

The Perceptions of Roles and Understanding about Forensic Evidence and Crime Scene Preservation of Thai Paramedics

Thongpitak Huabbangyang, PMD., M.Sc.*, Narong Kulnides, Ph.D.**

*Master of Science Program in Forensic Science, Graduate School, Suan Sunandha Rajabhat University, Bangkok 10300, Thailand and Department of Disaster and Emergency Medical Operation, Faculty of Science and Health Technology, Navamindradhiraj University, Bangkok 10300, Thailand,

**Doctor of Philosophy Program in Forensic Science, Graduate School, Suan Sunandha Rajabhat University, Bangkok 10300, Thailand.

ABSTRACT

Objective: 1. To study the perceptions of roles and understanding of FECSP of Thai paramedics. 2. To study the problems, obstacles, and solutions for development of Thai paramedics FECSP practices. 3. To study the factors affecting the perceptions of roles and understanding of FECSP in Thai paramedics.

Materials and Methods: Thai paramedics data over the country registered with National Institute for Emergency Medicine (NIEMS) during 1st March – 31st March 2021 was collected in this cross-sectional survey. The questionnaires were sent as Google forms to them by e-mail.

Results: 382 questionnaires were sent, and 281 responses (74%) were obtained. Most were female (61.9%). The average age was 26.09±4.44 years. The most common crime scene experienced was traffic accidents. Most had never had additional training related to forensic science. The perceptions of roles and understanding about FECSP were at the highest level. The most common problem and hindrance about FECSP was no FECSP law and the most common solution for improvement of the FECSP was the standard FECSP guideline development. Hospital level was found to be a factor related to the perceptions of roles of FECSP in Thai paramedics. Average score of a cohort who worked at university hospital was higher than those working at tertiary hospitals 0.220 (B = -0.220, p-value = 0.018). Additionally, hospital level was also a factor concerning the understanding about FECSP of Thai paramedics. The average score of cohorts who worked at university hospitals was greater than those working in primary or secondary hospitals 0.197 (B = -0.197, p-value = 0.022).

Conclusion: The paramedics had the perception of the roles and understanding about FECSP at the highest level. Hospital level was a significant factor related to the perception of the roles and understanding about FECSP. Relevant health institutes should develop standard guidelines and promote FECSP training.

Keywords: Crime scene; forensic evidence; paramedic; role; understanding (Siriraj Med J 2021; 73: 661-671)

INTRODUCTION

Paramedicine is a new profession in Thailand. The most important role of paramedics is to provide pre-hospital advanced life support for emergency patients.¹ Paramedics often need to assist the injured at crime

scenes. However, paramedics have not received any official educational sessions or trainings to deal with crime scene management.² Currently, the role of paramedics in forensic evidence and crime scene preservation (FECSP) is unclear in Thailand. In the past, the management of

Corresponding author: Narong Kulnides

E-mail: Narong.ku@ssru.ac.th

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ORCID ID: <https://orcid.org/0000-0001-5151-4325>

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the evidence and the crime scene depended on individual knowledge and experience. Consequently, paramedics might damage the evidence and crime scene due to a lack of a recognized role and understanding of FECSP and may damage evidence at the crime scene while performing their duties due to not following appropriate handling processes, potentially causing a more complicated inquest, an inconclusive judgement or even a miscarriage of justice.³

The aim is to study the perceptions of roles and understanding about FECSP of Thai paramedics as well as factors affecting the perceptions of roles and understanding of FECSP in Thai paramedics.

MATERIALS AND METHODS

The study design was a cross-sectional survey. The sample was composed of Thai paramedics registered with National Institute for Emergency Medicine (NIEMS). The questionnaire data was collected during 1st March – 31st March 2021. Inclusion criteria were being registered with NIEMS and having the intention to renew their 5-year license. Exclusion criteria were incomplete data in NIEMS database, such missing as e-mail addresses, as well as declining participation. The questionnaire was examined using a validity index by three forensic experts. The validity index was 1 for all questionnaires.

