Introduction

Medical emergencies arising in the office are a major concern for health care staff. The anxiety and difficulties faced by family doctors can be relieved to some extent by planning for unexpected occasions properly, and this can help improve patient safety in the office.[1,2] There were recommendations in the article published by some authors,[3,4] based on the suggestions of many workers expert in the field that there is no acceptable evidence on the subject of emergency preparation.

Obtaining emergency supplies is the first required step in preparation for emergencies. Family doctors must select drugs and equipment that help him/her in dealing with expected emergencies in their office practice; the most common expected emergencies are shortness of breath, shock, anaphylaxis, seizures, and cardiac attacks. They must be also aware of the needs when choosing additional supplies like neck collars and aseptic dressings.[5]

All of these facilities mitigate and improve the barriers of family physicians. Emergencies are considered part of the medical practice in PHCCs. For primary care physicians, the level of training in emergency medicine courses is suboptimal particularly advanced trauma life support (ATLS) courses in Riyadh. Regarding emergency services at the PHC level in Riyadh, most of the items were available; however, defects were reported in some. Knowing the barriers facing doctors during dealing with emergency cases helps in improving and providing integrated medical care.

Keywords: Emergency cases, family physician, primary healthcare centers

Abstract

The scarcity of emergency cases presented to the primary health care centers (PHCCs) makes treating such cases by family physicians more difficult. To identify the barriers facing family physicians in PHCCs when facing emergency cases in Riyadh, Saudi Arabia. A cross-sectional descriptive design was deployed in the study among a sample of family physicians. A reliable and valid self-reported questionnaire was used. In addition, an observational sheet was used to investigate the preparedness of PHCCs to deal with emergency situations. The study included 162 PHC physicians. Almost two-thirds of them (65.4%) aged 25–34 years, and 52.5% were females. Middle-aged (25–35 years) physicians (P = 0.030), females (P < 0.001), Saudis (P = 0.027), those attended advanced cardiovascular life support (ACLS) since more than 2 years (P = 0.029), those who had no exposure in working in emergency units (P = 0.029), and less experienced physicians (<1 year) (P = 0.010) showed lower “perceived level of competence in performing emergency skills.” The most common barrier facing physicians during the management of emergency cases in PHCC was lack of appropriate equipment (76.5%), followed by lack of exposure to emergency cases (62.3%) and lack of time (50.6%). Dealing with emergency cases is considered part of the medical practice in PHCCs. For primary care physicians, the level of training in emergency medicine courses is suboptimal particularly advanced trauma life support (ATLS) courses in Riyadh. Regarding emergency services at the PHCC level in Riyadh, most of the items were available; however, defects were reported in some. Knowing the barriers facing doctors during dealing with emergency cases helps in improving and providing integrated medical care.

Keywords: Emergency cases, family physician, primary healthcare centers

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automatic external pacemaker (AED) as the probability of having cases of cardiac arrest is relatively high, and also their location might be away from appropriate emergency services.[9]

Availability of emergency drugs and equipment in each primary health care setting must depend on the availability of experienced and qualified emergency medical staff. Physicians in rural areas may require doing more than just settle a seriously ill patient, therefore, these places need the availability of drugs and equipment that are required for long-term resuscitation particularly for children's emergencies; these drugs include mainly atropine, intravenous fluids, and equipment includes mainly cardiac monitors.[3,4]

Several previous studies suggested that basic life support courses must be provided to all primary care staff and should be repeated regularly, regardless of their authority.[3,4,10,11]

Experience and training are very essential for proper utilization of emergency equipment, and the lack of preparedness in emergency situations in primary care settings could be attributed to a lack of staff training. They should be supported to maintain skills either in basic life support for nurses and paramedics or advanced life support for adults and children for physicians, paramedics, and nurses.[12]

This study aims mainly to identify the barriers facing family physicians in primary health care centers (PHCCs) when dealing with emergency cases in Riyadh, Saudi Arabia.

**Material and Methods**

A cross-sectional descriptive study was deployed in the study. A sample of 162 family physicians was subsequently recruited. A reliable and valid self-reported questionnaire was used.

