

Factors affecting primary health-care physicians' emergency-related practice; Eastern Province, KSA

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ABSTRACT

Background: Being the first in-line care providers, primary health-care (PHC) physicians may encounter all forms of emergencies, ranging from minor complaints to life-threatening events. This wide variation of cases challenges the physicians to be competent in emergency medicine. Informative literature describing and assessing the factors affecting PHC physicians' emergency medical services (EMS)-related practice is deficient (nationally and internationally). The aim of this study is to assess PHC physicians' practice related to EMS, the factors affecting it, as well as their learning needs and preferred methods of continuous training in emergency medicine. **Methods:** All physicians working in the selected centers were invited to complete a self-administered questionnaire addressing their EMS-related practice. Moreover, physicians were invited to participate in face-to-face semi-structured interviews and focus group discussions. **Results:** 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 EMS. The most common reported emergencies encountered are bronchial asthma (86.51%), cut wounds (83.33%), and burns (76.19%). About 62% of participants reported that their greatest needs for further training were in cardiovascular and central nervous system emergency management, preferably by practical training in hospital emergency department (80%). **Conclusions:** Dammam PHC physicians have a good knowledge, neutral attitude, and fair practice concerning the emergency cases encountered. The majority of physicians reported their need for further hands-on training in emergency medicine. **Settings and Design:** A cross-sectional, mixed methods study was conducted in 13 out of 26 PHC centers of Dammam, Saudi Arabia.

Keywords: Emergency medical services, emergency medicine, physicians, primary health care, qualitative methods

Introduction

Primary health care (PHC) was defined by the World Health Organization in 1978 as an essential health care based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to all individuals and families in the community.^[1] In accordance with the Alma-Ata declaration,^[1] the need of PHC development was recognized by health-care authorities in the Kingdom of Saudi Arabia (KSA).^[2,3]

As communities continue to grow and age, increasing demand for acute medical services is required in response to life-threatening emergencies, acute exacerbation of chronic diseases, and numerous ordinary health problems that nevertheless necessitate rapid action.^[4] Emergency medical services (EMS) must be integrated with primary care and public health measures to ensure the presence of strong comprehensive health systems.^[4-8]

Being the first in-line care providers, PHC physicians may encounter all forms of medical emergencies, ranging from minor complaints to major life-threatening events.^[4-9] This wide variation of encountered emergency cases poses a challenge for physicians to be properly updated and competent in emergency

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medicine.^[10] Informative literature describing and assessing the impact of factors such as PHC physicians' emergency care-related knowledge, attitude, and practice (KAP) is, unfortunately, deficient both nationally and internationally.

Up to the authors' current knowledge, there is only one published study regarding the EMS in PHC centers in KSA, done in 2003, on all PHC centers in Asir, Southern KSA. It showed that most PHC physicians had practiced in wound (95.7%) and burn (93.6%) management. Almost 80% of physicians in Asir study believed that EMS was an essential component of PHC and felt confident to deal with emergency cases at PHC level.^[7] However, few international studies were done in Sri Lanka, Turkey, France, Asia, and the United States, and these revealed that PHC physicians' knowledge and attitude were not satisfactory, and their skill level in dealing with emergencies in PHC setting was extremely poor.^[11-15]

Regarding the need for continuous medical education (CME) among PHC physicians, both national^[7,16,17] and international^[18-21] studies revealed that training in emergency medicine was one of the highest in-demand CME courses. The PHC physicians' preferred methods for receiving CME training vary between practical training,^[7] clinical round,^[7,17] specialist consultation,^[17,18] video conferencing,^[18] seminars,^[20] interactive workshops,^[20,21] and e-learning methods.^[21]

A methodological evaluation of factors affecting PHC physicians' ability to effectively and efficiently handle emergency cases at the PHC level has not been previously performed in Dammam city, Eastern Province, KSA.

The current study aims to objectively and systematically assess PHC physicians' practice as related to EMS, the factors affecting clinical practice, physicians' learning needs, and preferred methods of training in emergency medicine. This would highlight the areas of strengths and weaknesses and provide a solid background for future improvement of the current EMS at PHC centers.

Subjects and Methods

A cross-sectional observational study with mixed (quantitative and qualitative) methods was carried out in the Ministry of Health (MOH) PHC centers in Dammam, Eastern Province, KSA, during the period of September 2014 to January 2015.

Dammam is the largest city and the capital of the Eastern Province of KSA and the most oil-rich region in the world.^[22,23] It is located on the coast of the Arabian Gulf at about 400-kilometer east of Saudi Arabia's Capital city of Riyadh, covering an area of more than 800 km² with a population of 949,939.^[22-24] PHC services in Dammam are delivered through a widespread network of 26 PHC centers providing services to nearly 843,580 people.^[25]

Thirteen out of all 26 PHC centers in Dammam were selected by systematic sampling technique as follows: all 26 centers

were ordered in a descending manner depending on their catchment population. Then, all centers corresponding to the odd follow-order numbers in this list (1, 3, 5, etc...) were selected [Appendix 1].^[26] Subsequently, all physicians working in these selected centers, who directly involved in the management of emergency cases, were invited to participate in this study. Of these, consenting physicians were asked to complete a self-administered questionnaire with the aim of assessing their KAP concerning the emergency cases encountered during their practice, their perceived CME need, and preferred methods of training. Physicians working in administrative jobs and not directly involved in patient care, dentists, and medical interns were excluded from this study.

