Barriers Facing Primary Health Care Physicians in Jazan when Dealing with Emergency Cases

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Received: February 2022 Accepted: March 2022; Published: April 1, 2022.
Citation: Sameer Ahmed Ali Holal, Hassan Ali Elsayed Abdelwahid. Barriers Facing Primary Health Care Physicians in Jazan when Dealing with Emergency Cases. World Family Medicine. 2022; 20(4): 32-43. DOI: 10.5742/MEWFM.2022.9525028

Abstract

Background: Primary healthcare centres (PHCCs) provide curative and preventative healthcare services. Little is known about perceived competence in handling potential emergencies by family physicians at PHCCs.

Aim of Study: To identify primary healthcare (PHC) physicians' emergency management competence and the barriers they experience when dealing with emergency cases.

Method: A descriptive questionnaire-based cross-sectional study of family physicians in Jazan Governorate, in south west of Saudi Arabia. We used Poisson regression modelling to evaluate the effect of background factors on perceived competence in handling emergency cases among family physicians.

Results: The study included 450 PHC physicians; 342 (77.8%) were males, and 364 (82.7%) were Saudi. When compared to Arab Board of Family Medicine (ABFM) certification, physicians did better if they had Family Medicine (FM) Diploma (OR = 1.1486, p = 0.03704) or MBBS (OR = 1.1529, p = 0.00371). Compared to physicians who attended Basic Life Support (BLS) courses within the last 12 months, competence in clinical emergencies was far worse for those who did not do BLS (OR = 0.6710, p <0.001), or did it over two years ago (OR = 0.8796, p<0.001). Notably, there was no difference between those who did BLS last year or within two years' time frame. Attending the Advanced Trauma Life Support (ATLS) course was associated with better emergency knowledge and competence if completed within one year than within two years (OR = 0.9071, p = 0.002), over two years (OR = 0.8694, p<0.001), or not done at all (OR = 0.9527, p = 0.01452). Advanced Cardiovascular Life Support (ACLS) course attendance was not associated with significant gains in terms of competence. Experience in Emergency Departments (ED) was associated with worse self-rating of competence in emergency cases (OR = 0.9527, p = 0.01452).

Conclusions: BLS and ATLS courses improve perceived competence among PHC physicians. There is a potential gap in defibrillation training among PHC-based family physicians in the southwestern area of Saudi Arabia. Therefore, BLS training should be an integral part of family physician core competence in handling emergency cases. More educational training should be devoted to defibrillation skills in clinical practice.

Key words: Primary Healthcare, Family physician, Emergency care, competence, barriers, Saudi Arabia.

Introduction

A medical emergency is "a sudden clinical incident that necessitates urgent and appropriate clinical management to treat its results and avoid its sequelae" [1]. Often, family physicians based in primary health care (PHC) centres encounter medical emergencies. Indeed, effective clinical management of emergencies in the PHC settings require availability of equipment, training, and well-structured protocols [2].

Healthcare services are prioritized in Saudi Arabia. There have been noticeable quantitative and qualitative strides in terms of healthcare services in Saudi Arabia over the last twenty years [3]. According to the World Health Organization, the Saudi health care system is ranked 26th among 190 global health care system [4]. PHC centres provide primary care service, both curative and preventive and they refer cases to public hospitals if they require more advanced care and refer those who require more complex care to central or specialized hospitals [3].

There is no information or data known about dealing with emergency cases in Jazan and the barriers that the physicians face while dealing with these emergency cases at PHC level. One recent survey tested 600 Riyadh-based family physicians in terms of interpretation of emergency X-Ray abilities [5]. The competence of family physicians was suboptimal and fell substantially below that of their radiology trainee colleagues.

The objective of this study was to identify PHC physicians' emergency management competence and the barriers they experience when dealing with emergency cases.

Methods

This study followed a cross-sectional questionnaire-based descriptive research design in Jazan City, Saudi Arabia. We surveyed all PHC centres under administration of Jazan Directorate for Health Services. The target population included all practicing family physicians in Jazan PHCCs.

All family physicians were contacted by phone. The purposes of the study were explained to them in detail and their approval to participate was obtained. A personalized link to the online questionnaire designed through Google Form was sent to those who approved participation to be filled out by each participant.