Family physicians from Cluster 1 and Cluster 2 in the Ministry of Health, Riyadh represented the target population for the study. Dentists and physicians on vacation at the period of the data collection were excluded from the study.

The sample size was calculated from a total population of 204 family physicians. The calculation methodology of sample size for population survey was done using “Raosoft, Sample size calculator.” According to this method, a minimum of 134 physicians were needed, given that the margin of error alpha (α) = 0.05, the confidence level is 95%, total population = 204, and the response of distribution = 50%.

A convenient sample was used to collect the required information in this study. Regarding the primary health care centers, there were 105 PHCCs in Riyadh; 51 in cluster 1 and 54 in cluster 2. Using the Raosoft sample size calculator with the same assumptions applied for the selection of physicians, 83 PHCCs were recruited to assess their preparedness for emergency cases. They were almost equally distributed on both clusters.

The physicians were engaged by fulfilling a validated questionnaire by Alofi and Bakarman (2016).[1] The questionnaire form had the socio-demographic data, questions to find the level of physicians’ training, earlier work encounters (1 year to more than 5 years), and emergency courses [Basic life support (BLS) – advanced cardiac life support (ACLS)– advanced trauma life support (ATLS), also it contained three tables that measures the physician’s competences and comfort in performing some of the emergency skills, which were marked from 1 to 4; 1 was not knowing how and when to start the procedure, and 4 was willing to do all procedures in all cases. Another table measures the number of cases faced by the physician in the past 12 months ranging from 0 to >3 cases, and the last table checks the physician’s contentment with emergency aid provided at their primary care centers.

An observation sheet was also included to assess the accessibility of equipment such as medications, ambulances, and other aiding facilities that are necessary to manage emergency cases. This sheet was previously utilized in a Saudi study carried out in Jeddah by Aloufi and Bakarman (2016).[1]

The research proposal was approved by the Research center Committee and the Institutional Review Board (IRB) at the King Fahad Medical City, Riyadh. Before enrollment of potential participants, the researchers explained the purpose of the study, and the participation in the study was voluntary. After IRB’s permission, the researcher asked permission from designated directors/managers to conduct the study.

The data were analyzed using IBM statistical package for social science (SPSS) version 26 for windows (IBM SPSS Inc., Chicago, Illinois). Initially, the data were cleaned and screened for mistakes, missing values, and outliers. Then, all the collected data were evaluated using descriptive statistics. All nominal and ordinal qualitative data were reported in frequencies and percentages, whereas the numerical data were examined first for distribution using Shapiro–Wilks test and reported as median and interquartile range as they were not normally distributed. Accordingly, nonparametric statistical tests (Mann–Whitney U and Kruskal–Wallis tests) were applied for comparisons. All hypotheses were tested as two-sided at a significance level of $P$ value $\leq 0.05$.

**Results**

The study included 162 primary health care physicians. Approximately two-thirds of them (65.4%) were in the age category 25–34 years, and females were 52.5% of them. The majority of the participants (90.1%) were Saudi nationals. [Table 1]

Table 2 shows that 46.9% had Arab Board of Family Medicine, whereas 34% had Saudi Board of Family Medicine. Most of them (41.1%) had attended the BLS course since a period ranging between 1 and 2 years, whereas 43.8% had attended the ACLS course since more than 2 years. The majority of them (71.6%) did
not attend the ATLS course. Most of them (84%) had any work experience in the emergency department. Most of them (44.4%) had experience of 1–5 years in PHC practice, whereas 28.4% had more than 5 years of experience.

Among the participants who did not attend any of the training courses, the most frequent reasons were having not enough time (36.4%), high cost (32.1%), and lack of motivation (30.9%). [Figure 1].

Among the total participants, the majority (88.9%) either strongly agreed or agreed to attend advanced training courses in an emergency if there was offer from the Ministry of Health (MOH) as shown in [Figure 2].

