm in the office	225	49	216	46.8	13	2.8	4	0.9	2	0.4
should know emergency telephone number	165	36	276	59.7	18	3.9	1	0.2	2	0.4
should actively participate on fire drill	208	45	230	49.8	16	3.5	3	0.6	5	1.1

**Table 4.5 Frequent distribution of fire safety Practices on selected government office.**

variable	Yes		No		Don't know	
	No	%	No	%	No	%
fire prevention plan in the office	160	34.6	213	46.1	87	18.8
fire prevention plan is freely available to go through	100	21.6	216	46.8	144	31.2
have the contact number to inform in an accident fire in the office	121	26.2	228	49.4	110	23.8
have the place, where to gather in an emergency fire incident	84	18.2	267	57.8	104	22.5
participated on fire drill	56	12.1	382	82.7	22	4.8
hear fire alarm of the office	64	13.9	278	60.2	118	25.5
have emergency fire exit in the office	149	32.3	248	53.7	63	13.6
have labeled fire exit route in the office	90	19.5	331	71.6	39	8.4
Use multiple electrical connection wire in office ignoring electricity capacity?	89	19.3	219	47.4	152	32.9
keep work place clean and tidy	416	90.0	37	8.0	7	1.5

According to the table4.5, out of 462 workers only 34.6 %mentioned that there is a fire prevention plan in their office but only 21.6% respond that it is readily available to go through and only 13.9% can hear fire alarm. Majority of the sample (85.7%) mentioned that they can't hear fire alarm.

## CHAPTER 5

### 5.1 Discussion

This study was carried out to assess the knowledge, attitudes regarding fire safety and practices on fire safety at government office.

Four hundred sixty two government office workers were selected by cluster sampling technique with probability proportionate to the size of the government workers in that areas and of them 462 were participated giving a response rate of 99%

Study participants consisted of 201 (43.5%) males and 258 (55.8%) females. Mean age of office workers were 40years (SD=10.25). The majority of workers were Sinhalese n=457 (98.9%) and all of them were Buddhist while the balance was from Christian and Hindu religions. According to job category majority were clerk and related workers n= 196(42.4%).out of total sample n=190(41.1%) had diploma/degree or postgraduate calcifications. there 73.2% (n=338) of office workers used computers as well. Approximately 92.4(n=427) of office workers had poor knowledge on fire

### 5.2 Methodological issues

A community based cross-sectional descriptive study design was selected for assessing the knowledge ,attitudes and practice on fire safety as it would be more appropriate for the purpose of collecting information on frequency and providing a snapshot of the particular characteristics. A community based study was appropriate because sample would be unbiased and the findings could be extrapolated to the general population .The study was carried out in Thamankaduwa divisional secretary area in the Polonnaruwa district because lack of water sources in Polonnaruwa and lack of readily available fire fighting mechanism would lead to sever out come due to accident fire if there is no adequate fire safety knowledge, attitude and practice.

Cluster sampling method was used to identify the required sample and the clusters were identified in relation to the size of the population. This method had several

advantages. Cluster was identified in relation to the population size and only the identification of first respondent is necessary, hence was the most feasible method to carryout for this type of community based studies. It was also less costly and easy to administer the questionnaires..

Results obtained by ensuring a representative sample would be useful for all the administrative planning and policy makers to allocate resources and to plan effective intervention programs to prevent accident fire and to protect lives and property by improving knowledge, attitude and practice at the offices. (Sari F.O.2009).

### **5.3 Knowledge on fire safety.**

There were 23.6 % of office workers had very poor knowledge on fire safety and 68.8 % of workers had poor knowledge. Only 7.4 % of government office workers had average knowledge on fire safety

There is no association on fire safety knowledge with age education level or grade/rank of the office.

### **5.4 Attitude on fire safety among office workers in the sample.**

Majority n=435 (94.2 %) of office workers agree that office should have a fire safety plan. About 96.5 % ( n=446) office workers agree that fire safety should be taught to them. There 95.7 % ( n=442) agreed that fire safety mechanism should review and they should aware of it.

Higher percentage of office workers (around94.4%) had agreed on the importance of fire safety and in general denoting the good attitudes. The similar result (99%) was observed among fire safety knowledge anesthesiologist of America. (Robert A.C 2008)

### **5.6 Practices on fire safety at government office.**

Fire prevention plan is very important component of the office. But 64.9% office workers had responded that there was no fire prevention plan at their office. Even though the total of n=160(34.6%) workers knew that fire prevention plan was at the office but only n=100(21.6%) could able to go through it.

Out of 12.1% of population participated on fire drill. About 32.3% workers mentioned that their office has fire exits. But only 19.5% mention that fire exits are labeled and the 90% mentioned that their office fire exits are not labeled. Ninety percent of office workers keep their working place clean and tidy. When



considering about use of multiple electric connection 47.4% mentioned that they do not use multiple electric connection but 19.3% responded that they use multiple electric connection and 32.9% did not aware of it.