The questionnaire was comprised of 4 parts. Part one was comprised of 9 questions about participants' personal information and included questions about participant sex, age, education level, income, position, employment period, hospital level, crime scene experience and additional forensic training experience. The second and third parts contained 30 questions in total: 15 questions referred to the perception of roles in FECSP of Thai paramedics and another 15 regarding their understanding of FECSP. The questionnaire employed closed questions, with responses structured using 5-point Likert rating scales - 5 being the highest, 4 being high, 3 being neutral, and 2 and 1 being low and lowest respectively. Parts two and three were validated via a tryout, tested by 30 fourth-year paramedic students who had similar characteristics to the sample. Reliability indices were calculated using Cronbach's alpha and were 0.868 and 0.875 for parts two and three respectively, indicating high reliability. The scoring criteria of the questionnaire parts two and three was divided into 5 levels, in accordance with the mean score (Best, 1986). Mean scores of 4.21-5.00, 3.41-4.20, 2.61-3.40, 1.81-2.60 and 1.00-1.80 mean highest, high, neutral, low, and lowest, respectively.⁴ Part four contained two questions relating to problems, obstacles, and solutions to improve FECSP. The questionnaires

were sent out as Google forms to the paramedics by e-mail. Participants were given 30 days to complete the survey. The definitions of factors were determined, firstly, hospital level regarding geographic information system (GIS), including tertiary, secondary and primary hospitals, as well as university hospital, separated from tertiary hospital. The university hospital was defined as a super tertiary hospital with the highest service capability and treatment readiness as well as provided medical personnel training and medical research. The tertiary hospital was an excellence center dedicated to sub-specialty care. Low, middle and high levels of secondary services were assembled in secondary hospital. The low secondary service level consisted of general practice to in-patient department (cared by general practitioner/family medicine physician). While the middle level was composed of major sub-specialty care. Both major and minor sub-specialty cares were offered in the high level of secondary service. The primary hospital was a combination of initial and main levels of primary service. The initial primary service level included elementary health promotion, prevention, rehabilitation and treatment (serviced by non-physician personnel). Whereas the main level of primary service comprised preliminary promotion, prevention, rehabilitation and treatment to out-patient department (cared by general practitioner/family medicine physician, etc.), besides paramedics under local administration were involved. Secondly, the perceptions of roles about FECSP were defined as paramedics' behavior or duty regarding knowledge and profession in FESCP according to emergency medicine. Thirdly, the understanding about FECSP was defined as paramedics' psychological process and evaluation in FECSP.

Statistical analyses

382 paramedics both registered with NIEMS in 2021 and determined to renew their 5-year license responded (NIEMS, 2021). The Taro Yamane formula was used for sample size calculation (Taro Yamane, 1973). The calculated sample size was 196, with an error margin of 0.05. After 20% of sample size was added to compensate for non-responses using the formula $n_{\text{new}} = 196 / (1-0.2)^5$, final sample size was 245. However, the questionnaire was sent to every paramedic.

Descriptive statistics were used to analyze the personal data including sex, age, education level, income, position, employment period, hospital level, crime scene experience and additional forensic training experience. For the qualitative data, frequency distribution and percentage were reported. Mean with standard deviation (SD) or

median with interquartile range (IQR) were used for the quantitative data, as appropriate. For the data of perceptions of roles and understanding about FECSP of Thai paramedic, mean with SD were reported, while frequency distribution and percentage were reported for problems, obstacles, and solutions for improvement of FECSP in Thai paramedics. Inferential statistics, multiple linear regression, were utilized for analysis of factors affecting perceptions of roles and understanding about FECSP of Thai paramedics.

IBM SPSS Statistics for Windows, Version 26.0 (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY, USA: IBM Corp.) was used. All statistical tests were considered statistically significant at P -value ≤ 0.05 .