A considerable proportion of the PHC physicians reported that they will attempt in all cases needed nebulization and oxygen therapy (45.1%), simple suture (44.4%), reading electrocardiogram (ECG) (38.3%), and performing bag and mask resuscitation (38.3%), whereas 27.8% of them did not know from where to start in defibrillation. [Table 3]

The total competence in performing emergency skill scale ranged between 10 and 40 with a median (IQR) of 27.5 (21.75–32). It was abnormally distributed as seen by significant Shaprio–Wilks test, $P = 0.015$. [Figure 3]

From [Table 4], it is shown that older physicians (≥45 years) had the highest score of “perceived level of competence in performing emergency scale skill” (mean rank = 103.7), whereas those aged between 25 and 34 years had the lowest score (mean rank = 74.92), $P = 0.030$. The male physicians expressed a higher significant score (mean rank = 100.33) compared to the females (mean ranks were 64.44), $P < 0.001$. Non-Saudi physicians had a higher score of “perceived level of competence in performing emergency skills scale” compared to Saudi national physicians (mean ranks were 106.06 and 78.81, respectively), $P = 0.027$. The physicians who attended ACLS since less than 1 year had a higher score than those who attended it since >2 years (mean ranks were 110.30 and 72.64, respectively), $P = 0.029$. The physicians who had experience in working in emergency departments expressed a significant higher score than their counterparts (mean score was 85 vs. 63.17, $P = 0.029$). More experienced physicians (>5 years) had a significant higher score than less experienced physicians (<1 year) (mean score was 95.66 vs. 65.76), $P = 0.010$. Physician–s qualification and history of attending BLS and ATLS courses were not significantly associated with “perceived level of competence in performing emergency skills scale” score.

As shown in [Table 5], the majority of the PHC physicians (87.7% and 78.4%) had seen cases of acute asthma and renal colic, respectively, in the last 12 months, whereas only 33.9%

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**Table 1: Socio-demographic characteristics of the respondents (n=162)**

| Age (years) | Frequency | Percentage |
|------------|-----------|------------|
| 25-34      | 106       | 65.4       |
| 35-44      | 40        | 24.7       |
| ≥45        | 16        | 9.9        |

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

| Highest qualification degree | Frequency | Percentage |
|-----------------------------|-----------|------------|
| MBBS                        | 12        | 7.4        |
| ABFM*                       | 76        | 46.9       |
| SBFM‡                       | 14        | 8.6        |
| FM‡ Diploma                 | 55        | 34.0       |
| Others                      | 5         | 3.1        |

| Duration since attending Basic Life Support course | Frequency | Percentage |
|---------------------------------------------------|-----------|------------|
| <1 year                                           | 52        | 32.1       |
| 1-2 years                                         | 67        | 41.1       |
| >2 years                                          | 43        | 26.5       |

| Duration since attending Advanced cardiac Life Support course | Frequency | Percentage |
|---------------------------------------------------------------|-----------|------------|
| <1 year                                                        | 15        | 9.3        |
| 12 years                                                       | 28        | 17.3       |
| >2 years                                                       | 71        | 43.8       |
| Didn’t attended                                                | 47        | 29.6       |

| Did you have any work experience in emergency department? | Frequency | Percentage |
|----------------------------------------------------------|-----------|------------|
| Yes                                                      | 136       | 84.0       |
| No                                                       | 26        | 16.0       |

| Years of work in primary health care                         | Frequency | Percentage |
|-------------------------------------------------------------|-----------|------------|
| <1 year                                                     | 44        | 27.2       |
| 1-5 years                                                   | 72        | 44.4       |
| >5 years                                                    | 46        | 28.4       |

*ABFM: Arab Board of Family Medicine, SBFM: Saudi Board of Family Medicine

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**Figure 1:** Reasons for not attending any of the training courses among the participants
34.6%, 34.6%, and 21.6% of them have seen cases of acute GI bleeding, anaphylaxis, acute vaginal bleeding, and cardiac arrest in the last 12 months, respectively. Most of them did not see any case of severe dehydration (61.8%) and convulsion (58.1%). Almost one-third of the physicians were fully satisfied with emergency services available at primary health care centers regarding bronchial asthma (31.8%) and hypoglycemia (30%). On the other hand, 47.3%, 44.4%, and 40.4% of them were