The research ethical approval was obtained from the Research Committee of the Saudi Board of Family Medicine and Saudi MOH and the medical directors of all participating PHC centers before the start of data collection [Appendix 2]. The participation in the study was completely voluntary, and the confidentiality of the collected information was assured. The purpose of the study was explained to all participants and they were asked to provide "verbal" informed consent before the start of data collection.

Physicians' questionnaire was constructed through the integration of previously validated questionnaires used in a national published study^[7] and data from a nonpublished local study. This questionnaire was piloted on 10 PHC physicians (equivalent to 10% of the study sample) working in 3 PHC centers different from those included in this study, 1 month before the start of data collection. This ensured that the questionnaire was understandable and acceptable to the proposed study population and to determine the time needed to complete it. The final questionnaire used here consisted of a total of 22 items divided into 3 sections, namely, participants' demographic data, KAP questions, and training need assessment [Appendix 3].

The researcher themselves collected and analyzed the data. All collected information was screened for completion of information before analysis; one questionnaire was discarded because of missing data. The remaining questionnaires were entered, managed, coded, and analyzed using SPSS stands for statistical package for social sciences (released 2007, SPSS for windows, version 16.0. Chicago, SPSS Inc).

$P < 0.05$ was considered statistically significant. The descriptive analysis of all the variables was expressed as mean, standard deviation, or median if not normally distributed.

The total physicians' knowledge score was expressed using summation of knowing how to diagnose and knowing how to manage questions, and then, a Likert scale of 3 scales was used. Scores of <50%, 50%–85%, and >85%–100% was considered as poor, fair, and good levels of knowledge, respectively.

The physicians' attitude was assessed through 7 statements, each one has a Likert scale of 5 (1 = strongly disagree; 2 = disagree;

3 = not sure; 4 = agree; and 5 = strongly agree). A Likert scale of 3 was developed for each statement after summation of the physicians' answer; scores of <50%, 50%–85%, and >85%–100% were considered negative, neutral, and positive attitude, respectively. The overall attitude of each physician was handled in the same manner.

In the qualitative study, PHC physicians were invited to participate in face-to-face semi-structured interviews and focus group discussions from 7 out of 13 centers. The interviews were conducted after taking participants' permission and completion of the questionnaire. Field notes were recorded by the researchers during the interviews.

The authors generated a conceptual framework by which the data were labeled and sorted. This process involved identifying the recurring themes of the interviewee and group discussion. Subsequently, a list of main themes and subthemes was applied systematically to the whole dataset.

Results

Based on the figures documented in the Saudi MOH statistical system, a total of 70 physicians were expected to be encountered in the targeted centers. However, only 65 physicians were found; the remaining 5 physicians were on study leave due to engagement in training elsewhere. All 65 physicians were invited to participate in the study, 64 gave consent to participate and 1 apologized due to being too busy, yielding a response rate of 99%.

The participants' ages ranged between 26 and 57 years with a median of 30 years. Female physicians constitute 71.4% ($n = 45$)

of the total sample with a female-to-male ratio of 2.5:1. Almost all participants, i.e., 61 (96.8%) were able to communicate with patients in Arabic language, 50 (79.4%) were Saudis, 48 (76.2%) have an MBBS degree, and 34 (54%) graduated from the local Imam Abdulrahman Bin Faisal University (IAU).

Their overall clinical experience ranged from 3 months to 35 years, with a median of 4 years. Their experience in PHC practice ranged between 2 weeks and 26 years with a median of 2.5 years. A total of 27 (42.9%) physicians have had previous experience in emergency medicine, ranging between 1 and 36 months with a median of 3.5 months.

The PHC emergency cases encountered were mapped using a bar chart and demonstrated that bronchial asthma, cut wounds, burns, acute abdomen, and palpitations represent the most common emergency cases encountered [Figure 1 and Appendix 4].

The total knowledge score, an objective measure of knowledge about how to diagnose and manage emergency cases, demonstrated that 42 (66.6%) physicians had a good total knowledge score while 21 (33.3%) physicians had a fair total knowledge score [Table 1 and Appendix 5].

There was a strong and significant positive correlation ($r \geq 0.6$, $P < .01$) between the encountered emergency cases and the actually managed cases for shock, anaphylactic reaction, burns, and corneal abrasion. Contrariwise, the correlation was weak ($r \leq 0.39$) for chest pain, palpitation, epilepsy, dislocation, hyperglycemic emergency, cardiac arrest, and per vaginal (PV) bleeding. For fractures, the correlation was very weak ($r \leq 0.19$)