Ethical approval

This study was approved by the institutional review board of Suan Sunandha Rajabhat University, No. COA. 1-006/2021.

RESULTS

Of 382 questionnaires sent, 281 responded (74%). Most respondents were female (61.9%). The average age was 26.09 ± 4.44 years. The average employment period was 1 year (IQR 1-3 years) for most paramedics. The most common crime scenes experienced were traffic accidents (91.1%), physical assaults (56.6%), and suicide attempts (55.5%). Most Thai paramedics (73%) had never received additional training related to forensic science (Table 1).

Mean of overall perceptions of roles about FECSP of this cohort was at the highest level ($\bar{x} = 4.27$, $SD = 0.51$). (Table 2)

Mean of overall understanding about FECSP of the sample was at the highest level ($\bar{x} = 4.28$, $SD = 0.63$). (Table 3)

Most paramedics (99.6%) faced problems and obstacles in FECSP. The most reported problems were: no FECSP law (68.7%), no standard FECSP guideline (64.8%), and lack of forensic evidence preservation equipment and collection systems (61.2%). The most commonly reported solutions to improve the practice of FECSP were: standard FECSP guideline development (83.3%), FECSP training program development (82.9%) and the passing of FECSP related laws (Table 4).

Multiple linear regression analysis revealed hospital level was the key factor related to the perceptions of roles about FECSP of Thai paramedics. The average score of a cohort who worked at tertiary hospitals was less than the cohort working at university hospitals ($B = -0.220$, p -value = 0.018), after controlling for current position

and crime scene experience (physical assault, falls from height, poisoning, occupational accident and suspicious death or suspected homicide) (Tables 5 and 6).

Hospital level was also the factor most related with the understanding about FECSP of Thai paramedics, as shown by multiple linear regression analysis. The average score of cohorts who worked at primary or secondary hospitals was less than that of university hospitals ($B = -0.197$, p -value = 0.022), after controlling for crime scene experience (falls from height and sexual assault) (Tables 7 and 8).

DISCUSSION

Overall, the perception of roles and understanding of FECSP reported in this study were at the highest level, reflecting a good quality of educational institutions providing training in paramedicine. Presently there are only four institutions, namely Navamindradhiraj University, Mahidol University, Mahasarakham University and University of Phayao that provide education and training about roles and understanding of FECSP, even though, most paramedics in this study did not have additional forensic training. Most paramedics in university hospitals were teachers and teacher assistants which had a higher level of perception of roles and understanding of FECSP than ones in tertiary, secondary and primary hospitals, respectively. Although they mainly didn't have experience in the field, due to their skill and knowledge in forensic science and crime scene, their level of perception of roles and understanding of FECSP was higher. Further, consistent with Khamya's study, emergency medical responders (EMRs) at the Poh Teck Tung Foundation in Bangkok mostly did not have additional forensic training, while overall knowledge and understanding, regard to emergency calls management aspect and crime scene preservation aspect were at the highest level, and forensic evidence understanding was at a high level.⁶ In addition, the most common problems and hindrances of FECSP the paramedics faced was a lack of an FECSP law and a lack of standard FECSP guidelines for EMRs, emergency medical technicians (EMTs), advanced emergency medical technicians (AEMTs), paramedics, emergency nurse practitioners (ENPs) and emergency physicians (EPs).⁷⁻⁸ At this moment, no FECSP guideline has been developed in Thailand, comparable to the study by Asci et al. in which there was no proper guideline relating to forensic patients for emergency medical staff and emergency stations in Turkey.³ EMRs did not clearly recognize the role as well as confronted problems and obstacles in handling the subject, while overall role perception was at a middle level for personnel, as

TABLE 1. Personal and Employment Information (n = 281).