Table 3: Physicians’ perceived competence when dealing with emergency cases

| Procedure                                           | 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                                 | 7 (4.3)                            | 50 (30.9)                                       | 48 (29.6)                        | 57 (35.2)                        |
| Mouth to mouth resuscitation                        | 18 (11.1)                          | 75 (46.3)                                       | 34 (21.0)                        | 35 (21.6)                        |
| Bag and mask resuscitation                          | 10 (6.2)                           | 53 (32.7)                                       | 37 (22.8)                        | 62 (38.3)                        |
| Inserting IV cannula                                | 30 (18.5)                          | 84 (51.9)                                       | 32 (19.8)                        | 16 (9.9)                         |
| Defibrillation                                      | 45 (27.8)                          | 57 (35.2)                                       | 27 (16.7)                        | 33 (20.4)                        |
| Reading ECG                                         | 11 (6.8)                           | 44 (27.2)                                       | 45 (27.8)                        | 62 (38.3)                        |
| Nebulization and oxygen therapy                     | 11 (6.8)                           | 41 (25.3)                                       | 37 (22.8)                        | 73 (45.1)                        |
| Simple suture                                       | 19 (11.7)                          | 30 (18.5)                                       | 41 (25.3)                        | 72 (44.4)                        |
| Urinary catheter insertion                          | 21 (13.0)                          | 57 (35.2)                                       | 35 (21.6)                        | 49 (30.2)                        |
| Using IV fluid and medications                      | 26 (16.0)                          | 51 (31.5)                                       | 38 (23.5)                        | 47 (29.0)                        |

Table 4: Factors associated with perceived level of competence in performing emergency skill scale among PHC physicians

| Factor                          | Score of level of competence in performing emergency skill scale (10-40) | P       |
|---------------------------------|------------------------------------------------------------------------|---------|
|                                 | Median | IQR       | Mean rank |         |
| Age in years                    |        |           |           |         |
| 25-34                           | 25     | 21-31     | 74.92     | 0.030** |
| 35-44                           | 29     | 22-35     | 90.04     |         |
| ≥45                             | 30.5   | 26.75-36  | 103.78    |         |
| Gender                          |        |           |           |         |
| Male                            | 30     | 25.5-35   | 100.33    | <0.001* |
| Female                          | 24     | 20-29.5   | 64.44     |         |
| Nationality                     |        |           |           |         |
| Saudi                           | 27     | 21-32     | 78.81     | 0.027*  |
| Non-Saudi                       | 30.5   | 27.25-37.75 | 106.06  |         |
| Qualification                   |        |           |           |         |
| MBBS                            | 29     | 21.25-35.75 | 90.63  | 0.061** |
| ABFM                            | 25     | 20-30     | 69.91     |         |
| SBFM                            | 30     | 25.25-35.25 | 97.5    |         |
| FM Diploma                      | 29     | 24-33     | 90.53     |         |
| Others                          | 30     | 21.5-35   | 91.6      |         |
| BLS                             |        |           |           |         |
| <1 year                         | 30     | 22.25-34  | 89.98     | 0.222** |
| 1-2 years                       | 27     | 22-32     | 80.03     |         |
| >2 years                        | 25     | 21-30     | 73.53     |         |
| ACLS                            |        |           |           |         |
| <1 year                         | 34     | 25-38     | 110.30    | 0.029** |
| 1-2 years                       | 30     | 23.25-32  | 89.39     |         |
| >2 years                        | 26     | 21-30     | 72.64     |         |
| Not at all                      | 28     | 21.25-32.75 | 81     |         |
| ATLS                            |        |           |           |         |
| <1 year                         | 25     | 21.5-34.5 | 78.44     | 0.286** |
| 1-2 years                       | 28.5   | 24.75-33  | 87.25     |         |
| >2 years                        | 29     | 24-34.5   | 96.19     |         |
| Not at all                      | 27     | 21-31.75  | 77.67     |         |
| Experience in emergency department |        |           |           |         |
| Yes                             | 28     | 22.25-33.75 | 85     | 0.029*  |
| No                              | 25.5   | 20-28.25  | 63.17     |         |
| Years of working in PHC         |        |           |           |         |
| <1                              | 24     | 21.25-29  | 65.76     | 0.010** |
| 1-5                             | 27     | 21-32     | 82.07     |         |
| >5                              | 30     | 23.5-36   | 95.66     |         |