## **CHAPTER 6**

### **6.1 Conclusions**

1. The assessment of knowledge on fire safety among government office workers showed that majority 92.4% had poor knowledge on fire safety. These findings indicate that in an accidental fire, the offices workers very vulnerable to fire hazard.
2. The fire safety knowledge was not associated with age, education level or rank/grade of the officer.
3. Assessment of attitude on fire safety of the workers showed that majority 95.7% attitude' was very good.
4. Most of the offices did not have a fire prevention plan. As (64.9%) workers responded that their office did not have fire safety plan.
5. Most of the offices lack a fire exit (77.3%).
6. Very few office workers (12.1%) had practical experience on fire safety.

## **CHAPTER 7**

### **7.1 Recommendations**

1. It is immediate necessary to develop fire prevention plan to all the government offices in Thamankaduwa DS area in Polonnaruwa district.
2. All appropriate action needs to be taken to implement at all the government office to respond in an accident fire.
3. Comprehensive and proper educational propaganda should be launched at all the government offices to increase knowledge on fire safety.

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## **Acknowledgement**

I wish to place record on my appreciation of those who assisted me in numerous ways to make this study a success. Many people have contributed to the realization of the study and it is my desire to express my deep gratitude to all, while it is, unfortunately, impossible to name them all.

I gratefully acknowledge the continued valuable and constructive advice provided by Dr.S.N.Udugama, Rregional director of Health Service, Polonnaruwa.

I highly appreciate the support of Mr.NimalAbesiri, District Secretary, Polonnaruwa and all Heads of the Government office in Thamankaduwa.

I deeply acknowledge the government office workers in Thamankaduwa to cooperate with me.

Many thanks go to the staff at RDHS Polonnaruwa, Dr. C.Liyanage, Mr. MalingaTharidu, to data entry and analysis for making this study, a success.

## References

1. The urban development authority law, no 41 of 1978, the gazette of the Democratic Socialist Republic of Sri Lanka, extra ordinary, P No.1597/8
2. Departments of Census and Statistics. (2006) Sri Lanka Labour Force Survey, *Census of Public and Semi Government Sector Employment - 2006*, Available: <http://www.statistics.gov.lk>
3. Departments of Census and Statistics, (2011) Sri Lanka Labour Force Survey Annual Report - 2011 Ministry of Finance and Planning, 38
4. Campbell.R(2013), U.S. Structure Fires in Office Properties,NFPA
5. Chow.W.K,(2001) ,Review on fire safety management and application to Hong Kong, International Journal on Engineering Performance, 3, 1, 52-58
6. Clare J, Garis L, Plecas D, Jennings C. (2012), reduced frequency and severity of residential fires following delivery of fire prevention education by on-duty fire fighters: Cluster randomized controlled study,Journal of Safety Research 43,123–128
7. Daniela. K,[Kehl D](#), [Hulse L](#), [Schmidt.S](#),(2013),Perievent distress during fires – The impact of perceived emergency knowledge, [Journal of Environmental PsychologyVolume 34](#), 10–17
8. GuichengZ,[Andy H. L](#),[Hoe C. L](#), [Michael C](#),(2006)Fire safety among the elderly in Western Australia-[Fire Safety JournalVolume 41, Issue 1](#), 57–61
9. Lehna.C, Todd J.A, Keller R, Presley L, Jackson J, Stephanie Davis S , Hockman K, Charles Phillips-Payne C.P, Sauer S, Wessemeier.S (2013), Nursing students practice primary fire prevention, *b u r n s* 3 9 , 1277-1284
10. LwangaS.K,Lemeshow.S.(1991)Sample size determination in health studies,A Practical Manual, World Health Organization,Geneva,Switzerland.
11. MargretheKobes, IraHelsloot, BaukedeVries, Jos G Post, (2010) Building safety and human behavior in fire: A literature review, Fire Safety Journal 45, 1–11.
12. K. Matthews.K(2011),1911 Triangle fire remembered as spur to unions, safety laws USA Today (March 22) ,[www.usatoday.com](http://www.usatoday.com)

13. Norio O, Yoko M. (2001), Risk Communication Strategy for Disaster Preparedness Viewed as Multilateral Knowledge Development, *Disaster Prevention Research Institute Annual Report*, No. 44,.23-34,
14. Philip P. Purpura(2013)13 – Life Safety, Fire Protection, and Emergencies, Security and Loss Prevention (Sixth Edition),ScienceDirec, Amsterdam, 363–400
- 15 Sari F.O.(2009),effect of employee training on the occupational safety and health in accommodating sector, *procedia social and behavioral science* 1,1865-1870.
16. Robert A.C (2008),practice advice for the preventive and management of operating room fire, *American anesthesiology*,2008,108,786-801.

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