

Emergency Cases And Primary Health Care Physicians, Factors And Barriers In Al-Madinah City 2021

Fallatah, Samah Bakr A¹, Tamim, Jehad Khairuddein H², Alzahrani, Abdulrahman Mesfer S³, Zamil, Abdulrhman Ahmed H

Abstract

Background: Primary health care (PHC) centers are the first meeting line with health services, therefore, there is a significant number of emergency cases presenting to PHC centers with different levels of severity from mild to moderate and sever cases

Objectives: To assess primary health care physicians` competency regarding emergency cases, factors and barriers.

Methods: A cross-sectional study among all primary health care physicians in Al-Madinah city was performed during 2021. Two tools were adopted for data collection; a self-administered questionnaire to assess physicians` competency in dealing with emergency cases and a structured observation sheet used to evaluate the availability of equipment, drugs, and other supporting facilities required to deal with emergency cases in PHC centers.

Results: The study included 200 primary healthcare physicians, out of targeted 219 with a response rate of 91.3%. Their age ranged between 26 and 63 years with an arithmetic mean of 36.05 years and standard deviation of (\pm) 8.16 years. More than one third (39%) of the physicians had poor level of competence in dealing with emergency cases. Saudi, more qualified physicians, those who attended BLS this year and those who attended ATLS courses since more than two years were more competent in dealing with emergency cases than their peers. Overall, 40% of them had insufficient level of competence and comfort in performing different emergency skills. Male physicians were more likely than females to have sufficient level of competency and comfort in performing emergency skills, $p=0.021$. The most frequently reported barriers facing primary healthcare physicians in dealing with emergency cases were availability of ER facilities (72%) and insufficient knowledge and practice related to emergency cases (61.5%). The commonest reported preferred methods for training in emergency medicine were practical training in PHC centers by a qualified staff (81%), hospital rotation training (52%) and lectures (40%).

Conclusion: A considerable proportion of primary healthcare physicians in Al Madinah were not competent in dealing with emergency cases, and performing emergency skills. Most of Emergency medications and services at PHC level were available; however, shortages were observed in some items.

¹ Family Medicine senior registrar

² Family Medicine senior registrar

³ Family Medicine senior registrar

⁴ Family Medicine senior registrar

Keywords: *Emergency, Primary healthcare, physicians, competency.*

1. Introduction

1.1 Background

Primary health care (PHC) was defined by the World Health Organization (WHO) as a whole-of-society approach to health and well-being centered on the needs and preferences of individuals, families and communities (1), It provides a comprehensive care for all patients ranging from promotion and prevention to treatment, rehabilitation and palliative care (1).

Medical emergency means any health condition, illness, injury, physical or mental inability which requires immediate attention by medical professionals, if wasn't managed in a timely manner could lead to serious impairment to bodily functions, organs, or parts and could place the physical or mental health of the patient in a serious risk(2)

Since PHC centers are an essential component of human and community development (1), there is a continuous and progressive need for its improvement.

Being the first meeting line with health services, there is a significant number of emergency cases presenting to PHC centers with different levels of severity from mild to moderate and sever cases(3) requiring a decent degree of care including a well-qualified PHC centers with all the required facilities and a well competent physicians in managing the emergent cases, all these puts the PHC physicians under challenge.

Some studies suggest that one-third to two-thirds of patients attend to the emergency departments with problems that could be managed at PHC centers (4).

In means to improve the quality of PHC services provided including emergency services studies showed that training in emergency medicine was on the top of the list of the needed aspects in continued medical education (5, 6).

An evaluation of PHC physicians competency, factors and barriers affecting them regarding dealing with emergency cases has not been previously performed in Al-Madinah city, KSA.

1.2 Rational of the study:

As communities are continuing in growing and aging there is an increased demand for PHC services(7). including acute and emergency cases management which represents a good number of cases so, the more good care provided by physicians the more control of emergency cases will be achieved, and this will also play a role in decreasing the emergency cases which presents to the emergency room in main hospitals while they can be managed in primary health care centers.

1.3 General objectives:

To know primary health care physicians competency regarding emergency cases, factors and barriers in Al-Madinah city 2021.

1.3 Specific objectives:

- To assess the competency of PHC physicians in dealing with emergency cases.
- To assess the factors affecting dealing with emergency cases.
- To assess the barriers facing physicians in dealing with emergency cases.
- To check the physicians preferred method for training in emergency medicine.

-To check the availability of the equipments, medications, intravenous fluids and supporting facilities those are needed in emergency care.

2. Literature review

- A study was done in Jeddah to estimate the prevalence of emergency cases reporting to PHC centers and to explore the barriers facing PHC physicians when dealing with emergency cases. It showed a prevalence of 5.2% for the emergency cases attending PHC centers in Jeddah in 2013. The majority of physicians 97.1% had attended basic life support (BLS) courses, but 83.5% had not attended ATLS courses, with 60.7% never attending advanced cardiac life support (ACLS) courses. Physicians in the age group 36-45 years, non-Saudi, those who had SBFM, those who reported experience in working in emergency departments and physicians who reported more working years in PHC centers >5 years had a significant higher score of perceived level of competence in performing emergency skill scale than others(9).
- A study was done in the Damam to assess the PHC physician's practice as related to emergency medical services, the factors affecting clinical practice, physicians learning needs and preferred methods of training in emergency medicine. The study revealed that 87.3% of physicians had a good diagnostic knowledge score while only 47.6% had a good management score. Nonetheless, 63.5% of physicians had a neutral attitude toward emergency medical services and practical training in hospital's emergency department was chosen by 80% of physicians as a preferred method for more training in emergency medicine(6).
- A study was done in Damam to assess the availability of human and nonhuman resources for emergency medical services at PHC centers level. It showed that the total number of physicians "actually" present ranged from 2 to 8 per center and nurses actually present were 4-11 which are less than the officially assigned number, 15.4% of centers had a place reserved for emergency medical services in each male and female section, 30.8% of PHC centers had a male ER located on the ground floor, near the entrance. None of the centers had some emergency drugs such as metergotamine, calcium chloride, and naloxone, none of the centers had cervical collars, mouth gags, or a tracheostomy sets, 7.6% of centers had a functioning fully equipped ambulance and 38.46% of centers were equipped with electrocardiogram and X-ray machines (10).
- A study was done in Abha district to evaluate the PHC centers emergency health care services in terms of structure, outcome, knowledge, attitudes and practices of PHC physicians and to identify their felt needs for continuing medical education in emergency care and to study the patients satisfaction regarding PHC emergency services. The study showed that there was no devoted place for emergency services in 6.7% of PHC centers, Separate drug cabinets for emergency services were found in 76.7% of the centres. 16.7% had no devoted registry for emergency cases, there was deficiency in the supporting facilities, The average duration spent in PHC centers in Saudi Arabia was for physicians was 8.7 years., only 29.8% of them worked in hospitals for a mean duration of 2.7 years. Only 20.0% of physicians felt that they were not competent to deal with emergency cases at PHC level. The most preferred training method for receiving medical education training in emergency care was practical training in 91.5% of physicians. 82.2% of patients were satisfied with the emergency services provided by the PHC centers(11).
- A study was done in Alexandria, Egypt to evaluate the quality of emergency services at the primary care level and how it can be improved. All the PHC facilities had no written clinical practice guidelines for providing primary emergency services, no guidelines for pediatric emergency triage, assessment or treatment and no referral guidelines. Lack of some