*Mann-Whitney test. **Kruskal-Wallis test. IQR: Interquartile range.
not satisfied with emergency services available at primary health care centers regarding cardiac arrest, acute vaginal bleeding, and myocardial infarction, respectively. [Table 6]

The total physicians’ satisfaction with emergency services at primary health care centers’ scores ranged between 12 and 60 with a median (IQR) of 32 (24–41). It was abnormally distributed as seen by significant Shapiro–Wilk test, P = 0.011. [Figure 4]

None of the studied factors was significantly associated with the satisfaction of the physicians regarding the emergency services provided at their PHC centers as illustrated in [Table 7].

As shown in [Figure 5], based on the physicians’ perspectives, the commonest barrier facing them during the management of emergency cases in the primary health care center was lack of appropriate equipment (76.5%), followed by lack of exposure to emergency cases (62.3%) and lack of time (50.6%).

From [Table 8], it is demonstrated that the most frequent available equipment needed for emergency cases at investigated PHCCs were oxygen nebulizers and oxygen masks (92.8%), dressing table (88%), IV stand (84.3%), oxygen cylinder with standard fitting cannulas (80.7%), and scissors (80.7%). On the other hand, splints, Suction apparatus, and urinary catheters were available in only 28.9%, 32.5%, and 35.4% of PHCCs, respectively.

As regards medications and intravenous fluids, ventolin for nebulization and normal saline were available in 95.2% of PHCCs, whereas activated charcoal powder, morphine, and calcium chloride injection were available in only 24.1%, 30.1%, and 37.3% of PHC centers, respectively.

Concerning supporting facilities, X-ray was available in almost two-thirds of PHCCs (67.5%), whereas laboratory and equipped ambulance cars were available in 54.2% and 38.6% of PHCCs, respectively.

**Discussion**

A medical status becomes a health emergency if it leads to “an unexpected risk to the health of people or the physical environment in which they live”[13]. As primary health care physicians may experience some emergency cases at their workplace and as usually primary health care centers are not well prepared to face such medical emergencies, previous studies suggested that PHC centers should have a written emergency protocol that can help them to effectively deal with emergency cases[13,14]. In this context, the present study was conducted mainly to identify the barriers facing family physicians in primary health care centers (PHCCs) when dealing with emergency cases in Riyadh, Saudi Arabia.

Surveys have documented that emergency cases were to be expected in primary health care settings.[13,14] In the present study, the majority of the PHC physicians had seen cases of acute asthma and renal colic, whereas only a third or less of them have seen cases of acute gastro-intestinal bleeding,
Table 6: Satisfaction of the primary health care (PHC) physicians regarding the emergency services provided at their PHC centers

| Condition                        | Score 5 | Score 4 | Score 3 | Score 2 | Score 1 |
|----------------------------------|---------|---------|---------|---------|---------|
| Acute asthma                     | 48 (31.8) | 34 (22.5) | 39 (25.8) | 17 (11.3) | 13 (8.6) |
| Myocardial infarction            | 10 (6.6) | 26 (17.2) | 35 (23.2) | 19 (12.6) | 61 (40.4) |
| Angina pectoris                  | 18 (11.9) | 27 (17.9) | 34 (22.5) | 17 (11.3) | 55 (36.4) |
| Cardiac arrest                   | 12 (8.0) | 24 (16.0) | 21 (14.0) | 22 (14.7) | 71 (47.3) |
| Severe dehydration              | 23 (15.2) | 37 (24.5) | 43 (28.5) | 21 (13.9) | 27 (17.9) |
| Renal colic                      | 33 (21.9) | 28 (18.5) | 49 (32.4) | 17 (11.3) | 24 (15.9) |
| Acute G1T bleeding               | 16 (10.7) | 22 (14.7) | 27 (18.0) | 27 (18.0) | 58 (38.6) |
| Hypoglycemia                     | 45 (30.0) | 27 (18.0) | 38 (25.3) | 22 (14.7) | 18 (12.0) |
| Diabetic ketoacidosis            | 18 (11.9) | 23 (15.2) | 25 (16.6) | 30 (19.9) | 55 (36.4) |
| Convulsion                       | 24 (15.9) | 30 (19.9) | 30 (19.9) | 19 (12.6) | 48 (31.7) |
| Anaphylaxis                      | 25 (16.6) | 28 (18.5) | 33 (21.9) | 20 (13.2) | 45 (29.8) |
| Acute vaginal bleeding           | 18 (11.9) | 24 (15.9) | 22 (14.6) | 20 (13.2) | 67 (44.4) |