Data collection tool:
A self-administered questionnaire was constructed by the researchers based on thorough review of relevant literature and was utilized for data collection. It included the following sections:
1) Sociodemographic questionnaire: It was constructed by the researchers to collect data about PHC physicians, their training levels, experience, and attendance to life support courses.
2) Physicians' perceived competence score: Calculated by adding up the scores for self-perceived competence items related to specific emergency skills as rated between (1) and (4) by the study participants. Twelve competence skills are included, i.e., cardiac compression, mouth-to-mouth resuscitation, bag & mask resuscitation, insertion of IV cannula, intubation, defibrillation, ECG Reading, nebulization & oxygen therapy, simple suture, nasogastric tube insertion, urinary catheter insertion, and using IV fluids. The maximum score is 48 for fully perceived competence skills.
3) Physicians' barriers form: to detect PHC physicians' needs in emergency care e.g., equipment, medications, and facilities.

The study questionnaires were submitted to PHC physicians through a Google Form online link. Data were filled in by participants and automatically collected into an Excel spreadsheet.

Data were analysed using the R-Statistical Software (version 3.4.1). Descriptive statistics (frequency and percentages for categorical variables in addition to means, standard deviations and range for quantitative variables) were calculated. Inferential statistics, e.g., Chi Square test ($\chi 2$) to assess the associations and/or differences between two categorical variables was applied. Univariate Poisson regression was applied to evaluate the unadjusted effect of demographic factors on perceived competence scores. The results were displayed in the form of odds ratios and the significance was displayed according to z-scores which were calculated using the Wald procedure with Z being the standard normal variate whose mean is zero and SD is 1. Multiple Poisson regression modelling was used to test the significance for the adjusted impact of demographic factors on physician competence to treat emergency cases. A p-value less than 0.05 was considered as statistically significant.

Results

Figures (1 & 2) show that there were no differences between PHC physicians in terms of perceived-competence in handling emergency cases according to their gender or nationality.

Figure (3) shows that physicians with Diploma in Family Medicine and general practitioners with MBBS had better competence in clinical emergencies than Arab Board-qualified physicians (OR = 1.1486, p = 0.037 for Diploma qualified) and (OR = 1.153, p = 0.004 for MBBS qualified).

Figure (4) shows that, compared to physicians who completed BLS within the last 12 months, competence in clinical emergencies was far less for those who did not do BLS (OR = 0.6710, p < 0.0001), or did it over two years ago (OR = 0.8796, p = 5.30X10-05). However, there was no difference between those who did BLS last year or within a two years' time frame. Moreover, Figure (5) shows that, when adjusted to the effect of other variables, ACLS course attendance was not associated with significant gains in terms of competence.