essential equipment and drugs was evident. Most physicians 94.1% and nurses 85.0% had practiced emergency care in the primary health care. More physicians as compared to nurses reported greatest need for continuing medical education in the management of pediatric emergencies. More than half of physicians endorsed hospital training 58.8% while 48.4% endorsed practical training in PHC settings (12).

- A study was done in Asir region to identify the specific continuing medical education needs of doctors working in PHC centers. It showed that emergency skills were on the top of the list of the needed aspects in clinical practice followed by diagnostic skills and management of common diseases. The doctors preferred means of providing for their medical educational needs are clinical rounds, consultations with specialists and regular lectures (5).
- A study was done in Isparta, Turkey to assess the availability of emergency equipment and the knowledge of the staff working in PHC centers. It showed 9.5% of PHC centers had a complete emergency kit with an airways bag, mask, intravenous parenteral solutions, emergency drugs, and other diagnostic equipment. Emergency equipment was easily accessible in 90.5% of them, while in the remaining centers, the equipment and drugs were stored in locked cabinets. The staff that was evaluated 22% of them were doctors, 67% nurses and midwives, and 11% health officers. Doctors scored the highest knowledge score 65.5%, followed by nurses 58.6%, midwives 56.7%, and health officers 52.5% (13).
- A study was done in Queensland, Australia to determine the type and frequency of emergencies in general practice, and the extent to which general practices are equipped to appropriately respond to emergencies. It showed 57% general physicians (GPs) reported managing a cumulative total of 5640 emergencies over the preceding 12 months. Non-metropolitan GPs saw about 30% more emergencies than their metropolitan counterparts. The most common emergencies more than 30% were acute asthma, psychiatric emergencies, convulsions, hypoglycaemia, anaphylaxis, impaired consciousness, shock, poisoning and overdose. 77% GPs stocked 15 or more of the 16 emergency doctor's bag drugs, but 67% had all of the basic emergency equipment items considered essential (14).

3. Methodology

3.1 Study design:

A cross-sectional study among primary health care physicians in Al-Madinah city was performed.

3.2 Study area:

Al-Madinah city is situated in the Hejaz region of Western Saudi Arabia and has a population of 1,512,724 9(3).

There are around 40 PHC centers in Al-Madinah city; they are divided into 5 sectors according to the ministry of health so, each sector has its own secondary care hospital and PHC centers.

3.3 Study population:

Primary health care physicians working in primary health care centers in Al-Madinah city 2021 constituted the target population for the study.

3.4 Inclusion criteria:

All primary health care physicians working in primary health care centers in the central areas in Al-Madinah city were invited to participate in the study.

3.5 Exclusion criteria:

PHC centers in Al-Madinah city in peripheral areas as well as PHC physicians who work in administration were excluded from the study.

3.6 Sample size:

All primary health care physicians working in primary health care centers in Al-Madinah city are included in the study, their estimated number is 219.

3.7 Study tool:

The study tool consists of 2 sources for data collection:

1. A self-administered questionnaire and the researcher was available for any questions.
2. A structured observation sheet used to evaluate the availability of equipment, drugs, and other supporting facilities required to deal with emergency cases.

The questionnaire is ready used by a published study in 2016 about

"Barriers facing primary health care physicians in Jeddah when dealing with emergency cases"(9) and the permission was taken from the author to use the study tool.

Regarding physicians` competency in dealing with emergency cases, a scoring system was created in the way the higher the score the more competent the physician. Total score and its percentage were computed and physicians scored less than 60% were considered having "poor competence" whereas those scored 60% or more were considered having "good competence".

Further modifications were done on some questions, more questions were added and the questionnaire was presented to 2 Emergency Room (ER) consultants for validity checking.

The questionnaire is written in English language and it is divided into 3parts:

-The 1st part contains questions to assess the physicians` perceived competence and comfort in dealing with emergency cases.

-The 2ndpart contains questions to assess the barriers facing physicians in dealing with emergency cases and their preferred training method in emergency medicine.

-The 3rdpart contains the sociodemographic data of the participants.

The availability sheet was filled by the researcher and it's divided into 3 parts:

-The 1st part including a list of equipments needed in emergency care.

The 2nd part including a list of medications and intravenous fluids needed in emergency care.

The 3rd part including supporting facilities in emergency care

3.8 Data collection:

A ready used questionnaire was distributed among primary health care physicians during work days and they were interviewed by the researcher to fill it.

3.9 Study period:

The study was conducted during 2021.

3.10 Pilot study:

Ten physicians were asked to fill the questionnaire to test its validity; little modifications were done, in socio-demographic data according to the pilot study and pilot records were excluded from the study.

3.11 Data entry and analysis:

The researcher distributed the questionnaire during working hours, was available to clarify any issues, and then the questionnaire was recollected on the same day.

Data analysis and management plan:

Data were entered into a personal computer and it was analyzed using (SPSS), version 26.

All variables were coded before entry and checked before analysis.

Continuous data were tested for normal distribution and normally distributed variables were presented as the mean and standard deviation while abnormally distributed variables were presented as median and interquartile range (IQR). Categorical data were presented as percentage and frequency.

Suitable statistical tests were applied according to the type of data with the help of a statistician. Chi-square was used for comparing 2 or more qualitative variables, Student's t-test for comparing two independent quantitative normally distributed variables and mann-Whitney test for comparing two independent quantitative abnormally distributed variables.

A p-value of less than 0.05 was considered statistically significant.

3.12 Ethical consideration:

- Approval was obtained from the ethics committee before data collection.
- A written permission was obtained from the concerned authority in the primary care centers.
- The purpose of the study was explained to the participants and they were asked to provide a "verbal" informed consent before filling the questionnaire.
- All information was kept confidential and anonymous.