5: I am fully satisfied about the facilities, equipment, trained health care personnel, and medications available to deal with such cases. 4: I am satisfied about the facilities, equipment and medications, but we need more training for health care personnel (physicians and nurses) when dealing with such cases. 3: I am satisfied about the facilities, equipment, and trained health care personnel, but medications are deficient when dealing with such cases. 2: I am satisfied about the medications and trained personnel, but facilities and equipment are deficient when dealing with such cases. 1: I am overall not satisfied about the services provided at our PHC center when dealing with such cases.

Table 7: Factors associated with score of physicians’ satisfaction with emergency services at primary healthcare centers

| Factor                              | Score of physicians’ satisfaction | P       |
|-------------------------------------|-----------------------------------|---------|
|                                    | Score 12-60                       | Median  |
|                                    |                                   | IQR     |
|                                    |                                   | Mean rank |
| Age in years                        |                                   |         |
| 25-34                               | 33                                | 24.5-41 | 75.42 | 0.588** |
| 35-44                               | 29                                | 20.5-41.5 | 69.19 |         |
| ≥45                                 | 33.5                              | 25.5-48.75 | 82.18 |         |
| Gender                              |                                   |         |
| Male                                | 35                                | 24-41.5 | 80.07 | 0.119*  |
| Female                              | 30                                | 21-41   | 69.08 |         |
| Nationality                         |                                   |         |
| Saudi                               | 31.5                              | 24-41   | 73.76 | 0.518*  |
| Non-Saudi                           | 36.5                              | 23.75-45.25 | 81.54 |         |
| Qualification                       |                                   |         |
| MBBS                                | 39                                | 23-52   | 86.18 | 0.177** |
| ABFM                                | 32.5                              | 23.5-41 | 72.86 |         |
| SBFM                                | 30                                | 22-47   | 73.04 |         |
| FM Diploma                          | 33                                | 26-41.5 | 78.49 |         |
| Others                              | 18                                | 14.5-29.5 | 32.0 |         |
| BLS                                 |                                   |         |
| <1 year                             | 30                                | 23-41   | 73.01 | 0.176** |
| 1-2 years                           | 36                                | 27-45   | 81.55 |         |
| >2 years                            | 29.5                              | 21.75-40.75 | 65.50 |         |
| ACLS                                |                                   |         |
| <1 year                             | 31                                | 24-43.5 | 78.35 | 0.145** |
| 1-2 years                           | 36                                | 29.25-48 | 89.89 |         |
| >2 years                            | 31                                | 22.5-41 | 67.66 |         |
| Not at all                          | 30.5                              | 24-42.25 | 73.63 |         |
| ATLS                                |                                   |         |
| <1 year                             | 39                                | 30-47.5 | 92.72 | 0.602** |
| 1-2 years                           | 30                                | 24-60   | 77.21 |         |
| >2 years                            | 34                                | 20.25-43.75 | 74.93 |         |
| Not at all                          | 31                                | 24-40   | 72.63 |         |
| Experience in emergency department  |                                   |         |
| Yes                                 | 32.5                              | 24-42.25 | 76.46 | 0.183*  |
| No                                  | 28                                | 21.5-37 | 63.27 |         |
| Years of working in PHC             |                                   |         |
| <1                                  | 31                                | 25-39.5 | 74.39 | 0.964** |
| 1-5                                 | 32                                | 22.5-43.5 | 73.64 |         |
| >5                                  | 34.5                              | 24-41.25 | 75.94 |         |

*Mann-Whitney U test, **Kruskal-Wallis test, IQR: Interquartile range
anaphylaxis, acute vaginal bleeding, and cardiac arrest in the last 12 months. However, most of them did not see any case of severe dehydration and convulsion. Also in other studies carried out in Jeddah (Saudi Arabia),[1] Norway,[17] Netherlands,[18] and Spain,[19] emergency cases represented a considerable proportion of cases seen at primary health care centers. Therefore, these centers should be prepared to deal with such cases.