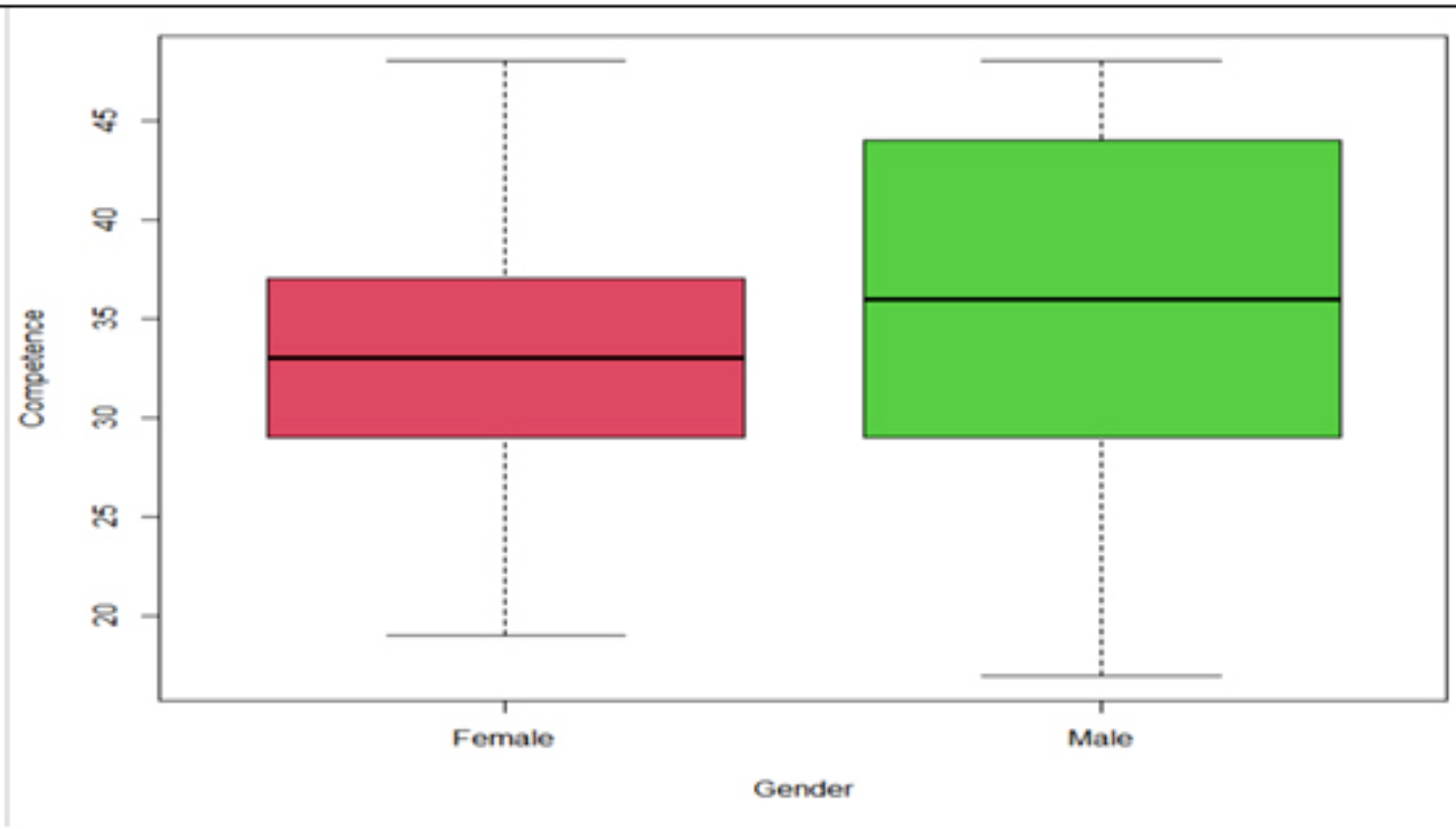

Figure 1. Physicians' emergency management competence according to their gender

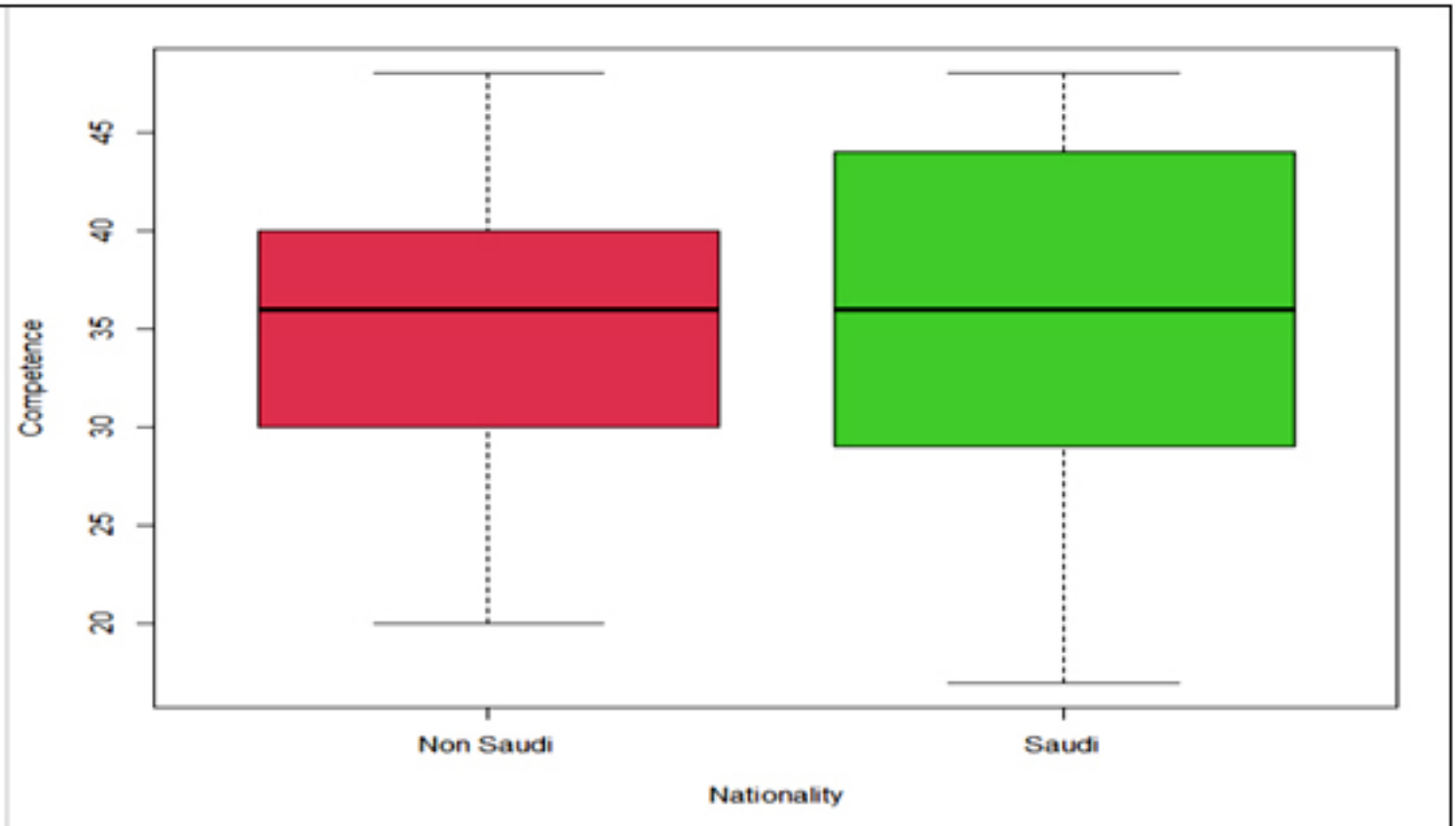

Figure 2. Physicians' emergency management competence according to their nationality