3.13 Budget:

It was self-funded.

3.14 Services:

It is hoped to improve the quality of the emergency care provided in PHC centers, to provide more facilities as required and if possible to provide a standardized protocol for emergency cases management in PHC centers.

4. Results

The study included 200 primary healthcare physicians, out of targeted 219 with a response rate of 91.3%. Table 1 presents their socio-demographic characteristics. Their age ranged between 26 and 63 years with an arithmetic mean of 36.05 years and standard deviation of (\pm) 8.16 years. Slightly more than half of them (52.5%) were males and most of the physicians (73.5%) were Saudi nationals.

Table 1: Socio-demographic characteristics of the participants (n=200)

	Frequency	Percentage
Age (years)		
Range	26-63	
Mean±SD	36.05±8.16	
Gender		
Male	105	52.5
Female	95	47.5
Nationality		
Saudi	147	73.5
Non-Saudi	53	26.5

-Level of training, previous experience and emergency courses

Most of the PHC physicians were either MBBS (42%) or Saudi Board of Family Medicine (SBFM) (41%) holders. Almost half of them (84.5%) have attended Basic Life Support (BLS) course since less than one year whereas 41.5% have attended BLS courses since a period ranged between one and two years. Slightly less than half (47% (22%) of physicians have attended ACLS course since more than two year and 22% did not attend such courses. More than half (57%) of them did not attend ATLS course while only 7% attended ATLS courses since less than one year. Less than half of them (47.5%) had any work experience in emergency department. Average number of patients seen per day ranged between 4 and 80 with a median of 30 patients. Experience of working in primary care ranged between 3 months and 30 years (7.2±6.0 years) while experience since graduation ranged between 4 months and 36 years (10.2±8.4 years).

Table 2: Level of training, previous experience and emergency courses

	Frequency	Percentage
Highest qualification degree		
MBBS	84	42.0
ABFM	15	7.5
SBFM	82	41.0
FM/Internal medicine Diploma	16	8.0

Others	3	1.5
Duration since attending Basic Life Support course		
<one year		
1-2 years	99	49.5
>2 years	83	41.5
	18	9.0
Duration since attending Advanced cardiac Life Support course		
<one year	28	14.0
1-2 years	34	17.0
>2 years	94	47.0
Didn't attended	44	22.0
Duration since attending Advanced Trauma Life Support course		
<one year	14	7.0
1-2 years	24	12.0
>2 years	48	24.0
Didn't attended	114	57.0
Did you have any work experience in emergency department?		
Yes	95	47.5
No	105	52.5
Average number of patients seen/day		
Range	4-80	
Median	30	
Years of work in primary health care		

Range	3 months-30 years
IQR	3-10
Median	5
Years of total experience since graduation	
Range	4 months-36 years
IQR	4.25-16
Median	7

ABFM: Arab Board of Family Medicine

SBFM: Saudi Board of Family Medicine

-Perceived competence and comfort when dealing with emergency cases

A considerable proportion of the PHC physicians were extremely competent in dealing with cases of severe acute asthma (41%) while 47% were slightly competent in dealing with cases of acute gastrointestinal bleeding and 45% were moderately competent in dealing with cases of severe dehydration and 41% in dealing with cases burns or convulsions. More than one-fourth (26%) were not competent in dealing with cases of cardiac arrest. Table 3

Overall, more than one third (39%) of the physicians had poor level of competence in dealing with emergency cases as illustrated in Figure 1.

Table 3: Physicians` perceived competence and comfort when dealing with emergency cases

	Not competent N (%)	Slightly competent N (%)	Moderately competent N (%)	Extremely competent N (%)
Severe acute asthma	18 (9.0)	28 (14.0)	72 (36.0)	82 (41.0)
Myocardial infarction	30 (15.0)	68 (34.0)	58 (29.0)	44 (22.0)
Angina pectoris	36 (18.0)	62 (31.0)	56 (28.0)	46 (23.0)
Cardiac arrest	52 (26.0)	64 (32.0)	62 (31.0)	22 (11.0)
Severe dehydration	14 (7.0)	56 (28.0)	90 (45.0)	40 (20.0)
Renal colic	12 (6.0)	46 (23.0)	78 (39.0)	64 (32.0)
Acute gastrointestinal bleeding	44 (22.0)	94 (47.0)	48 (24.0)	14 (7.0)
Hypoglycaemia	10 (5.0)	46 (23.0)	62 (31.0)	82 (41.0)
Diabetic Ketoacidosis	22 (11.0)	58 (29.0)	78 (39.0)	42 (21.0)
Convulsions	18 (9.0)	70 (35.0)	82 (41.0)	30 (15.0)
Anaphylaxis	28 (14.0)	62 (31.0)	68 (34.0)	42 (21.0)
Acute vaginal bleeding	44 (22.0)	80 (40.0)	64 (32.0)	12 (6.0)
Burns	24 (12.0)	58 (29.0)	82 (41.0)	36 (18.0)

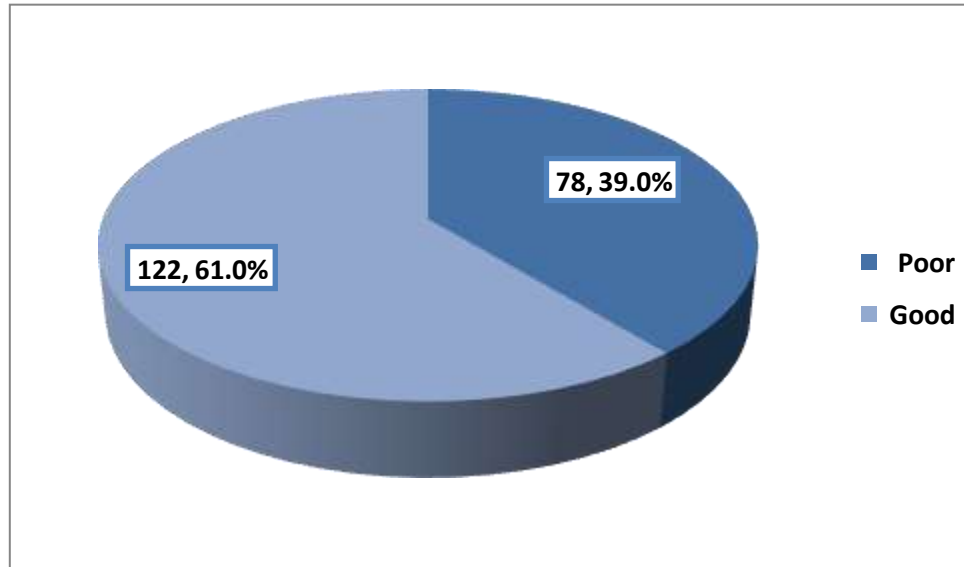


Figure 1: Overall level of competency of primary healthcare physicians in Al-Madinah regarding dealing with emergency cases.