In the current study, the commonest barriers facing physicians during the management of emergency cases in the primary health care centers, according to their perspectives were lack of appropriate equipment, lack of exposure to emergency cases, and lack of time. In Spain,[19] the provision of equipment was perceived as the most important barrier faced by physicians in dealing with emergency cases. However, in Norway, the provision of equipment in primary health care centers in both rural and urban areas was considered by physicians as satisfactory.[20]

In this study and in agreement with several studies,[1,8,19,21] most of the primary health care centers were lacking equipped ambulance cars, almost half of them were lacking laboratory, and about one-third were lacking X-ray, making these centers not well prepared for dealing with emergency situations.

It has been previously reported that in Saudi Arabia, primary health care is provided by physicians who had no postgraduate training at all or who had been trained in other medical specialties, as documented by Aloufi and Bakarman (2016)[1] who found that more than two-thirds of PHC physicians were Bachelor degree holders. However, in the current study, the situation has been changed as the majority of PHC physicians in the present study were board certified. Despite that, physicians’ qualification was not associated with the “perceived level of competence in performing emergency skills” or the satisfaction with emergency services at the PHC centers. The more important in this study was that experience in emergency departments, regardless of the qualification as experienced physicians in emergency departments “perceived a higher level of competence in performing emergency skills.” Almalki, et al. (2011)[22] have observed that the majority of PHC physicians in Saudi Arabia would like to have more knowledge and training in emergency medicine. The same also has been observed in the current survey.

The current study in accordance with others carried out in Saudi Arabia[1] and Egypt[23] revealed an essential need for implementing emergency medicine continuing medical education training programs (particularly regarding cardiovascular systems emergency) for primary health care physicians. In our cohort of primary health care physicians, most of them (71.6%) and 29.6% had never attended ATLS and ACLS courses, respectively. Similarly, it has been observed in another Saudi study carried out in Jeddah that more than 60% of PHC physicians never attended ACLS courses, whereas more than 83% never attended ATLS courses.[1] Moreover, even the attendance of ATLS courses, in addition to the BLS course was not proved to improve their “perceived level of competence in performing emergency skills” or their satisfaction with emergency services at PHC centers, which confirms that the quality and/or contents of such courses need to be revised. Furthermore, so long as attending continuing medical education is not essential for promotion or seniority, there are no motivations for physicians to attend and participate actively in such activities. On the other hand, clinical experience in emergency departments as well as more years of experience in working in PHCCs proved to be of value in improving “perceived level of competence in performing emergency skills” among primary health care physicians in this study. Non-Saudis and older physicians reported a higher level of “perceived level of competence in performing emergency skills” most probably due to their higher experience. This may reveal a strong need for further training in clinical emergency medicine, especially for younger Saudi physicians.

This study has some limitations that need to be addressed. The questionnaire was full of detailed questions that could affect the response rate of the physicians and the quality of data. However, regular visits by the research team to motivate
Table 8: Availability of items needed for emergency care at primary health care centres in Riyadh