Variables	No.	%
Sex		
Male	107	(38.1)
Female	174	(61.9)
Age (years), mean \pm SD	26.09 \pm 4.44	
Education level		
Bachelor degree	275	(97.9)
Master degree	5	(1.8)
Doctoral degree	1	(0.4)
Income (per month)		
Less than 15,000 baht	57	(20.3)
15,001 - 20,000 baht	79	(28.1)
20,001 - 25,000 baht	56	(19.9)
25,001 - 30,000 baht	52	(18.5)
30,001 - 35,000 baht	13	(4.6)
35,001 - 40,000 baht	12	(4.3)
More than 40,001 baht	12	(4.3)
Current position		
Teacher/Teacher assistant	18	(6.4)
University employee/State Enterprise	39	(13.9)
Civil servant/Ministry of Public Health officer	106	(37.7)
Employee/Freelance	114	(40.6)
Other	4	(1.4)
Employment period (year), median (IQR)	1	(1 - 3)
Hospital level		
University hospital	104	(37.0)
Tertiary hospital	65	(23.1)
Secondary hospital	70	(24.9)
Primary hospital	20	(7.1)
Private hospital	10	(3.6)
Local Administration	12	(4.3)
Crime scene experience		
Traffic accident	256	(91.1)
Suicide attempt	156	(55.5)
Physical assault	159	(56.6)
Fall from height	150	(53.4)
Shooting	98	(34.9)
Poisoning	98	(34.9)
Occupational accident	114	(40.6)
Electrical accident	111	(39.5)
Burn	86	(30.6)
Drowning	130	(46.3)
Suspicious death/homicide	94	(33.5)
Sexual assault	37	(13.2)
Incised wound	115	(40.9)
Additional forensic training		
No	205	(73.0)
Yes	76	(27.0)

TABLE 2. The perceptions of Thai paramedics regarding their roles in FECSP.

Questions	mean	SD	Level of Understanding/ Awareness
1. Paramedics always remember that lifesaving is more important than forensic considerations.	4.26	0.79	Highest
2. Paramedics should damage the crime scene as little as possible for forensic evidence preservation.	4.72	0.58	Highest
3. Paramedics and team member should not enter the crime scene until the crime scene is safe and controlled by police.	4.84	0.47	Highest
4. Paramedics have a role in recording details of the crime scene and forensic evidence in the patient record.	3.93	1.09	High
5. Paramedics have a role in giving information and advice regarding critical emergency state to prehospital forensic patient.	4.27	0.84	Highest
6. Paramedics have a duty to examine forensic evidence, especially when recording the medical details of the case.	3.68	1.17	High
7. Paramedics have a role in history taking and recording information of forensic patient at the scene, during delivery, history taking, physical examination, treatment at the scene and vital signs, clearly.	4.60	0.66	Highest
8. Paramedics have a role to contact dispatch center for coordination with police officer or authorities involved in case of forensic patient.	4.54	0.75	Highest
9. Paramedics have a role in explanation of required information regarding crime scene examination to forensic doctor and inquiry official.	4.17	0.92	High
10. Paramedics have a role as an advanced life support team leader and has a duty in security check of the team before entering the crime scene.	4.66	0.72	Highest
11. Paramedics often have a role in assisting forensic patient.	3.89	0.99	High
12. Paramedics have an important role in forensic evidence and crime scene preservation as well as often been related to this activity in daily operation.	4.17	0.91	High
13. Paramedics have a role in Chain of Custody.	3.89	1.08	High
14. Paramedics have a role in assisting forensic patient by applying holistic approach, included physical, mental, social and spiritual aspects, according to emergency medicine theory.	4.25	0.91	Highest
15. Overall, what level of a role in forensic evidence and crime scene preservation does paramedic has?	4.15	0.88	High
Overall perception of roles in forensic evidence and crime scene preservation.	4.27	0.51	Highest

TABLE 3. The understanding of FECSP of Thai paramedics.