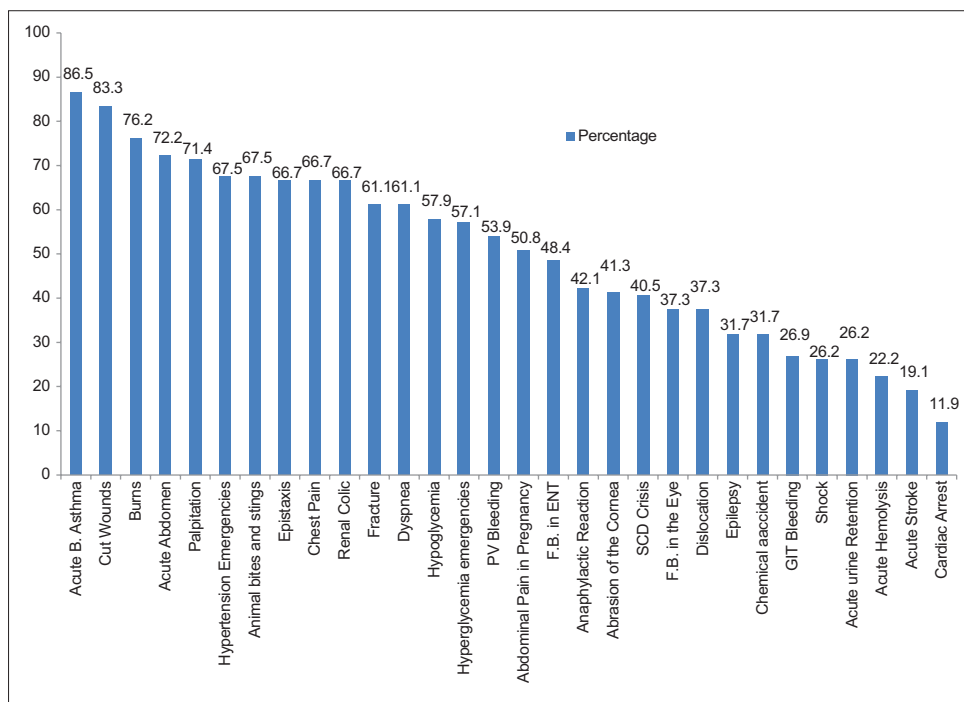


Figure 1: Bar chart demonstrating the most common emergency cases encountered in primary health care centers

between the encountered cases and the actually managed ones ($r = 0.185$) [Appendix 6].

The total number of actually managed cases had a very strong correlation with the physicians' highest qualification ($r = 0.813$), a weak correlation with the physicians' age ($r = 0.328$), and overall experience since graduation ($r = 0.394$). However, years of experience working in PHC centers and duration of work in hospital emergency room (ER) had no correlation to the total number of actually managed cases [Table 2].

The study showed that those physicians with a higher knowledge score had actually managed more cases at their PHC centers than those with a lower knowledge score ($P = 0.005$). Furthermore, none of these specific physicians' characteristics (age, overall experience since graduation, years of experience in PHC centers, and duration of work in hospital ER) were found to be correlated with the physicians' total knowledge score.

When probed about their attitudes toward the concept of providing EMS at their centers, 40 (63.49%) physicians had a neutral attitude, 21 (33.33%) had a negative attitude, and only 2 (3.17%) had a positive attitude toward managing emergency cases at their PHC centers [Table 3].

Regarding the CME need, almost 50%–70% of the participants admitted a need for further training in one or more of the major and common emergencies. For example, management of hypertensive emergencies was recognized as an educational need by 42 (67%) of the physicians followed by management of central nervous system (CNS) emergencies 39 (62%), coronary artery disease emergencies 36 (57%), diabetic ketoacidosis/hypoglycemic emergencies 35 (56%), anaphylactic reactions 34 (54%), cardiopulmonary resuscitation, and wound care/trauma both training needs expressed by 31 (50%) of physicians [Table 4].

The most preferred training methods in emergency medicine were hospital training in ER (79.37%) followed by practical training through a qualified trainer at the respective PHC centers (68.25%). The least preferred methods were lectures (49.2%) and printed materials (28.57%).

PHC physicians were invited to participate, in the interviews for the qualitative part of this study, until data saturation was apparent. In total, 14 physicians from 7 different centers were interviewed. Eight of them were interviewed individually in face-to-face semi-structured interviews while the remaining 6 were interviewed in 2 focus group discussions each contains 3 physicians. All participants were Saudi, 3 male and 11 female physicians. Field notes were noted down by the authors. Each interview lasted between 15 and 20 min.

When interviewees were asked in-depth about the status of EMS in their PHC centers, their role in this vital service, and the factors that affect their KAP in emergencies, most interviewees believed

Table 1: Primary health-care physicians' knowledge score in emergency care

Knowledge score	Good, n (%)	Fair, n (%)	Poor, n (%)
Diagnostic knowledge	55 (87.3)	8 (12.7)	0
Management knowledge	30 (47.6)	29 (46)	4 (6.3)
Total knowledge	42 (66.6)	21 (33.3)	0

Table 2: The correlation between primary health-care physicians' specific characteristics and their practice of emergency cases

PHC physicians' specific characteristics	Actually managed cases (r)
Age	0.328
Sex	0.000
Highest qualification	0.813
Overall experience since graduation	0.394
Experience in PHC setting	0.0486
Duration of work in hospital ER	0.027

Correlation coefficient (r) <0.19 very weak, 0.2-0.39 weak, 0.4-0.59 moderate, 0.6-0.79 strong, and >0.8 very strong correlation. PHC: Primary health care; ER: Emergency room

Table 3: Attitude of physicians toward emergency medical services provided at their respective primary health-care centers

