

The Willingness Performing First Aid On-Site At Hot-Spring Scenery for Travelers



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Abstract

Objective: To explore the willingness performing first aid on-site at hot-spring scenery for travelers and investigate the factors of willingness influence.

Method: Within the period from September to November in 2016, we delivered 255 questionnaires to employees of hot-spring enterprises in Tainan. A total of 239 eligible respondents completed their responses with a return rate of 90.2%. We analyzed the association between demographical data and employees' willingness performing first aid on-site at scenery in accident and inspected the barrier of the willingness. Chi-square test was performed to examine whether; the most frequency of learning the on-site first aids exists; the factors related to demographics influence employees' willingness performing first aid on-site at workplace; the willingness barriers regarding the fundamental on-site first aids presents.

Results: A total of 250 employees were surveyed. Around 58.6% stated that the barrier of receiving training courses was the lack of learning resources. More than 80% of respondents who have extremely high willingness to provide complete Cardio-pulmonary Resuscitation (CPR) for their customers and 77.7% hope to learn CPR. The results show that: the highest willingness to learn course regarding on-site first aid is CPR; the top factors of demographics related to willingness performing first aid are gender and the year gap prior to previous training. The lowest rate of willingness to first aid is CPR; the highest barrier that influences the willingness of performing first aid is that fearing to fail.

Conclusion: Our study shows that the willingness to perform CPR is low. The major barrier to learn this basic life-saving technique is the lack of suitable learning sources. Recent emergency training course will affect the status of rescue. On-site first-aid educations and training systems are required putting more emphases on studies in the future.

Keywords: Hot Spring; First Aid; Cardio-Pulmonary Resuscitation; Heimlich maneuver; Workplace

Abbreviations: BH: bandage homeostasis; CPR: cardio-pulmonary Resuscitation; MBPP: measuring blood, pressure, and pulse; SLM: situational Leadership Model; TPB: theory of planned behavior

Introduction

With the rapid progress of its economy over the past three decades, emergences of a middle class with increasing

disposable income and time, and more relaxation on travel have greatly contributed to the leisure and recreational enterprise

and business [1]. Meanwhile, Taiwan attracts a large number of tourists from foreign countries. According to the Taiwan government statistics, the foreign tourists have been seen with a rapid growth at an approximate 10.43 million tourists to Taiwan in 2015 [2]. One of the most attractive scenery in Taiwan is the hot spring because Taiwan is part of the collision zone between the Yangtze Plate and Philippine Sea Plate [3]. Eastern and southern Taiwan is the northern end of the Philippine Mobile Belt. Accordingly, Taiwan has evolved a unique environment that produces high-temperature springs with crystal-clear water, usually both clean and safe to drink. These hot springs are not only clean and potable but also commonly used for spas and resorts.

On-Site First Aid Required in Tourism Spots

However, we have not seen any to date that reports the first aid on-site at the hot-spring scenery well prepared for travelers for the safety reason. The number of foreign travelers with emergency incidences in Taipei has been increased 5.8 times from 115 tourists in 2006 to 667 in 2017 according to the statistics of Taipei government. No any guarantee can be given to the hot-spring spot with a highly safe environment even if a rigid regulation stipulated by Taiwan government has been effective as of 1975 and address that each employee who works at place should periodically receive first-aid rescue training courses [4,5]. It is thus worth investigating whether employees at workplaces are able to (or are willing to) perform on-site first-aid rescue technique onto the victim. The fundamental techniques of the on-site first aid includes, cardio-pulmonary Resuscitation (CPR), Heimlich maneuver, bandage homeostasis (BH), and measuring blood, pressure, and pulse (MBPP) [6-9].

The Willingness and Ability to Perform the First-Aid Rescue

The Situational Leadership Model (SLM) developed by Ken Blanchard and Paul Hersey is one of the most practical leadership theories for project managers [10-12]. The SLM provides us with a framework that we can use it to determine what type of leadership style would be most effective based on our followers' abilities and willingness to perform the desired task. Accordingly, the employees' abilities and willingness to perform the on-site first-aid rescue are the main contents of this study.