Questions	mean	SD	Level of Understanding/Awareness
1. You must control ambulance parking at the scene to be far from skid marks, tire prints or other evidence.	4.32	0.93	Highest
2. From the ambulance, you must use the same walking route to and from the scene to avoid evidence damage.	4.16	0.93	High
3. You are notified about a body found hanging at home. You are the first team arriving the scene, the body found hanging, slightly faced down with the knot at the posterior. You will cut the rope far from the knot and the hanging loop.	3.95	1.34	High
4. You will avoid touching the weapon or moving the object possible to be a clue for forensic patient except only as needed for patient assistance.	4.70	0.59	Highest
5. You must record patient's state and injured person's character when arriving the scene as well as surrounding.	4.48	0.82	Highest
6. You will cut or tear victim's clothes regarding seam to avoid mark penetrated from object and avoid cutting and tearing at the mark.	4.38	1.02	Highest
7. You will not shake the clothes but collect all the clothes in the paper bag, instead of plastic bag due to evidence change and you will not give the clothes to unknown people, even victim's family.	4.40	0.94	Highest
8. You will preserve tissue or other parts for the benefit of forensic examination.	4.08	1.17	High
9. If you find bullet at the scene, you will put it in the container padded with cotton or protection sheet to prevent any mark on the bullet and you will keep the evidence until giving to the police.	3.63	1.45	High
10. You will record victim's dying declaration and report to EMS director and police officer.	3.96	1.20	High
11. You will make a report recording all the change EMS team make to the scene and physical evidence, to crime scene investigator and police officer.	4.12	1.11	High
12. You will keep all the irrelevant ones away from the patient and the scene.	4.57	0.79	Highest
13. You will not smoke or eat at the scene.	4.77	0.66	Highest
14. You will not make any comment relating the case.	4.63	0.82	Highest
15. What level do you have for overall understanding of forensic evidence and crime scene preservation?	4.12	0.89	High
Overall understanding of forensic evidence and crime scene preservation.	4.28	0.63	Highest

TABLE 4. The problems, obstacles and solutions for improvement of FECSP.

Problems and Obstacles/Solutions	No.	%
Problems and obstacles of forensic evidence and crime scene preservation	280	(99.6)
Not knowing the detail of the role.	103	(36.7)
No standard guidelines for forensic evidence and crime scene preservation.	182	(64.8)
Lack of knowledge, education and training of forensic evidence and crime scene preservation.	143	(50.9)
No law of forensic evidence and crime scene preservation.	193	(68.7)
Insufficient information of forensic evidence and crime scene preservation.	137	(48.8)
Lack of device in forensic evidence and crime scene preservation, systematically.	172	(61.2)
Other problems and obstacles.	7	(2.5)
Solutions for improvement of forensic evidence and crime scene preservation	281	(100.0)
Development of standard guideline of forensic evidence and crime scene preservation.	234	(83.3)
Development of training program of forensic evidence and crime scene preservation.	233	(82.9)
Legislation of forensic evidence and crime scene preservation.	206	(73.3)
Development of connection systems and communication between police officer and EMS team.	193	(68.7)
Other solutions.	6	(2.1)

TABLE 5. Univariable analysis regarding the perceptions of roles about FECSP of Thai paramedic.

Factors	B	SE(B)	β	p-value
Sex				
Male	Reference			
Female	-0.059	0.063	-0.056	0.348
Age (years)	0.003	0.007	0.027	0.650
Education level				
Graduate and above	Reference			
Undergraduate	-0.009	0.212	-0.003	0.965
Income (per month)				
Less than 15,000 baths	Reference			
15,001 - 20,000 baths	0.044	0.089	0.039	0.619
20,001 - 25,000 baths	-0.066	0.097	-0.052	0.493
More than 25,000 baths	-0.062	0.087	-0.056	0.478
Current position				
Teacher/Teacher assistant/ University employee/State Enterprise	Reference			
Civil servant/Ministry of Public Health officer	-0.168	0.084	-0.159	0.046
Employee/Freelance/Other	-0.170	0.082	-0.164	0.040
Employment period (year)	-0.017	0.013	-0.082	0.169