Attitude toward EMS	n* (%)	Attitude score
Emergency services is an essential component of PHC	271 (86.03)	Positive
Are you willing to treat emergency cases at PHC	215 (68.25)	Neutral
Are you confident to deal with emergency cases at PHC level	205 (65.08)	Neutral
Your PHC setting is supportive to deal with emergency cases	143 (45.39)	Negative
Your PHC center is capable to deal with emergency cases	136 (43.17)	Negative
Your PHC center is ready to deal with emergency cases	133 (42.22)	Negative
The overall EMS in your PHC center are efficient	130 (41.27)	Negative

*n represents the summation of physician's response regarding each statement. PHC: Primary health care; EMS: Emergency medical services

Table 4: Topics identified by primary health-care physician's for continuous medical education in emergency care

Continuing medical education needed courses	n (%)
Hypertensive emergencies	42 (66.67)
Central nervous system emergencies	39 (61.90)
Coronary artery disease emergencies	36 (57.14)
DKA/hypoglycemia	35 (55.56)
Anaphylactic reactions	34 (53.97)
Obstetrics/gynecology emergencies	34 (53.97)
Ophthalmological emergencies	33 (52.38)
Cardiopulmonary resuscitation	31 (49.21)
Wound care/trauma	31 (49.21)
Bronchial asthma exacerbations	29 (46.03)
Others	2 (3.17)
No need for further training in emergency medicine	0

DKA: Diabetic ketoacidosis

that PHC EMS is not functioning well, and they attributed this to many structural as well as workforce-related factors [Table 5].

Discussion

Most of the sampled physicians, who provide PHC services in Dammam, KSA, were Saudi (79.4%), female (71.4%) and aged between 26 and 57 years. More than half of them are graduates of the IAU who have no further postgraduate qualifications (76.2%). Moreover, almost half of the participants have previously worked in hospital ER for an average duration of 1 year.

Most common medical emergency encountered

Dealing with critical patients necessitates proper preparation which requires knowing the spectrum of anticipated medical emergencies in that specific practice's catchment population; for example, a practice with many epileptic patients must be more prepared to manage epileptic seizures.^[27,28]

This study shows that, in Dammam area, bronchial asthma, cut wounds, burns, acute abdomen, and palpitation represent the most common cases encountered. However, in 2007, the American Academy of Family Physicians reviewed many articles and reported that asthma, anaphylaxis, shock, seizures, and cardiac arrest are the most common adult and childhood emergencies encountered in PHC setting which apart from bronchial asthma is much different than the commonly described cases in our study.^[27-34] This demonstrates the wide variety of emergency cases encountered in different communities where demographic, cultural, and geographic factors play an important role.

Almost all types of medical emergencies encountered are actually managed in the respective PHC centers apart from PV bleeding, cardiac arrest, and fractures which were managed less frequently compared to their encountered rate. This can be partially explained by the fact that dealing with such cases necessitates the presence of special requirements. For instance, PV bleeding cases require the presence of well-trained physicians, and functioning ultrasound, this point has been emphasized on by a number of interviewed physicians "... we have US in our center, but no one is trained to use it in emergencies, it is used only for regular antenatal-care follow-up" interviewee #1. Cardiac arrest cases require the presence of essential equipment such as crash cart, ECG machine, monitor, defibrillator, pulse oximetry, intubation equipment, and resuscitation drugs.^[6] As for fractures, many prerequisites are needed, for example, X-ray machine, cast, splint, and trained personnel. The equipment shortage was further explained by a number of interviewees "...once we had a staff nurse collapsed in the center, with previous history of cancer and pulmonary-embolism, she was hardly breathing, we didn't have pulse-oximetry, portable oxygen-cylinder, ECG-machine nor X-ray facility, we felt helpless..." interviewee #6.

Table 5: Opinion of primary health-care physicians regarding the status of and factors affecting primary health-care emergency services*

Theme	Supporting quotes
Factors related to knowledge	
The need for continuous medical education in emergency medicine	"... I need more training in managing emergency cases..." interviewee #4 "...although we have 14 days a year for educational purposes, we cannot use them for such purpose because of shortage of staff." interviewee #1 "... we need lectures in dealing with emergency cases but of course lectures alone are not beneficial ... practical training is a must." interviewee #7
Factors related to clinical practice	
Human factors	
Patient crowdedness and shortage of health-care staff	"... it is not feasible for me to spend long time in treating one emergency case while a queue of other patients are waiting for me to attend to them too." interviewee #12 "...we need more staff number in order to deal with emergency cases..." interviewee #3
Lack of experience	"...I know how to manage myocardial infarction theoretically but in real life I am not sure if I can handle such a case..." interviewee #7
Nonhuman factors	
Lack of patient privacy	"... here there is no regard for patient privacy... in our clinics; 3 to 4 physicians share the same room with one examination bed without a partition." interviewee #2
Lack of emergency equipment	"...first of all, in order to deal with emergency cases, emergency tools and equipment need to be available, followed by staff training..." interviewees #7, 14
Suitability of the tool	"...I will never suture my patients with old rusty tools...in such a situation ER referral is a better option..." interviewee #12
Inadequate supporting equipment (X-ray, US, laboratory screening, ambulance car)	"... we immediately refer suspicious cases to the hospital because we do not have lab facilities which provide immediate and rapid results..." interviewee #9 "...in our center we do not have an ambulance car... sometimes we ask patients with suspicious cardiac chest pain to go by their own car to the hospital ER to save time rather than waiting for the ambulance ... which is unacceptable..." interviewee #11 "... we have US in our center, but no one is trained to use it in emergencies ... it is used only for regular antenatal care follow up" interviewee #1

Contd...