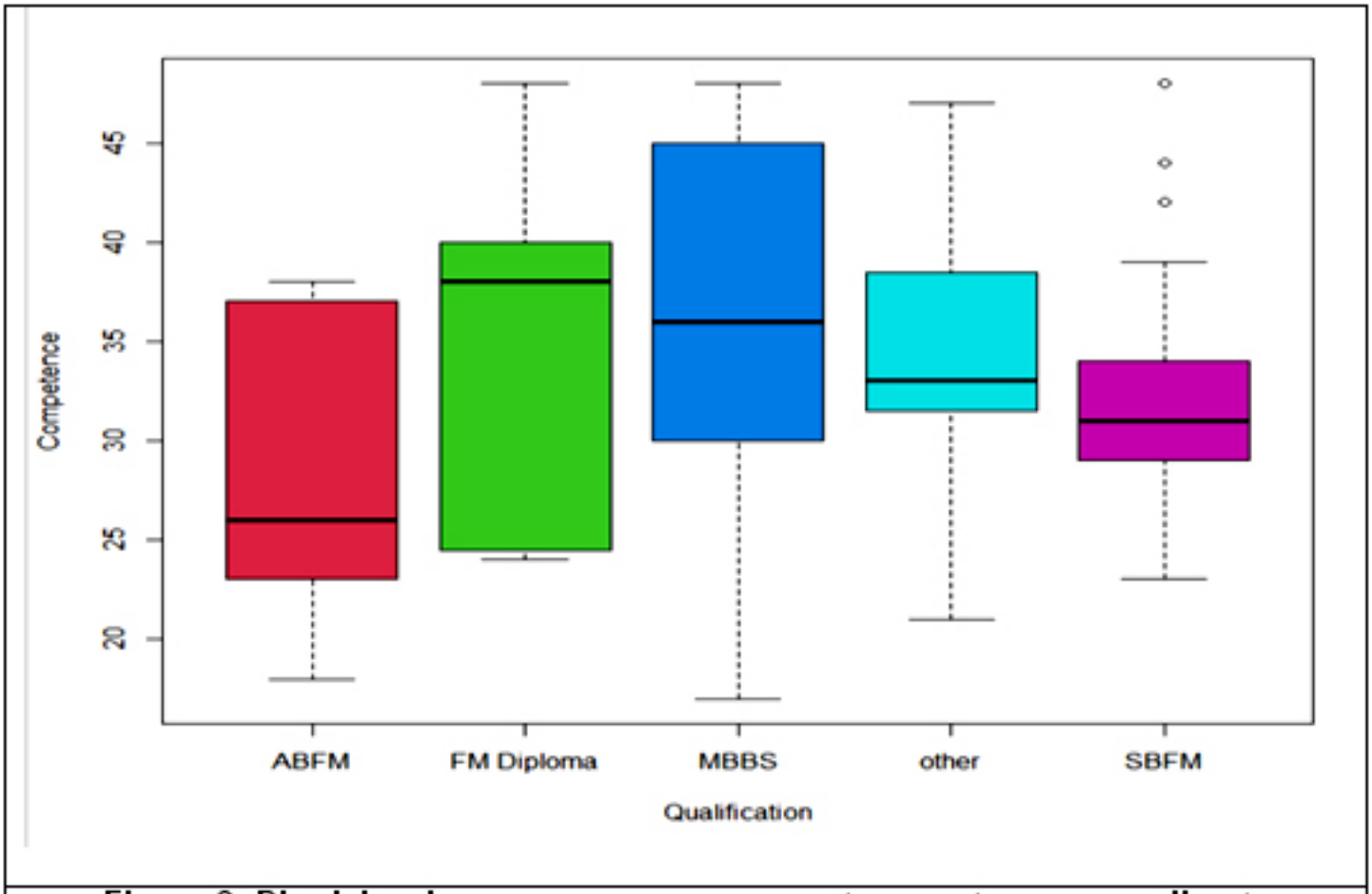

Figure 3. Physicians' emergency management competence according to their qualification