| Items                                           | Availability of the item at PHCCs (n=83) |
|------------------------------------------------|------------------------------------------|
|                                                | Number | Percentage |
| Equipments needed in emergency care            |        |            |
| Side lamp with stand                           | 55     | 66.3       |
| Dressing drum                                  | 62     | 74.7       |
| Dressing trays                                 | 65     | 78.3       |
| Dressing table                                 | 73     | 88.0       |
| Urinary catheter                               | 29     | 35.4       |
| Scissors                                       | 67     | 80.7       |
| Suture materials                               | 58     | 70.7       |
| Needle holder                                  | 56     | 67.5       |
| Suction apparatus                              | 27     | 32.5       |
| IV stand                                       | 70     | 84.3       |
| Splints                                        | 24     | 28.9       |
| Cannulas                                       | 66     | 79.5       |
| Defibrillator                                  | 46     | 55.4       |
| Oxygen mask                                    | 77     | 92.8       |
| Airways equipment                              | 48     | 57.8       |
| Oxygen cylinder with standard fitting          | 67     | 80.7       |
| Ambu bag                                       | 57     | 68.7       |
| Nebulizer                                      | 77     | 92.8       |
| Medications and intravenous fluid needed in emergency care |        |            |
| Calcium chloride injection                     | 31     | 37.3       |
| Antihistaminic injection                       | 46     | 55.4       |
| Hydrocortisone injection                       | 65     | 78.3       |
| Dextrose 5%, 10%, 50%                          | 67     | 80.7       |
| Normal saline                                  | 79     | 95.2       |
| Ringer lactate                                 | 59     | 71.1       |
| Activated charcoal powder                      | 20     | 24.1       |
| Metoclopramide                                 | 62     | 74.7       |
| Adrenaline injection                           | 55     | 66.3       |
| Ventolin for nebulization                      | 79     | 95.2       |
| Budesonide                                     | 61     | 73.5       |
| Ipratropium                                    | 61     | 73.5       |
| Diazepam                                       | 44     | 53.0       |
| Furosemide                                     | 50     | 60.2       |
| Hyoscine                                       | 53     | 63.9       |
| Morphine                                       | 25     | 30.1       |
| Glueagon                                       | 44     | 53.0       |
| Sublingual nitrate                             | 49     | 59.0       |
| Aspirin                                        | 70     | 84.3       |
| Supporting facilities in emergency care        |        |            |
| X-ray                                          | 56     | 67.5       |
| Laboratory                                     | 45     | 54.2       |
| Equipped ambulance cars                        | 32     | 38.6       |

Table 8: Availability of items needed for emergency care at primary health care centres in Riyadh

Physicians helped in obtaining a response rate that even exceeded the required minimum sample size. The study was based totally on the self-administered questionnaire, therefore was subjected to bias as it was possible that certain practices may have been over-reported. Furthermore, 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 some 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 relatively large sample size, as it captured 79.4% of the total population of primary health care physicians in Riyadh (162 out of 204) and 79% of the primary health care centers (83/105), thus minimizing selection bias and increasing precision.

In conclusion, the level of training and emergency courses for PHC physicians in Riyadh is suboptimal particularly regarding ATLS courses. Middle-aged (25-35 years) physicians, females, Saudi nationals, those who attended ACLS since more than 2 years, those who had no experience in working in emergency departments, and less experienced physicians (<1 year) showed lower “perceived level of competence in performing emergency skills.” A considerable proportion of physicians were fully satisfied with emergency services available at primary health care centers regarding some medical problems such as bronchial asthma and hypoglycemia. However, also a considerable proportion of them was not satisfied with emergency services regarding some other health problems such as cardiac arrest, acute vaginal bleeding, and myocardial infarction. Regarding emergency services at the PHC level in Riyadh, most of the items were available; however, defects were reported in some others.

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

1. There is a need to organize training courses for primary care physicians concerning dealing with emergency cases in PHC settings.
2. Providing incentives for physicians to encourage them to attend activities in emergency medicine such as promotion or seniority.
3. It is essential to provide PHCCs with good signs leading to the emergency location, and it is important to provide sufficient parking areas at or around the PHCCs.
4. It is recommended to monitor PHCCs regularly for the supply of essential medications and needed equipment for emergencies.
5. Equipped ambulances, laboratory, and X-ray should be available at the main PHCCs, especially those in remote areas.
6. Emergency equipment should be stocked at an appropriate place, achievable when needed, and maintained regularly.

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List of Abbreviations

| Abbreviation | Description |
|--------------|-------------|
| AED          | Automatic external pacemaker |
| ATLS         | Advanced Trauma Life Support |
| ACLS         | Advanced Cardiovascular Life support |
| PHCCs        | Primary healthcare centers |
| SPSS         | Statistical package for social sciences |
| KSA          | Kingdom of Saudi Arabia |
| BLS          | Basic life support |
| ABFM         | Arab Board of Family Medicine |
| SBFM         | Saudi Board of Family Medicine |
| MOH          | Ministry of Health |
| IQR          | Interquartile range |

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Conflicts of interest

There are no conflicts of interest.

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