Table 5: Contd...

Theme	Supporting quotes
Factors related to attitude	"...once we had a staff nurse collapsed in the center, with previous history of cancer and pulmonary embolism...she was hardly breathing, we did not have pulse oximetry to assess her saturation status, portable oxygen cylinder, ECG machine nor X-ray facility, we felt helpless..." interviewee #6
Role of PHC centers in management of emergency cases	"...We have to educate our patients not to seek emergency medical care at PHC centers...they should go directly to hospital ER..." interviewee #6 "...Our patients should know that PHC centers is for cold and chronic cases only... emergency cases should be dealt with in hospital ER ..." interviewee 5
Lack of supporting environment, PHC center building status	"... we encountered many emergency cases which can be managed in PHC setting but because the place is unsuitable here we refer them to the hospital ..." interviewee #8 "... we should have a purpose built building, higher number of health care staff and well trained qualified nurses in order to manage emergency cases and decrease the load on the hospital ER..." interviewee #7
Quality of care and patient safety	"...it is safer for the patient to be referred since there is no devoted nurse in the ER to observe him, some physicians do not feel comfortable to put their patients on the bed for IV line without a continuous nurse supervision, they cannot leave their clinic frequently to check on the patient ... one of our patients collapsed while receiving IV line without notice" interviewee #13

*Physicians comments are reported here as themes and subthemes, with subdivisions of the latter. Quotations are in the participating physicians' own words. US: Ultrasound; PHC: Primary health care; ER: Emergency room; ECG: Electrocardiogram

Primary health-care physicians' knowledge, attitude, and practice in dealing with medical emergency

Updated physicians' knowledge, communication, and procedural skills along with the presence of trained paramedical staff are vital to provide optimum care which might save lives. The wide range of emergencies and the rarity of some of them make it difficult for physicians to be updated and competent in emergency care provision.^[10]

With regard to the physicians' knowledge in dealing with medical emergencies, the current study revealed that 87.3% and 66.6% of PHC physicians have a good diagnostic and total knowledge scores, respectively. Furthermore, although only 47.6% of participants had good management score, those with a higher knowledge score had actually managed more cases at their centers than those with a lower knowledge score ($P = 0.005$).

Data regarding PHC physicians' KAP in dealing with emergency cases are deficient both nationally and internationally. However, one study performed in Asir, KSA, reported that most PHC physicians had practiced in wound (95.7%) and burn (93.6%) management.^[7] These findings were similar to the physicians' practices in this study where bronchial asthma (78.6%), burns (65.9%), and cut wound (64.3%) management were commonly practiced.

When assessing the attitude of PHC physician toward the role of PHC centers in providing EMS, an obvious discordance and disparity were revealed. Whereas 86% of participants admit that EMS is an essential component of PHC services: "...EMS is an extremely important part of a PHC center..." interviewee 10, almost half of them still consider the current PHC setting neither ready (42.22%) nor supportive (45.39%) to deal with emergency cases. This attitude can be partially attributed to the current deficiencies in the infrastructure and supporting facilities of PHC centers as has been stated by many interviewees "... we should have a purpose-built building, higher number of health-care staff and well-trained qualified nurses in order to manage emergency-cases and decrease the load on the hospital-ER..." interviewee #7. Yet, other participants limited the role of PHC services to nonurgent cases: "...our patients should know that PHC-centers is for cold and chronic cases only, emergency-cases should go to hospital-ER ..." interviewee #5.

These findings are similar to Asir-study findings where majority of the physicians (78.2%) believed that EMS are essential components of PHC and 80% of them felt that Talley are competent to deal with emergency-cases at PHC-level.^[7]

Primary health-care physicians' continuous medical education needs in emergency medicine

As in previous studies,^[7,16-21] the current study demonstrated a role for CME programs targeting emergency medicine (particularly in the management of CVS and CNS emergencies) taking into considerations PHC physicians' needs, workplace setting, and circumstances. In addition, as emergency medicine is a life-saving specialty, higher authority must establish clear systematic policies to ensure training of PHC physicians in emergency medicine, especially since physicians have no incentives to attend such educational activities. This point was repeatedly mentioned and emphasized by many of our participants: "...the national health-care authorities should assign one qualified-nurse and give her training in emergency-care so she/he can train the staff in the center..." interviewee #14.

Although 42.9% of sampled physicians have previous practical experience in managing medical emergencies nevertheless, a strong perceived need for further hands-on training in emergency medicine was expressed by all physicians in this study, preferably through clinical rotations in a hospital ER: "... we need lectures in dealing with emergency-cases but of-course lectures alone is not beneficial, practical training is a

must.” interviewee #7. However, in contrast to this declared preference by the study participants, our objective assessments reveal an interesting fact: The proportion of actually managed emergency cases was found to be significantly higher in physicians with more experience in a PHC setting when compared to those with a previous experience in hospital ER. This is also reflected by the authors' personal practical clinical experience in different local PHC settings, where each setting has its own dynamics that independently impact the quality of services provided there.