Factors associated with level of competency in dealing with emergency cases

-Socio-demographic factors

Almost two-thirds (66%) of Saudi physicians compared to 47.2% of none-Saudi physicians had good level of competency in dealing with emergency cases, $p < 0.001$. Participants' age and gender were not significantly associated with level of competency in dealing with emergency cases. Table 4

-Training, previous experience and emergency courses

Table 5 demonstrated that the highest level of good competency in dealing with emergency cases was observed among Saudi Board of Family Medicine (SBFM) (75.6%) and Arab Board of Family Medicine (ABFM) (73.3%) holders compared to 47.6% of MBBS holders, $p = 0.003$. Physicians who attended BLS this year were more likely to have good level of competency in dealing with emergency cases than those attended it since more than two years (65.7% vs. 22.2%), $p = 0.002$. Majority of physicians who attended ATLS courses since more than two years (83.3%) compared to 41.7% of those who attended such courses since 1-2 years expressed good level of competency in dealing with emergency cases, $p = 0.001$. Other studied factors were not significantly associated with level of competency in dealing with emergency cases.

Table 4: Socio-demographic factors associated with competency of primary healthcare physicians in dealing with emergency cases

	Competency in dealing with emergency cases		p-value
	Poor N=78	Good N=122	
Age (years)			
Mean±SD	37.3±9.5	35.2±7.1	0.075*
Gender			
Male (n=105)	40 (38.1)	65 (61.9)	

Female (n=95)	38 (40.0)	57 (60.0)	0.783**
Nationality			
Saudi (n=147)	50 (34.0)	97 (66.0)	
Non-Saudi (n=53)	28 (52.8)	25 (47.2)	0.016**

*Student t-test

**Chi-square test

Table 5: Impact of training, previous experience and emergency courses on competency of primary healthcare physicians in dealing with emergency cases

	Competency in dealing with emergency cases		p-value
	Poor N=78	Good N=122	
Highest qualification degree			
MBBS (n=84)	44 (52.4)	40 (47.6)	
ABFM (n=15)	4 (26.7)	11 (73.3)	
SBFM (n=82)	20 (24.4)	62 (75.6)	
FM/Internal medicine Diploma (n=16)	8 (50.0)	8 (50.0)	
Others (n=3)	2 (66.7)	1 (33.3)	0.003*
Duration since attending Basic Life Support course			
<one year (n=99)	34 (34.3)	65 (65.7)	
1-2 years (n=83)	30 (36.1)	53 (63.9)	
>2 years (n=18)	14 (77.8)	4 (22.2)	0.002*
Duration since attending Advanced cardiac Life Support course			
<one year (n=28)			
1-2 years (n=34)	14 (50.0)	14 (50.0)	
>2 years (n=94)	14 (41.2)	20 (58.8)	
Didn't attended (n=44)	30 (31.9)	64 (68.1)	
	20 (45.5)	24 (54.5)	0.236*
Duration since attending Advanced Trauma Life Support course			
<one year (n=14)			
1-2 years (n=24)	8 (57.1)	6 (42.9)	
>2 years (n=48)	14 (58.3)	10 (41.7)	
Didn't attended (n=114)	8 (16.7)	40 (83.3)	
	48 (42.1)	66 (57.9)	0.001*
Did you have any work experience in emergency department?			
Yes (n=105)			
No (n=95)	44 (41.9)	61 (58.1)	
	34 (35.8)	61 (64.2)	0.376*
Average number of patients seen/day			
IQR			
Median	9-45	20-40	
	25	30	0.142**

Years of work in primary health care IQR Median	3-10 4	3.75-10 6	0.271**
Years of total experience since graduation IQR Median	4-18 8	5-13.25 7	0.375**

*Chi-square

**Mann-Whitney test

Frequency of seeing emergency cases in the last 12 months:

As shown in table 6, more than half of the PHC physicians (54.5%) have seen 5 cases or more with severe acute asthma and about one-fourth of them have seen 5 cases or more with renal colic (23%), hypoglycemia (22.5%) and burns (20.5%). On the other hand, most of them have not seen any case in the last 12 months of cardiac arrest (84%), acute gastrointestinal bleeding (74%), anaphylaxis (68%), acute vaginal bleeding (67%) and angina pectoris (56%).

Table 6: Frequency of emergency cases seen by primary healthcare physicians in the last 12 months, AlMadinah.

	None	1-4	≥5
Severe acute asthma	36 (18.0)	55 (27.5)	109 (54.5)
Myocardial infarction	102 (51.0)	91 (45.5)	7 (3.5)
Angina pectoris	112 (56.0)	80 (40.0)	8 (4.0)
Cardiac arrest	168 (84.0)	30 (15.0)	2 (1.0)
Severe dehydration	106 (53.0)	83 (41.5)	11 (5.5)
Renal colic	38 (19.0)	116 (58.0)	46 (23.0)
Acute gastrointestinal bleeding	148 (74.0)	48 (24.0)	4 (2.0)
Hypoglycaemia	60 (30.0)	95 (47.5)	45 (22.5)
Diabetic Ketoacidosis	82 (41.0)	84 (42.0)	34 (17.0)
Convulsions	102 (51.0)	87 (43.5)	11 (5.5)
Anaphylaxis	136 (68.0)	54 (27.0)	10 (5.0)
Acute vaginal bleeding	134 (67.0)	57 (28.5)	9 (4.5)
Burns	58 (29.0)	101 (50.5)	41 (20.5)

Perceived level of competence and comfort in performing different emergency skills

From Table 7, it is seen that more than one-third of the primary healthcare physicians will attempt nebulization & oxygen therapy (41.5%), simple suture (37%), cardiac compression (37%), bag & mask resuscitation (36%), and using IV fluid & medications (35.5%) in all cases. On the other hand, 50% of them did not know how to start intubation whereas 30%, 29%, 28% and 27% of them did not know how to start inserting IV cannula, defibrillation, nasogastric tube insertion and urinary catheter insertion, respectively.

Overall, 40% of the primary healthcare physicians had insufficient level of competence and comfort in performing different emergency skills as shown in Figure 2.