TABLE 5. Univariable analysis regarding the perceptions of roles about FECSP of Thai paramedic. (Continue)

Factors	B	SE(B)	β	p-value
Hospital level				
University hospital	Reference			
Tertiary hospital	-0.172	0.081	-0.142	0.034
Primary/Secondary hospital	-0.113	0.074	-0.103	0.127
Private hospital/ Local Administration	-0.094	0.120	-0.049	0.432
Crime scene experience				
Traffic accident	0.026	0.108	0.014	0.813
Suicidal attempt	0.082	0.061	0.080	0.182
Physical assault	0.136	0.061	0.131	0.028
Falls from height	0.192	0.060	0.187	0.002
Shooting incident	0.038	0.064	0.035	0.557
Poisoning	0.169	0.064	0.158	0.008
Occupational accident	0.169	0.062	0.162	0.006
Electrical accident	0.112	0.062	0.107	0.074
Burn	0.087	0.066	0.078	0.193
Drowning	0.066	0.061	0.064	0.282
Suspicious death/Suspected homicide	0.137	0.064	0.126	0.035
Sexual assault	0.145	0.090	0.096	0.109
Incised wound	0.083	0.062	0.080	0.182
Additional forensic training	0.012	0.069	0.010	0.864

B = Regression coefficient, SE(B) = Standard error of B, β = Standardized regression coefficient

TABLE 6. Multivariable analysis regarding the perceptions of roles about FECSP of Thai paramedic.

Factors	B	SE(B)	β	p-value
Current position				
Teacher/Teacher assistant/ University employee/State Enterprise	Reference			
Civil servant/Ministry of Public Health officer	-0.039	0.098	-0.037	0.692
Employee/Freelance/Other	-0.109	0.086	-0.106	0.204
Hospital level				
University hospital	Reference			
Tertiary hospital	-0.220	0.093	-0.181	0.018
Primary/Secondary hospital	-0.119	0.080	-0.108	0.140
Private hospital/ Local Administration	-0.016	0.121	-0.008	0.897
Crime scene experience				
Physical assault	0.042	0.071	0.041	0.553
Fall from height	0.107	0.071	0.105	0.133
Poisoning	0.073	0.073	0.068	0.318
Occupational accident	0.060	0.075	0.058	0.422
Suspicious death/Suspected homicide	0.097	0.068	0.090	0.154

B = Regression coefficient, SE(B) = Standard error of B, β = Standardized regression coefficient, Constant = 4.255, $R^2 = 0.086$

TABLE 7. Univariable analysis regarding the understanding about FECSP of Thai paramedic.

Factors	B	SE(B)	β	p-value
Sex				
Male	Reference			
Female	0.111	0.074	0.090	0.134
Age (years)	0.003	0.008	0.020	0.739
Education level				
Graduate and above	Reference			
Undergraduate	-0.004	0.248	-0.001	0.988
Income (per month)				
Less than 15,000 baht	Reference			
15,001 - 20,000 baht	-0.064	0.105	-0.048	0.543
20,001 - 25,000 baht	-0.125	0.113	-0.083	0.272
More than 25,000 baht	-0.059	0.102	-0.046	0.563
Current position				
Teacher/Teacher assistant/ University employee/State Enterprise	Reference			
Civil Servant/Ministry of Public Health officer	-0.036	0.099	-0.029	0.720
Employee/Freelance/Other	-0.003	0.097	-0.003	0.974
Employment period (year)	-0.011	0.015	-0.045	0.456
Hospital level				
University hospital	Reference			
Tertiary hospital	-0.108	0.094	-0.076	0.254
Primary/Secondary hospital	-0.195	0.086	-0.152	0.024
Private hospital/ Local Administration	-0.031	0.140	-0.014	0.823
Crime scene experience				
Traffic accident	0.036	0.126	0.017	0.777
Suicide attempt	0.072	0.072	0.060	0.320
Physical assault	0.134	0.072	0.111	0.063
Fall from height	0.144	0.071	0.120	0.045
Shooting	0.045	0.075	0.036	0.548
Poisoning	-0.004	0.075	-0.003	0.958
Occupational accident	0.104	0.073	0.085	0.155
Electrical accident	0.110	0.073	0.090	0.134
Burn	-0.018	0.078	-0.014	0.814
Drowning	-0.040	0.072	-0.034	0.576
Suspicious death/homicide	0.051	0.076	0.040	0.500
Sexual assault	0.209	0.105	0.118	0.048
Incised wound	0.015	0.073	0.013	0.833
Additional forensic training	0.015	0.081	0.011	0.851