Of special importance here is our finding that although medical emergencies such as hypertensive emergencies, wound care, and bronchial asthma exacerbations were frequently encountered by sampled PHC physicians, constituting 70%–85% of the cases, still more than 50% of participants admitted a need for further hands-on training in the management of these common medical emergencies. This finding is further emphasized by the fact that only 47.6% of our participants had a good management score and almost half of them had an unfavorable attitude toward managing emergency cases at their respective PHC centers, as discussed above.

Limitation of our study

Although 20.6% of our participants were non-Saudi, all physicians who took part in our qualitative study interviews were Saudi by random chance. The reason was that, for the purposes of acquiring representative information for the qualitative study, we targeted the larger PHC centers in our study sample, where the chance of encountering ER cases is higher due to a greater patient volume. However, as it turned out, most of the non-Saudi participating physicians were working in the smaller PHC centers of our sampled PHC centers.

Strength of our study

This is the first study done in Dammam city, the capital of Eastern Providence of Saudi Arabia, the most oil-rich region in the world, and the fifth largest city in KSA in its population size and health infrastructure. Moreover, it is an important study since it provides information regarding PHC physician KAP in emergency medicine through both quantitative and qualitative methods expressing the reality of the current situation of PHC emergency services and its vital role on the reduction of future mortality and disability.

Conclusions

Dammam PHC physicians have a good knowledge, neutral attitude, and fair practice concerning the emergency cases encountered in PHC setting. All physicians reported the need for CME in emergency medicine preferably by practical training.

We recommend that all PHC physicians should be certified in BLS and preferably ACLS and ATLS. In addition, to provide

PHC physicians CME training in Emergency-medicine that is focused on practical rather than theoretical methods.

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Conflicts of interest

There are no conflicts of interest.

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Appendices

Appendix 1: Primary health care centers in Dammam						
Sample + 10%	Sample	Total	Population		Physicians, n	PHC name
			Non-Saudi	Saudi		
133	121	74,778	107	74,671	10	Bader 1
72	66	40,641	9433	31,208	8	Jalawiah 3
34	31	19,283	146	19,137	5	Mubarakiah 5
30	27	17,000	51	16,949	3	Qadisiah 7
26	23	14,427	185	14,242	6	Rawdhah 9
23	21	12,739	145	12,594	5	Anood 11
21	19	11,755	936	10,819	4	Budaie 13
20	18	11,116	69	11,047	4	Eskan 15
18	16	10,151	3505	6646	5	Mohamadiyah 17
16	15	9103	55	9048	8	Manar 19
12	11	6888	90	6798	3	Etisalat 21
11	10	6215	47	6168	3	Faisaliah 23
8	7	4306	271	4035	6	Bin Khaldoon 25
425	385		238,402		70	Total

Appendix 2: Primary health-care physicians' questionnaire

This questionnaire aims at assessing the human resources of PHC centers for emergency care.

Your individual privacy and confidentiality of the information provided will be maintained throughout the study.

If you agree to participate in the study, please fill in the following questionnaire, it should take only few minutes.

If you have any questions, please contact any one of the researchers.

Your participation is highly encouraged and appreciated, thank you for your time.

Dr. Salma Abu-Grain

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Dr. Sanaa SadiqAlsaad,

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1. Sex? Male (1) female (2)
2. Age? ----- Years old.
3. Last medical degree?
 - MBBS (1)
 - Family medicine diploma (2)
 - Saudi board degree in family medicine (3)
 - Master degree (4)
 - Others (5) please specify

4. Place of graduation?
 - University of Dammam (1)
 - Other governmental Saudi medical college (2)
 - Other private Saudi medical college (3)
 - International (Non- Saudi) medical college (4)
5. Years of experience as a physician since graduation? _____
6. Years of experience in primary health care in Saudi Arabia? _____
7. Did you work in hospital emergency department? _____
 - Yes (1), for how long _____
 - No (2) _____
8. Are you able to communicate with patients in Arabic language?
 - Yes (1) No (2) Sometimes (3)
9. What is your nationality?
 - Saudi (1) Non-Saudi (2) please specify.....

Diagnosis	9. You have encountered in your practice			10. You know how to diagnose		11. You know how to manage		12. You have actually managed in your PHC		
	Often (1)	Rarely (2)	Never (3)	Yes (1)	No (2)	Yes (1)	No (2)	Most of the time (1)	Sometimes (2)	Never (3)
1. Epilepsy										
2. Acute stroke										
3. Abrasion of the cornea										
4. Foreign body in the eye										
5. F. body in ENT										
6. Epistaxis										
7. Fracture										
8. Dislocation										
9. Cut wound										
10. Anaphylactic reaction										
11. Cardiac arrest										
12. Hypertension emergencies										
13. Shock										
14. Acute dyspnea										
15. Chest pain										
16. Palpitation										
17. Acute bronchial asthma										
18. Acute hemolysis										
19. SCD crisis										
20. GIT bleeding										
21. Acute abdomen										
22. Hypoglycemia										
23. Hyperglycemic emergencies										
24. Renal colic										
25. Acute urine retention										
26. PV bleeding										
27. Abdominal pain in pregnancy										
28. Burns										
29. Chemical accident										
30. Animal bites and stings										

To what extent do you agree or disagree with the following statements:

Note: please tick one box for each statement,

1=Strongly disagree 2=Disagree 3=Not sure 4=Agree 5=strongly agree

Statement	1	2	3	4	5
13. Emergency services is an essential component of PHC centers					
14. You are willing to treat emergency cases at your PHC center					
15. You are confident to deal with emergency cases at your PHC level					
16. Your PHC center is ready to deal with emergency cases					
17. Your PHC center is capable to deal with emergency cases					
18. Your PHC setting is supportive to deal with emergency cases					
19. The overall emergency medical services in your PHC center are efficient					

20. Which of the following emergency medicine courses do you need to be trained in

Note: you can choose more than one choice

Do not need any training (1)	Ophthalmological emergencies (7)
Central nervous system emergencies (2)	DKA/hypoglycemia (8)
Cardiopulmonary resuscitation (3)	Anaphylactic reactions (9)
Coronary artery disease emergencies (4)	Wound care/trauma (10)
Hypertension emergencies (5)	Obstetrics/gynecology emergencies (11)
Bronchial asthma exacerbations (6)	Others (12) please specify

21. What is your preferred method for training in emergency medicine?

Note: you can choose more than one choice

- Practical training in PHC center by a qualified staff (1)
- Hospital rotation training in emergency department (2)
- Printed materials (3)
- Lectures (4)
- I do not need any training in emergency medicine (5).

Appendix 3: Approvals of ministry of health

11-10-2014

الرقم: 171957 / 41/17/16.222
التاريخ: 9/12/1435هـ
المرافقات:

المملكة العربية السعودية
المديرية العامة للشؤون الصحية بالمنطقة الشرقية
General Directorate of Health Affairs in Eastern Province
إدارة التخطيط والتدريب
وزارة الصحة
Ministry of Health
7000873336
واتف: 8431773
فاكس: 8416673
Pln Trn-DM@moh.gov.sa


من: م/ المدير العام للتخطيط والتدريب بصحة الشرقية
الس: مدير إدارة المراكز الصحية بقطاع الدمام
الموضوع: السلام عليكم ورحمة الله وبركاته

برفقة نسخة من خطاب رئيس لجنة البحوث والدراسات بالمنطقة الشرقية رقم 41/17/16.222 وتاريخ 1435/9/18هـ بشأن موافقة اللجنة العلمية للدراسات في البحوث بالمنطقة الشرقية على البحوث للأطباء المتدربين على الدراسات العلمية في برنامج الزمالة للتخصصات الصحية ومن ضمنهم الدكتورة / سلمي حسين أبو قرين وحيث ان المذكورة ستنفذ بحثها لديكم .

لذا فأمل من سعادتكم الاطلاع وتسهيل مهمة الباحثة بما يضمن ان لا يكون هناك أي تأثير على خدمة المراجعين خلال قيامها ببحثها (برفقة نسخة من كامل المعاملة)

ولكم الطيب تيماتي وتقديري

المستند رقم: 1172020-هـ



 المملكة العربية السعودية
 المديرية العامة للتشؤون الصحية بالمنطقة الشرقية
 General Directorate of Health Affairs in Eastern Province
 إدارة التخطيط والتدريب
 هاتف / ٨٤٣٦٧٧٣
 فاكس / ٨٤١٦٦٧٣
 Pin Trn-DM@moh.gov.sa

الرقم: ٤٧١٣٧ / ١٦١٩٦٥
 التاريخ: ١٤٣٥ / ٩ / ٢١
 المرفقات:

م/ المدير العام للتخطيط والتدريب بصحة الشرقية	الدكتور/ أماسية بن محمد المنسي	من:
مدير إدارة المراكز الصحية بقطاع الدمام		إلى:
		الموضوع:

السلام عليكم ورحمة الله وبركاته

برفقة نسخة من خطاب رئيس لجنة البحوث والدراسات بالمنطقة الشرقية رقم
 ٤١/١٧/١٦٠٣٢٢ وتاريخ ١٤٣٥/٩/١٨هـ بشأن موافقة اللجنة العلمية للدراسات في
 البحوث بالمنطقة الشرقية على البحوث للأطباء المتدربين على الدراسات العلمية في
 برنامج الزمالة للتخصصات الصحية ومن ضمنهم الدكتورة / سناء صادق السعيد وحيث
 ان المذكورة ستنفذ بحثها لديكم .

لذا نأمل من سعادتكم الاطلاع وتسهيل مهمة الباحثة بما يضمن ان لا يكون هناك
 أي تأثير على خدمة المراجعين خلال قيامها بمهام بحثها (برفقة نسخة من كامل
 المعاملة)

ولكم اطيب تحياتي وتقديري
 ١٤٣٥ / ٩ / ٢١

Appendix 4: Frequency of common emergency cases encountered in primary health-care centers

The frequency of common emergency cases encountered in PHC centers

Cases encountered in PHC	n (%)
Acute bronchial asthma	109 (86.51)
Cut wounds	105 (83.33)
Burns	96 (76.19)
Acute abdomen	91 (72.22)
Palpitation	90 (71.42)
Hypertension emergencies	85 (67.46)
Animal bites and stings	85 (67.46)
Epistaxis	84 (66.67)
Chest pain	84 (66.67)
Renal colic	84 (66.67)
Fracture	77 (61.11)
Dyspnea	77 (61.11)
Abdominal pain in pregnancy	64 (50.79)
FB in ENT	61 (38.41)
Anaphylactic reaction	53 (42.06)
Abrasion of the cornea	52 (41.27)
SCD crisis	51 (40.47)
FB in the eye	47 (37.30)
Dislocation	47 (36.30)
Epilepsy	40 (31.74)
Chemical accident	40 (31.74)
GIT bleeding	34 (26.98)
Shock	33 (26.19)
Acute urine retention	33 (26.19)