Table 7: Perceived level of competence and comfort in performing different emergency skills among the participants

C	I do not know where to start N (%)	I will do only if no one else is available N (%)	I will attempt in most cases N (%)	I will attempt in all cases N (%)
Cardiac compression	36 (18.0)	43 (21.5)	47 (23.5)	74 (37.0)
Mouth to mouth resuscitation	34 (17.0)	60 (30.0)	50 (25.0)	56 (28.0)
Bag & mask resuscitation	24 (12.0)	38 (19.0)	66 (33.0)	72 (36.0)
Inserting IV cannula	60 (30.0)	44 (22.0)	58 (29.0)	38 (19.0)
Intubation	100 (50.0)	66 (33.0)	22 (11.0)	12 (6.0)
Defibrillation	58 (29.0)	74 (37.0)	47 (23.5)	21 (10.5)
Reading ECG	12 (6.0)	66 (33.0)	88 (44.0)	34 (17.0)
Nebulization & oxygen therapy	22 (11.0)	46 (23.0)	49 (24.5)	83 (41.5)
Simple suture	30 (15.0)	40 (20.0)	56 (28.0)	75 (37.0)
Nasogastric tube insertion	56 (28.0)	44 (22.0)	64 (32.0)	36 (18.0)
Urinary catheter insertion	54 (27.0)	38 (19.0)	49 (24.5)	59 (29.5)
Using IV fluid & medications	26 (13.0)	48 (24.0)	55 (27.5)	71 (35.5)

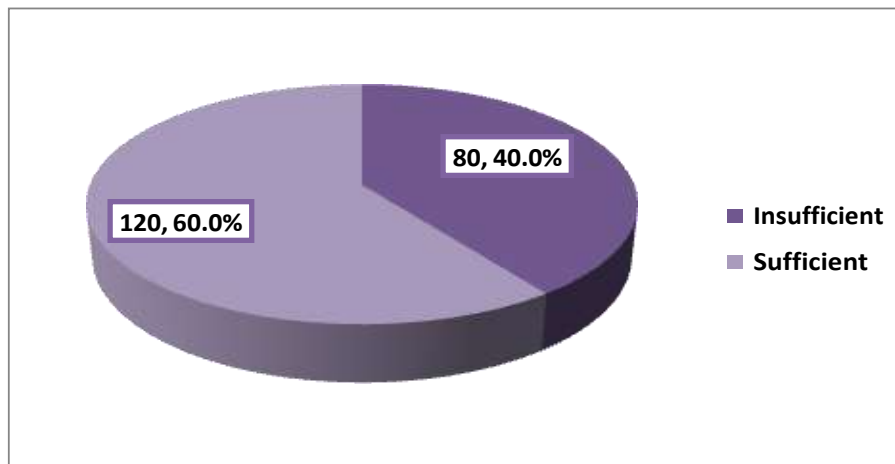


Figure 2: Overall level of competency and comfort of primary healthcare physicians in Al-Madinah in performing different emergency skills among the participants

Factors associated with level of competency and comfort in performing emergency skills

-Socio-demographic factors

About two-thirds (67.6%) of male physicians compared to 51.6% of female physicians had sufficient level of competency and comfort in performing emergency skills, $p=0.021$. Participants' age and nationality were not significantly associated with level of competency and comfort in performing emergency skills. Table 8

-Training, previous experience and emergency courses

The highest level of sufficient competency and comfort in performing emergency cases was observed among all physicians with other qualification compared to 33.3% of ABFM holders, $p=0.015$. Other studied factors were not significantly associated with level of competency in dealing with emergency cases. Table 9

Table 8: Socio-demographic factors associated with competency and comfort of primary healthcare physicians in Al-Madinah in performing different emergency skills

	Competency in performing emergency skills		p-value
	Insufficient N=80	Sufficient N=120	
Age (years)			
Mean±SD	36.4±8.3	35.8±8.1	0.622*
Gender			
Male (n=105)	34 (32.4)	71 (67.6)	0.021**
Female (n=95)	46 (48.4)	49 (51.6)	
Nationality			
Saudi (n=147)	54 (36.7)	93 (63.3)	0.116**
Non-Saudi (n=53)	26 (49.1)	27 (50.9)	

*Student t-test

**Chi-square test

Table 9: Impact of training, previous experience and emergency courses on competency and comfort of primary healthcare physicians in performing emergency skills.

	Competency in performing emergency skills		p-value
	Insufficient N=80	Sufficient N=120	
Highest qualification degree			
MBBS (n=84)	40 (47.6)	44 (52.4)	0.015*
ABFM (n=15)	10 (66.7)	5 (33.3)	
SBFM (n=82)	26 (31.7)	56 (68.3)	
FM/Internal medicine Diploma (n=16)	4 (25.0)	12 (75.0)	
Others (n=3)	0 (0.0)	3 (100)	
Duration since attending Basic Life Support course			
<one year (n=99)	32 (32.3)	67 (67.7)	

1-2 years (n=83) >2 years (n=18)	38 (45.8) 10 (55.6)	45 (54.2) 8 (44.4)	0.067*
Duration since attending Advanced cardiac Life Support course <one year (n=28) 1-2 years (n=34) >2 years (n=94) Didn't attended (n=44)	8 (28.6) 14 (41.2) 36 (38.3) 22 (50.0)	20 (71.4) 20 (58.8) 58 (61.7) 22 (50.0)	0.322*
Duration since attending Advanced Trauma Life Support course <one year (n=14) 1-2 years (n=24) >2 years (n=48) Didn't attended (n=114)	6 (42.9) 12 (50.0) 16 (33.3) 46 (40.4)	8 (57.1) 12 (50.0) 32 (66.7) 68 (59.6)	0.584*
Did you have any work experience in emergency department? Yes (n=105) No (n=95)	47 (44.8) 33 (34.7)	58 (55.2) 62 (65.3)	0.148*
Average number of patients seen/day IQR Median	7-45 25	20-40 30	0.107**
Years of work in primary health care IQR Median	2.25-10 5	4-10 5.5	0.700**
Years of total experience since graduation IQR Median	4-15.75 7	5-16 7.5	0.920**

*Chi-square

**Mann-Whitney test

Emergency services provided at PHC centre:

From table 10, it is demonstrated that the most frequent available equipments needed for emergency cases at investigated PHCCs were blades (97.2%), dressing table, suture materials, suction apparatus, intravenous (IV) stand, cannulas, oxygen masks and oxygen cylinder with standard fitting (94.4%). On the other hand, splints, and cervical collars were available in only 72.2% and 50% of PHCCs, respectively.