Aims of the Study

A survey on four scenarios asking employees who work at hot-spring spots to respond their abilities and willingness to perform the on-site first-aid rescue at workplace, we propose three hypotheses of the most difficult first aid of fundamental technique is CPR; the most influential factor in willingness of the first-aid rescue is the year gap prior to previous training; the highest barrier that influences the willingness of performing first aid is that fearing to fail.

Methods

Data Source and Research Tools

Within the period from September to November in 2016, we delivered 255 questionnaires to employees of hot-spring enterprises in Tainan city. A total of 239 eligible respondents completed their responses with a return rate of 90.2%. The contents of the questionnaire include.

- a) Demographical characteristics (e.g. age, gender, work tenure, education level, the year gap prior to previous training course, and the willingness to learn first-aid rescue techniques),
- b) Four scenarios (i.e. CPR, Heimlich maneuver, BH, and MBPP) provided respondents with answering of their willingness and the barrier of the willingness (e.g. fear to fail, shouldering law responsibility, afraid of infectious diseases, and physical condition limited to execution). All questions are Likert-type 5-point scale from 1 for completely no any willingness to 5 for high willingness. The high score means the more willingness to the task.

Scenarios

In the questionnaire we gave four scenarios to respondents for answer. Each scenario with different stories is required to answer: whether it is possible for him/her to call ambulance; what is the barrier to him/her if there is no any willingness to perform the respective technique of first-aid rescue.

Data Analysis

We analyzed the association between demographical data and employees' willingness performing first aid on-site at scenery in accident and inspected the barrier of the willingness. Chi-square test was performed to examine whether

- a) The most frequency of learning the on-site first aids exists.
- b) The factors related to demographics influence employees' willingness performing first aid on-site at workplaces.
- c) The willingness barriers regarding the fundamental on-site first-aids present.

Social Network Analysis

All possible pairings of response to the four scenarios including willingness and barrier to willingness based on centrality measures were determined using Pajek software [13-16]. Thus, the current study applied social network analysis (SNA) to analyze the scenario scales and their responses. The willingness (or barrier) to its respective scenario is defined as a node. Like the journal authors are linked with each other, the most frequent number of nodes linked is the outstanding selection with a biggest bubble size and a wider bold line. The

clusters (i.e. types of feature) are distinguished with different colors.

Statistical Tools and Analyses

SPSS 22.0 for Windows (SPSS Inc., Chicago, IL) was used to conduct: the description statistics; Chi-square test on the consistent distribution of the number between demographical variables and the gender. R language was used to draw the bar chart and report the easier and harder technique being performed by employees. Pajek software was performed to execute social network analysis. All the statistical significances were examined by the criterion of type I error at 0.05 levels.

Results

Demographical Statistics

The sample includes male 97(40.6%) and female 142(59.4%). An average age is 39.0, 40 years old or under accounts for 0%. The most part education level is college or above (66.9%), following senior high school (33.1%) (Table 1). As for the experience in first aid, 73.2% respondents have received CPR training before in comparison with those 26.8% never participating in any course regarding CPR. The year gap prior to previous training accounts for 27.6% within one year, 14.6% ranging 1 to 2 years, and 31.0% more than 2 years, indicating around one third of employees whose training course of first aid rescue lags behind 2 years.

Table 1: The demographical characteristics and the year gap prior to previous training.

Variable		n	%
Age	≤40 yrs	145	60.7
	>40	94	39.3
Gender	Male	97	40.6
	Female	142	59.4
Work tenue	≤15	134	56.1
	>15	105	43.9
Education	College	160	66.9
	Senior high	79	33.1
	Junior high	64	26.8
Year gap prior to previous training	Within one year	66	27.6
	Before one to two yrs	35	14.6
	Beyond 2 yrs	74	31

The Highest Willingness to Learn Course of First Aid Rescue

For the four selected items (i.e. A. Hope to receive more courses regarding first aid rescue, B. Which one with most interest, C. The reason for leaning first aid rescue, and D. The barrier to receiving course of first aid rescue), we can see in Table 2 that all distributions in option count are unequally (p<0.05). However, the top priorities for the four selected items are those

- a) 80.8% hope to learn first aid rescue techniques,
- b) CPR is the top one with the most interest to lean (30.9%),
- c) The reason to lean first aid is to rescue family member if necessary (37.5%), and
- d) The barrier is the lack of route to learn first aid (28.9%) (Table 2).