Appendix 5: Number of primary health-care physicians who know how to diagnose/manage emergency cases

Emergency cases	Number of PHC physicians who know how to diagnose/manage emergency cases			
	Knowing how to diagnose		Knowing how to manage	
	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Epilepsy	60 (95.2)	3 (4.8)	47 (74.6)	16 (25.4)
Acute stroke	59 (93.7)	4 (4.8)	44 (69.8)	19 (30.2)
Abrasion of the cornea	52 (82.5)	5 (4.8)	48 (76.2)	15 (23.8)
Foreign body in the eye	58 (92.1)	6 (4.8)	40 (63.5)	23 (36.5)
F. body in ENT	59 (93.7)	7 (4.8)	48 (76.2)	15 (23.8)
Epistaxis	63 (100)	8 (4.8)	60 (95.2)	3 (4.8)
Fracture	61 (96.8)	9 (4.8)	45 (71.4)	18 (28.6)
Dislocation	53 (84.1)	10 (4.8)	38 (60.3)	25 (39.7)
Cut wound	63 (100)	11 (4.8)	59 (93.7)	4 (6.3)
Anaphylactic reaction	62 (98.4)	12 (4.8)	57 (90.5)	6 (9.5)
Cardiac arrest	58 (92.1)	13 (4.8)	51 (81)	12 (19)
Hypertension emergencies	62 (98.4)	14 (4.8)	57 (90.5)	6 (9.5)
Shock	55 (87.3)	15 (4.8)	47 (74.6)	16 (25.4)
Acute dyspnea	61 (96.8)	16 (4.8)	60 (95.2)	3 (4.8)
Chest pain	62 (98.4)	17 (4.8)	57 (90.5)	6 (9.5)
Palpitation	61 (96.8)	18 (4.8)	52 (82.5)	11 (17.5)
Acute bronchial asthma	62 (98.4)	19 (4.8)	59 (93.7)	4 (6.3)
Acute hemolysis	54 (85.7)	20 (4.8)	44 (69.8)	19 (30.2)
SCD crisis	61 (96.8)	21 (4.8)	59 (39.7)	4 (6.3)
GIT bleeding	59 (93.7)	22 (4.8)	42 (66.7)	21 (33.3)
Acute abdomen	61 (96.8)	23 (4.8)	60 (95.2)	3 (4.8)
Hypoglycemia	62 (98.4)	24 (4.8)	60 (95.2)	3 (4.8)
Hyperglycemic emergencies	63 (100)	25 (4.8)	55 (87.3)	8 (12.7)
Renal colic	62 (98.4)	26 (4.8)	56 (88.9)	7 (11.1)
Acute urine retention	53 (84.1)	27 (4.8)	44 (69.8)	19 (30.2)
PV bleeding	58 (92.1)	28 (4.8)	41 (65.1)	22 (34.9)
Abdominal pain in pregnancy	55 (97.3)	29 (4.8)	47 (74.6)	16 (25.4)
Burns	63 (100)	30 (4.8)	61 (96.8)	2 (3.2)
Chemical accident	57 (90.5)	31 (4.8)	43 (68.3)	20 (31.7)
Animal bites and stings	60 (95.2)	32 (4.8)	57 (90.5)	6 (9.5)

Appendix 6: The correlation coefficient (r) between emergency cases encountered and the actually managed cases (including initial stabilization)

Disease	Correlation coefficient (r)	P	Disease	Correlation coefficient (r)	P
Epilepsy	0.374**	0.003	Palpitation	0.376**	0.002
Acute stroke	0.437**	0.000	Acute bronchial asthma	0.567**	0.000
Abrasion of the cornea	0.597**	0.000	Acute hemolysis	0.400**	0.001
Foreign body in the eye	0.501**	0.000	SCD crisis	0.468**	0.000
F. body in ENT	0.525**	0.000	GIT bleeding	0.466**	0.000
Epistaxis	0.434**	0.000	Acute abdomen	0.475**	0.000
Fracture	0.185	0.148	Hypoglycemia	0.594**	0.000
Dislocation	0.364**	0.003	Hyperglycemic emergencies	0.322**	0.010
Cut wound	0.409**	0.001	Renal colic	0.502**	0.000
Anaphylactic reaction	0.659**	0.000	Acute urine retention	0.496**	0.000
Cardiac arrest	0.321*	0.010	PV bleeding	0.248*	0.050
Hypertension emergencies	0.543**	0.000	Abdominal pain in pregnancy	0.534**	0.000
Shock	0.662**	0.000	Burns	0.598**	0.000
Acute dyspnea	0.477**	0.000	Chemical accident	0.594**	0.000
Chest pain	0.399**	0.001	Animal bites and stings	0.521**	0.000
Overall correlation	0.604**				

*Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level, Correlation coefficient (r) <0.19 very weak, 0.2-0.39 weak, 0.4-0.59 moderate, 0.6-0.79 strong and >0.8 very strong correlation (BMJ)