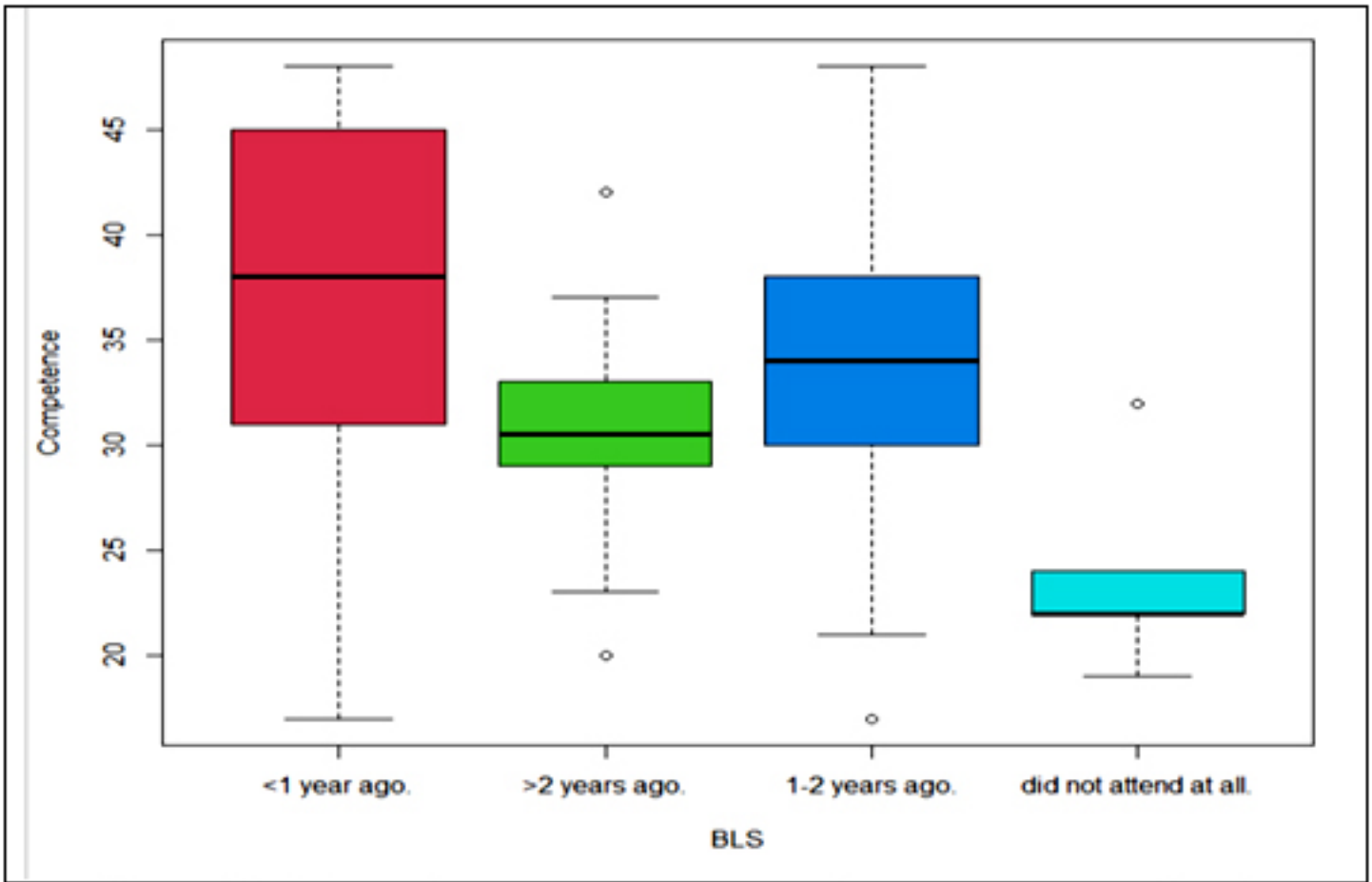

Figure 4. Physicians' emergency management competence according to their attendance of basic life support (BLS) course