Table 2: The willingness to learn technique for first aid rescue.

Item	n	%	Chi-square(prob.)
A. Hope to receive more courses regarding first aid rescue			90.41
Yes	<.0001	80.8	<.0001
No	46	19.2	
B. Which one with most interest			
(data were from those 193 respondents in the previous item)			9.24
CPR	150	30.9	0.026
Heimlich maneuver	111	22.9	
bandage homeostasis	115	23.7	
MBPP	109	22.5	
C. The reason for leaning first aid rescue			299.05
Rescue family member if necessary	182	53.37	<.0001
Rescue victims at workplace if necessary	146	42.82	
Position promotion if possible	11	3.23	
Others	2	0.59	
D. The barrier to receiving course of first aid rescue			
Lack of route for training	140	41.06	265.49
No time to participate	61	17.89	<.0001
No interest	27	7.92	
High cost	4	1.17	
Others	7	2.05	

Note: Techniques include cardio-pulmonary Resuscitation (CPR), Heimlich maneuver, bandage hemostasis (BH), and measuring blood, pressure, and pulse (MBPP).

The Willingness Regarding Demographical Characteristics

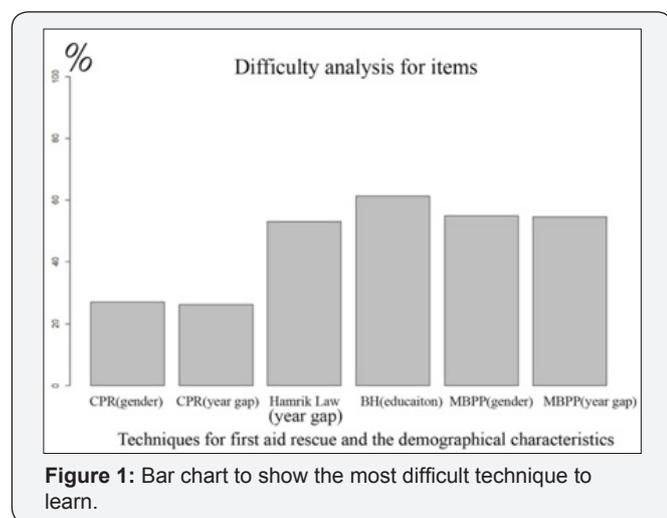
Chi-square test was performed to investigate the association between willingness and techniques onto demographical characteristics. All of those variables are statistically and significantly associated with each other, see Table 3. The most

difficult technique to learn is CPR according to the data from those with high willingness (i.e. low proportions (27.05 and 26.17 in comparison with other counterparts) for gender and the year gap prior to previous training) (Table 3) (Figure 1).

Table 3: Chi-square test for willingness and techniques onto demographical characteristics.

Item	Category	High willingness		Low willingness		Prob.
		n	%	n	%	
1.CPR						
Gender	Male	34	35.1	63	64.9	0.005*
	Female	27	19.0	115	81.0	
	None	9	14.1	55	85.9	
Year gap	Within one year	14	21.2	52	78.8	0.018*
	Before one to two yrs	12	34.3	23	65.7	
	Beyond 2 yrs	26	35.1	48	64.9	
Total		61		178		
2. Heimlich maneuver						
Year gap	None	25	39.1	39	60.9	0.042*
	Within one year	34	51.5	32	48.5	
	Before one to two yrs	21	60.0	14	40.0	
	Beyond 2 yrs	46	62.2	28	37.8	
Total		126		113		
3.bandage homeostasis						
Education	College	111	69.4	49	30.6	0.014*
	Senior high or below	42	53.2	37	46.8	
Total		153		86		
4.MBPP						
Gender	Male	60	61.9	37	38.1	0.033*
	Female	68	47.9	74	52.1	
	None	25	39.1	39	60.9	
Year gap	Within one year	44	66.7	22	33.3	0.009*
	Before one to two yrs	22	62.9	13	37.1	
	Beyond 2 yrs	37	50.0	37	50.0	
Total		128		111		

Note: MBPP-measuring blood, pressure, and pulse.



The Barrier Affected the Willingness of Performing the Respective First Aid Rescue

From Table 4, it can be seen that all cross tables are shown significant differences in proportion of count number for each row. The highest proportion across all row is the identical one which is that fears to fail when performing the first aid rescue.