As regards medications and intravenous fluids, normal saline and Ringer lactate were available in 100% and 97.2% of PHCCs, respectively while activated charcoal powder and Rabies vaccine were available in only 36.1%, and 47.2% of PHC centers, respectively

Concerning supporting facilities, x-ray was available in only less than one-third of PHCCs (30.6%) while laboratory and ECG machine were available in 91.7% and 69.4% of PHCCs, respectively.

Table 10: Availability of items needed for emergency care at primary health care centers in Al-Madinah

Items	Availability of the item at PHCCs (n=36)	
	Number	Percentage
1.Equipments needed in emergency care		
Side lamp with stand	32	88.9
Dressing trays	32	88.9
Dressing table	34	94.4
Urinary catheter	31	86.1
Forceps	33	91.7
Scissors	33	91.7
Suture materials	34	94.4
Needle holder	32	88.9
Suction apparatus	34	94.4
Blades	35	97.2
IV stand	34	94.4
Splints	26	72.2
Nasogastric tubes	25	69.4
Cannulas	34	94.4
Cervical collars	18	50.0
Oxygen mask	34	94.4
Airways equipment	31	86.1
Oxygen cylinder with standard fitting	34	94.4
Ambubag	34	94.4
Nebulizer	33	91.7
2. Medications and intravenous fluid needed in emergency care		
Calcium chloride injection	29	
Calcium gluconate injection injections	26	72.2

Antihistaminic injection injection	26	72.2
Hydrocortisone injection	32	88.9
Dextrose5%,10%,50%	32	88.9
Normal saline	36	100
Ringer lactate	35	97.2
Activated charcoal powder	13	36.1
Metoclopramide	31	86.1
Adrenaline injection	31	86.1
Ventolinfor neublization	33	91.7
Tetanustoxoid	30	83.3
Rabies vaccine	17	47.2
Diazepam	20	55.6
Furosemide	32	88.9
Hyoscine	33	91.7
3.Supporting facilities in emergency care		
X-ray	11	30.6
Laboratory	33	91.7
Equipped ambulancescars	22	61.1
ECG machine	25	69.4
US	18	50.0

Barriers facing primary healthcare physicians in dealing with emergency cases

From Figure 3, it is shown that the most frequently reported barriers facing primary healthcare physicians in dealing with emergency cases were availability of ER facilities (72%) and insufficient knowledge and practice related to emergency cases (61.5%)

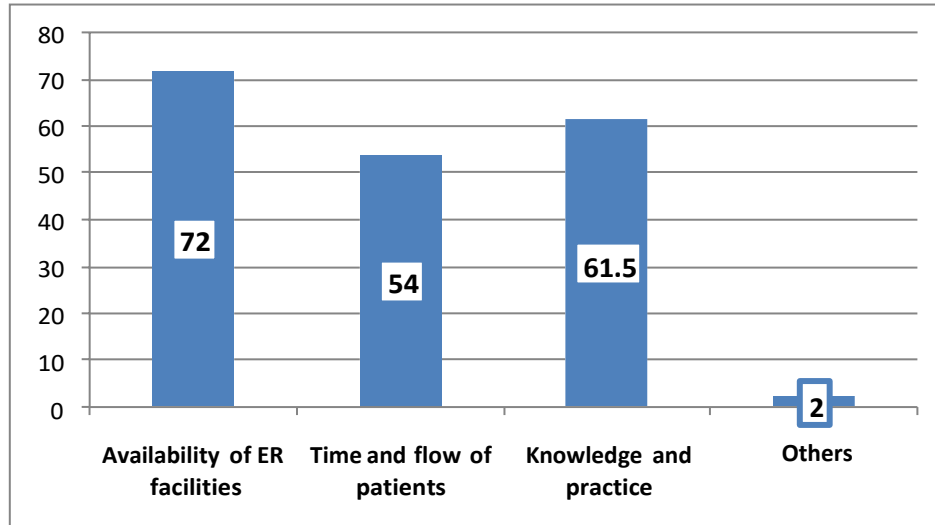


Figure 3: Barriers facing primary healthcare physicians in dealing with emergency cases

Preferred methods for training in emergency medicine

Regarding preferred methods for training in emergency medicine among primary healthcare physicians, the commonest reported were practical training in PHC centers by a qualified staff (81%), hospital rotation training (52%) and lectures (40%). Figure 4

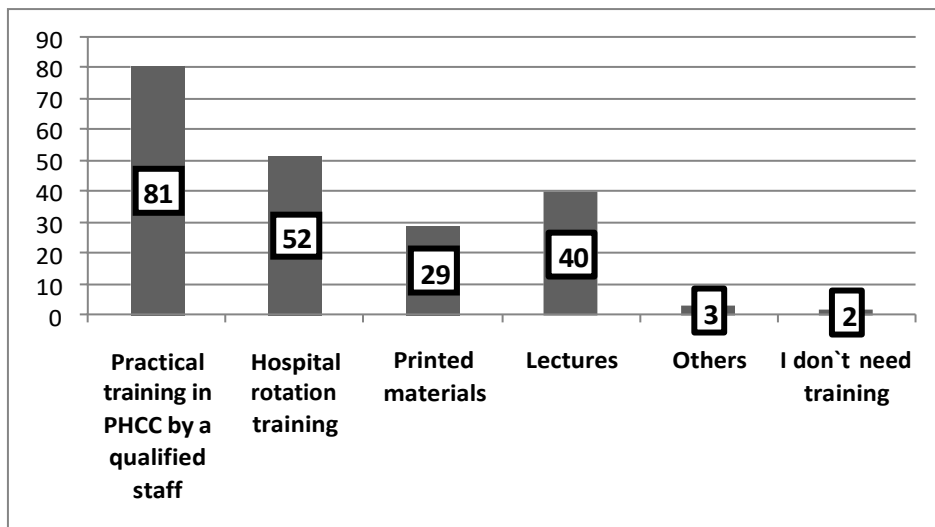


Figure 4: Preferred methods for training in emergency medicine among primary healthcare physicians, AlMadinah

5. Discussion

As primary healthcare physicians may face some emergency situations at their workplace and as often primary healthcare centers are not well equipped to deal with such medical emergencies, previous studies indicated that PHC centers should have a written emergency protocol that can assist them to effectively deal with emergency cases (15, 16). In this context, the current study was conducted mainly to assess primary health care physicians' competency regarding emergency cases, factors and barriers.