B = Regression coefficient, SE(B) = Standard error of B, β = Standardized regression coefficient

TABLE 8. Multivariable analysis regarding the understanding about FECSP of Thai paramedic.

Factors	B	SE(B)	β	p-value
Hospital level				
University hospital	Reference			
Tertiary hospital	-0.135	0.094	-0.095	0.152
Primary/Secondary hospital	-0.197	0.085	-0.153	0.022
Private hospital/ Local Administration	0.021	0.140	0.009	0.881
Crime scene experience				
Fall from height	0.126	0.072	0.105	0.082
Sexual assault	0.208	0.106	0.118	0.051

B = Regression coefficient, SE(B) = Standard error of B, β = Standardized regression coefficient, Constant = 4.294, $R^2 = 0.047$

Sadudee reported.⁹ Regarding solutions for improving FECSP, the paramedics most wanted development of standard guidelines for FECSP and FECSP training programs, agreeing with the study by Saenkaew showing the best crime scene investigation improvement was annual training and guideline development.¹⁰ To improve emergency nurses' practice, hospitals should focus on and support forensic tasks by providing training in forensic medicine and forensic science, as suggested in Suwanchasri's study.¹¹ This paper would encourage the National Institute for Emergency Medicine to develop Forensic Evidence and Crime Scene Preservation training course together with launching national standard FECSP law and guidelines. In Thailand, the multidisciplinary team involved with crime scene, including crime scene investigators, forensic medicine doctors, pathologists and forensic anthropologists.¹² Paramedics were required only if there is injury necessary for emergency treatment and hospital admission. Sexual assault was common in Thailand and counted as a criminal case. Sperm detection in specimen collection after male sexual assault was essential in court.¹³⁻¹⁴ Therefore, knowledge of forensic evidence preservation in sexual assault case was crucial for paramedics to prevent forensic evidence damage and investigation compromise.

The most important limitation of this study was that of potential insufficient experience on the part of survey respondents, as their average employment period was only 1 year. Hence, information regarding problems, hindrances and solutions for FECSP improvement might not be representative, because they had less experience

about problems and hindrances of FECSP. Secondly, no e-mail addresses of the older generation of paramedics was in the database, hence they could not be included in this study. Thirdly, the second and third parts of the questionnaire regarding the perceptions of roles and understanding about FECSP of Thai paramedics were positive questions only because most paramedics might choose without consideration, possibly leading to bias. Hence, the highest levels of the perceptions of roles and understanding about FECSP of Thai paramedics were presented. In the future study, both positive and negative questions should be set to get rid of this limitation.

CONCLUSION

Thai paramedics had overall perceptions of the roles and understanding of FECSP at the highest level. Hospital level was the factor related to the perceptions of the roles of Thai paramedics, with the group working in tertiary hospitals scoring less than those at university hospitals. The factor related to the understanding of FECSP of Thai paramedics was hospital level, as the scores of those working in primary or secondary hospitals were lower than those at university hospitals. The professional council, NIEMS and educational or training institutes should focus on roles of paramedics in FECSP, by developing standard guidelines and FECSP training for paramedics.

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