Using SNA to Highlight the Abstract of the Study

The social network can classify three clusters: rescue barrier; rescue willingness; combined analysis of barrier and willingness. We can see (Figure 2) showing that the rescue main barrier is that fear to fail, all of rescue willingness in scenarios is extremely high. The reason for no willingness to perform artificial respiration is afraid of suffering infectious diseases, and for no willingness to perform CPR is that fear to shouldering the law responsibility (Figure 2).

Table 4: The barriers affected the willingness of first aid rescue.

Item	Fear fail	Shouldering law responsibility	Afraid of infectious diseases	physical condition limited to execution	Others	Chi-square	Prob.
Scenario A							
Call ambulance	42.3	29.7	1.3	47	7.1	67.5	<.0001*
CPR	56.5	30.1	2.9	9.2	1.3	92.72	<.0001*
Artificial respiration	47.7	17.2	27.6	5	2.5	59.57	<.0001*
Scenario B							
Call ambulance	45.2	26.8	2.1	18	7.9	51.08	<.0001*
Heimlich maneuver	65.7	19.7	3.3	9.6	1.7	117.42	<.0001*
Scenario C							
Call ambulance	42.7	26.4	3.3	18.4	9.2	43.17	<.0001*
Heimlich maneuver	63.6	11.7	11.3	9.6	3.8	101.65	<.0001*
Scenario D							
Call ambulance	43.1	28	1.7	17.2	10	46.61	<.0001*
MBPP	64.4	15.9	2.5	12.1	5	108.31	<.0001*

Note: MBPP- measuring blood, pressure, and pulse.

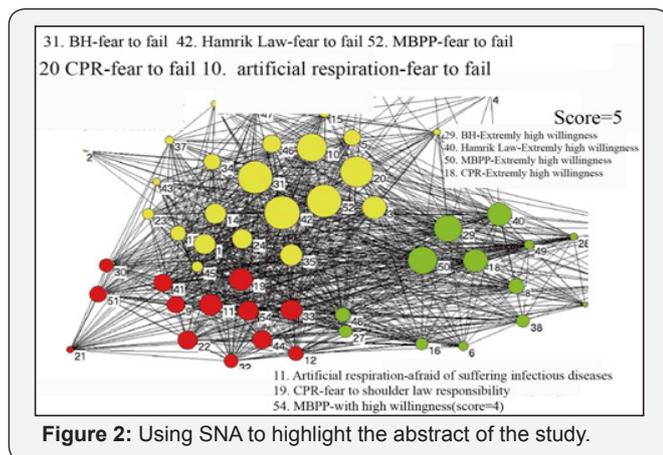


Figure 2: Using SNA to highlight the abstract of the study.

Discussion

We found that in Taiwan hot-spring industry

- a) The highest interest to learn technique of first aid rescue is CPR for employees.
- b) The main variable affecting the rescue willingness is the year gap prior to the previous training.
- c) The main barrier affecting the willingness to rescue is that fear to fail (i.e. insufficient abilities in rescue).

What This Adds to What Was Known

Almost 75% respondents who have received CPR training courses before, which is higher than the study of investigating the willingness and barrier of CPR for nurses in hemodialysis department about 25% receiving CPR training [17]. However,

the result is similar to the principle “the motivation from training and the ability from motivation”. That is based on fully implementation of the government regulations of emergency rescue at workplace (i.e. the elementary technician is required to receive 40-hour training course within three years). The year gap prior to the previous training can be shortened and the rescue confidence can be increased. Kuramoto et al. [18] addressed that the ratio of people willing to perform CPR for family member (13%) is near to 2 times to them who are willing to perform CPR for unknown strangers (7%). The result is similar to this study that the ratio is about 1.25 times (53:43 see) (Table 2). According to report regarding hospital cardiac arrest (OHCA) in Taiwan, the 70% of OHCA location is at home, 10% at workplace or other public places. Giving the first aid rescue at right time, many lives can be saved [19].