In agreement with other studies conducted in Saudi Arabia (9) and Egypt (12), the present study revealed a need for continuing medical education training programs to primary health care physicians in emergency medicine. In our cohort of primary health care physicians, 22% did not attend ACLS courses and more than half (57%) of them did not attend ATLS course while only 7% attended ATLS courses since less than one year. More dramatic situation has been observed in another Saudi study carried out in Jeddah (Saudi Arabia) where more than 60% of PHC physicians never attended ACLS courses whereas more than 83% never attended ATLS courses (9). Moreover, even the attendance of ACLS, ATLS courses, in addition to BLS course was not proved to improve their perceived level of competence in performing emergency skills and only attendance of ATLS and BLS courses was associated with better competency in dealing with emergency cases, which was not the case with ACLS. This indicates that the quality and/or contents of such courses need to be revised; particularly the part dealing with practicing different emergency skills. In addition, so long as attending continuing medical education is not obligatory for promotion or seniority, there are no incentives for physicians to attend and participate actively in such activities. Furthermore, clinical experience in emergency departments as well as years of experience in working after graduation or in PHCCs proved to be not associated with improving perceived level of competence in dealing with or performing emergency skills among primary health care physicians in this study.

In the present study, 40% of the primary healthcare physicians had insufficient level of competence and comfort in performing different emergency skills. Better result has been observed in Abha city (Saudi Arabia), as only 20% of physicians felt that they were not competent to deal with emergency cases at PHC level (11). However quite similar rates were observed in other Saudi studies conducted in Jeddah (9) and Dammam (6). Competence and comfort of primary healthcare physicians in performing different emergency skills is essential in proving emergency care of good quality.

In the present study, finding that male physicians were more competent and comfortable than female physicians in performing emergency skills while Saudis had higher rate of perceived level of competence in dealing with emergency cases compared to non-Saudis; most probably attributed to physiologic nature as males can withstand emergency situations more than females and consequently tended to practice emergency skills at higher rate than females and Saudis are mostly younger than non-Saudis and also can withstand emergency cases and possess more tendency to deal with emergency cases than older non-Saudis. Therefore, further training in clinical emergency medicine is warranted especially for non-Saudi and female physicians.

Review of literature revealed that emergency cases can be seen in primary health care settings (17). Furthermore, a Saudi study done in Jeddah showed a prevalence of 5.2% for the emergency cases attending PHC centers (9). In accordance with that, the current study showed that more than half of the PHC physicians have seen 5 cases or more in the last 12 months, with severe acute asthma and about one-fourth of them have seen 5 cases or more with renal colic (23%), hypoglycemia (22.5%) and burns (20.5%). On the other hand, most of them have not seen any case in the last 12 months of cardiac arrest (84%), acute gastrointestinal bleeding (74%), anaphylaxis (68%), acute vaginal bleeding (67%) and angina pectoris (56%). Also in other studies carried out in Jeddah (Saudi Arabia) (9) Norway (18), Netherlands (19) and Spain (20), emergency cases represented a considerable proportion of cases seen at primary healthcare centers. In Australia, 57% general physicians (GPs) reported managing a cumulative total of 5640 emergencies over the preceding 12 months and the most common emergencies were acute asthma, psychiatric emergencies, convulsions, hypoglycaemia, anaphylaxis, impaired consciousness, shock, poisoning and overdose (14). Therefore, PHC centers should be well equipped and properly prepared to deal with emergency cases.

The most frequently reported barriers facing primary healthcare physicians in dealing with

emergency cases in the current study were availability of ER facilities and insufficient knowledge and practice related to emergency cases. In Spain (20), the provision of equipments was perceived as the most important barrier faced by physicians in dealing with emergency cases. However, in Norway, the provision of equipments in primary healthcare centers in both rural and urban areas was considered by physicians as satisfactory (21). Overcoming those barriers will lead to improvement in the care delivered to emergency cases at primary healthcare settings.

In this study, the most preferred methods for training in emergency medicine, according to the primary healthcare physicians were practical training in PHC centers by a qualified staff (81%), hospital rotation training (52%) and lectures (40%). Another Saudi study done in Asir region showed that emergency skills were on the top of the list of the needed aspects in clinical practice by primary healthcare physicians and the most preferred means of providing their medical educational needs were clinical rounds, consultations with specialists and regular lectures (5). In Dammam, Saudi Arabia, practical training in hospital's emergency department was chosen by 80% of physicians as a preferred method for more training in emergency medicine (6). In Alexandria (Egypt), 58.8% of PHC physicians endorsed hospital training while 48.4% endorsed practical training in PHC settings as preferred methods for emergency education (12). In Abha (Saudi Arabia), the most preferred training method was practical training as mentioned by 91.5% of physicians. (11). So, there is consensus on the role of practical training as a preferred method.

In the study and in agreement with several studies (9, 20, 22, 23), most of primary healthcare centers are lacking x-ray while 38.9% and 30.6% lacked equipped ambulance cars, and ECG machine making these centers not well prepared for dealing with emergency situations.

In the present study, relative shortage of splints, and cervical collars was observed at PHC centers. Furthermore, shortage of some medications needed in emergency care such as activated charcoal powder and Rabies vaccine were observed. In Damam (Saudi Arabia), none of the PHC centers had some emergency drugs such as metergotamine, calcium chloride, and naloxone, none of the centers had cervical collars, mouth gags, or a tracheostomy sets, 7.6% of centers had a functioning fully equipped ambulance and 38.46% of centers were equipped with electrocardiogram and X-ray machines (10). In Abha city (Saudi Arabia), there was no devoted place for emergency services in 6.7% of PHC centers, separate drug cabinets for emergency services were found in 76.7% of the centres. 16.7% had no devoted registry for emergency cases, and there was deficiency in the supporting facilities (11). Similarly, in Turkey only 9.5% of PHC centers had a complete emergency kit with an airways bag, mask, intravenous parenteral solutions, emergency drugs, and other diagnostic equipment and emergency equipment was easily accessible in 90.5% of them, while in the remaining centers, the equipment and drugs were stored in locked cabinets (13). In Alexandria, Egypt, there was lacking of some essential equipment and drugs (12).

This study has some important limitations. The questionnaire was full of detailed questions that could affect on the response rate of the physicians and quality of data. However, regular visits by the researcher to motivate physicians helped in obtaining a considerable response rate. The study was based entirely on self-administered questionnaire, therefore is subjected to bias as it is possible that certain practices may have been over-reported. Moreover, the study investigated the frequency that each approach was utilized, but this does not take into account the quality of practice. On the other hand, the study has also important strengths as it includes both physician`s survey as well as observation of the primary health care centers for readiness to cope with emergencies and the high response rate among primary health care physicians and all available PHC centers as 4 were closed at the time of study conduction.