From the current study, 75% respondents who received CPR training course but 25% have the willingness to rescue victims. In comparison with other Asia countries, Taiwan is similar to Korea and Singapore (about 19~20%) [20,21]. If comparing to other western countries like U.S., Australia and Norway, the ratio of willingness to perform CPR for unknown strangers can reach 50% or above [22-24]. The ratio for willing to rescue with CPR at the hot-spring workplace is required to increase. The finding of association between gender and the year gap prior to the previous training course is similar to the previous study [25]. The male has a higher potential and willingness to perform CPR than the Female, which can be attributed to the requirement of physical power and energy consumption. Relatively, the female has little confidence in performing this first-aid rescue, particularly in CPR.

As for the year gap prior to the previous training course, the less year gap implies the higher willingness to perform first-aid rescue, which phenomenon is related to the confidence and ability in rescue and similar to the result of the previous study [17]. As for the barrier to the willingness, the finding of fearing to fail when performing first-aid rescue is similar to the previous study which investigated on-duty air attendants administering proper emergency procedures in Taiwan [26]. Giving no any training in rescue, no one is willing to or able to perform first aid. Consecutive training is the only way to upgrade the willingness and increase the ability in rescue at workplace.

What It Implies and What Should Be Changed?

When ranking the difficulties of those fundamental rescue techniques, CPR is harder than other else, see Figure 2. We found that the highest interest one to learn is CPR, the most barrier to willingness of rescue is that fears to fail, and the major factor affecting the willingness to rescue is the year gap prior to the previous training course. It is based on fully implementing the government regulations of emergency rescue at workplace (i.e. the elementary technician is required to receive 40 -hour training course within three years). The year gap prior to the previous training can be shortened and the rescue confidence can be increased. We also found that 80.8% respondents are willing to receive more courses related to first aid rescue, the CPR ranks the first place accounting for 30.9%, the motivation to learn CPR is to rescue family member if necessary (37.5%), and the biggest barrier is lacking sufficient the route of training course, see (Table 2). How to integrate social resources and circulate CPR information at workplace is needed to further improve in future.

Strengths of this Study

We applied four scenarios regarding a variety of first aid and their proper occasions to the respondents' willingness and barrier to rescue at the earlier time. The Chi-square test verified that; hot-spring employees who execute CPR with less willingness and low motivation; the biggest barrier to hinder them from performing first aid rescue is lacking a proper learning route (Table 2), and the year gap prior to the previous training course will affect the rescue willingness (Table 3). Furthermore, using R language (see Additional file 1) to draw a bar chart plot and disclose the most difficult rescue technique of CPR (Figure 1). We recommend future researches to apply these types of tables and Figures, especially using the social network analysis (Figure 2), to other fields of occupation workplaces and compare with their similarity and difference. Furthermore, The SLM can be applied to provide us with a framework that we can use it to determine what type of leadership style would be most effective based on our followers' abilities and willingness to perform the desired task such as the first-aid rescue techniques. The basic premise of SLM is that there is no one "best" way to lead a team. In other words, the leadership style we use should be adjusted

based on the situation according to the followers' willingness and abilities. More specifically, it is dependent on the maturity of the specific follower we are trying to influence.

Limitations and Future Study

There are three limitations in the current study. First, the willingness comes from the survey responding data. In real world when the accident happened, we cannot anticipate the rescue behaviors similar to the level of willingness. Future studies are encouraged to collect data immediately and instantly from respondents in the on-site continuous training course to narrow the gap between intention and behaviors. Another suggests is to adopt the Theory of Planned Behavior, TPB) to make the inference of these relations (i.e. attitude, intention, and behavior) more effective than this study [27,28]. Second, the finding of barrier to willingness to rescue such as that fears to fail cannot generalize the relation to the cause and effect. That is, others such as afraid of shouldering law responsibility fear to suffering infection diseases, and personal physical limitations can be a synergy to construct the barrier to willingness. It is worth studying in the future. Third, due to the research budget limitation, the current study merely collected data from an area of southern Taiwan. Whether any difference will be occurred at other areas or workplaces is needed for further studying.

Conclusion

Our study shows that the willingness for the hot-spring practitioners to perform complete CPR is low. Based on our findings, the major barrier to learn this basic life-saving technique is the lack of suitable learning sources. Recent emergency training course affects the status of rescue. On-site first-aid educations and training systems are required putting more emphases on studies in the future.

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