6. Conclusion

A considerable proportion of primary healthcare physicians in Al Madinah were not competent in dealing with emergency cases, particularly none Saudi and less qualified physicians as well as they were not competent in performing emergency skills particularly females.

Their level of training and emergency courses was suboptimal particularly regarding ATLS courses.

The most frequently reported barriers facing primary healthcare physicians in dealing with emergency cases in the current study were availability of ER facilities and insufficient knowledge and practice related to emergency cases.

The most preferred methods for training in emergency medicine, according to the primary healthcare physicians were practical training in PHC centers by a qualified staff, hospital rotation training and lectures.

Regarding emergency services at PHC level in Al Madinah, most of items were available; however, shortages were observed in some others.

7. Recommendations

Based on the present study's findings, the following are recommended:

1. Conduction of regular practical training courses concerning dealing with emergency cases in PHC settings for primary care physicians.
2. Encouraging primary healthcare physicians to attend activities in emergency medicine such through providing incentives such as promotion or seniority.
3. Provision of guidelines at primary healthcare centers for emergency triage, assessment or treatment and no referral guidelines.
4. It is recommended to monitor PHCCs regularly for the supply of essential drugs and necessary equipment for emergencies.
5. Equipped ambulances, laboratory and x-ray should be available at the main PHCCs, especially those in remote areas.
6. Emergency equipments should be stocked at an appropriate place, achievable when needed and maintained regularly.

References

1. Primary health care [Internet]. Who.int. 2019. Available from: <https://www.who.int/news-room/fact-sheets/detail/primary-health-care>.
2. Medical emergency | legal definition of Medical emergency by Law Insider [Internet]. Lawinsider.com. Available from: <https://www.lawinsider.com/dictionary/medical-emergency>.
3. Ministry of Health, Bahrain. Improvement of emergency services at primary health care centers program [Internet]. Available from: <https://www.moh.gov.bh/Services/Emergency>
4. Becker J, Dell A, Jenkins L, Sayed R. Reasons why patients with primary health care problems access a secondary hospital emergency centre. SAMJ; 2012; 102 (10): Available from: https://pdfs.semanticscholar.org/beaa/daafc7322572134563b3349828e44f8513fd.pdf?_ga=2.2006386.279648980.1581465040-468656771.1579723586

5. Alakija W, Mahfouz AA, Raof A, Al-Khuzayem AA, Al-Erian RA. Continuing medical education in primary health care in Saudi Arabia: an epidemiologic study of physicians' needs in the Asir region. *J Egypt Public Health Assoc.* 1994;69(5-6):469-79.
6. Abu-Grain SH, Alsaad SS, El Kheir DY. Factors affecting primary health-care physicians' emergency-related practice; Eastern Province, KSA. *J Family Med Prim Care.* 2018;7(4):739–751. doi:10.4103/jfmpe.jfmpe_284_17.
7. Almalki M e. Health care system in Saudi Arabia: an overview. - PubMed - NCBI [Internet]. Ncbi.nlm.nih.gov. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22256414>
8. About Al Madinah [Internet]. Ngha.med.sa. 2018. Available from:<https://ngha.med.sa/English/MedicalCities/AlMadinah/Pages/AboutAlMadinahAlMunawwarah.aspx>.
9. Aloufi MA, Bakarman MA. Barriers Facing Primary Health Care Physicians When Dealing with Emergency Cases in Jeddah, Saudi Arabia. *Glob J Health Sci.* 2016;8(8):54248. Published 2016 Aug 1. doi:10.5539/gjhs.v8n8p192.
10. Alsaad SSM, Abu-Grain SHS, El-Kheir DYM. Preparedness of Dammam primary health care centers to deal with emergency cases. *J Family Community Med.* 2017;24(3):181–188. doi: 10.4103/jfcm.JFCM_5_17.
11. Primary health care emergency services in Abha district of southwestern Saudi Arabia [Internet]. Applications. emro.who.int. Available from:http://applications.emro.who.int/emhj/1301/13_1_2007_103_112.pdf.
12. Mohey A. Primary Healthcare Emergency Services in Alexandria, Egypt 2016. *Quality in Primary Care* 2017; 25 (5): 303-315
13. Yorganci M, Yaman H. Preparedness of Primary Healthcare Centers for Critical Emergency Situations in Southwest Turkey. *Prehospital and Disaster Medicine.* Cambridge University Press; 2008;23(4):342–5.
14. Lopez DG, Hamdorf JM, Ward AM, Emery J. Early trauma management skills in Australian general practitioners. *ANZ Journal of Surgery* 2006; 76(10):894-897. doi: 10.1111/j.1445-2197.2006.03901.x.
15. Toback SL. Medical emergency preparedness in office practice. *American Family Physician* 2007; 75(11): 1679-1684
16. Shenoj R, Li J, Jones J, Pereira F. An education program on office medical emergency preparedness for primary care pediatricians. *Teach Learn Med.* 2013; 25(3): 216-224.
17. Yorganci M, Yaman H. Preparedness of primary healthcare centers for critical emergency situations in southwest Turkey. *Prehosp Disaster Med.* 2008; 23(4): 342-345.
18. Zakariassen E, Hansen EH, Hunskaar S. Incidence of emergency contacts (red responses) to Norwegian emergency primary healthcare services in 2007 – a prospective observational study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2009; 17:30
19. Moll van Charante EP, van Steenwijk-Opdam PC, Bindels PJ: Out-of-hours demand for GP care and emergency services: patients' choices and referrals by general practitioners and ambulance services. *BMC Fam Pract* 2007, 8:46.
20. Martínez JAC, Delgado RC, González PA. Self-perceived limitations and difficulties by primary health care physicians to assist emergencies. *Medicine* 2018; 97:52:e13819
21. Vaardal B, Lossius HM, Steen PA, et al. Have the implementation of a new specialized emergency medical service influenced the pattern of general practitioners involvement in pre-hospital medical emergencies? A study of geographic variations in alerting, dispatch, and response. *Emerg Med J.* 2005; 22:216-9.

22. Mansfield CJ, Price J, Frush KS, Dallara J. Pediatric emergencies in the office: are family physicians as prepared as pediatricians? *J Fam Pract* 2001; 50:757-61.
23. Dick ML, Schluter P, Johnston C, Coulthard M. GPs' perceived competence and comfort in managing medical emergencies in southeast Queensland. *Aust Fam Physician*. 2002; 31:870-5.