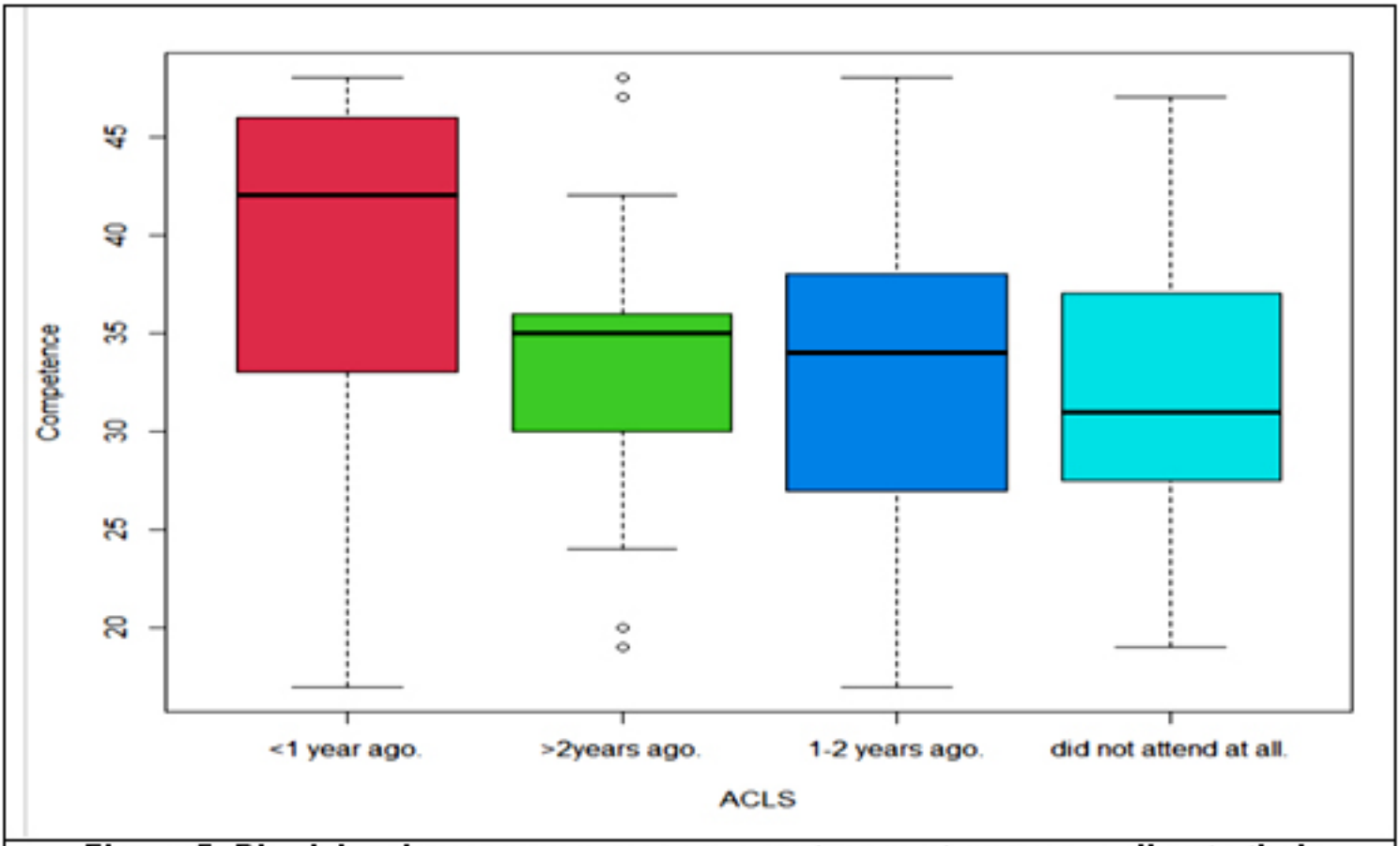

Figure 5. Physicians' emergency management competence according to their attendance of advanced cardiovascular life support (ACLS) course

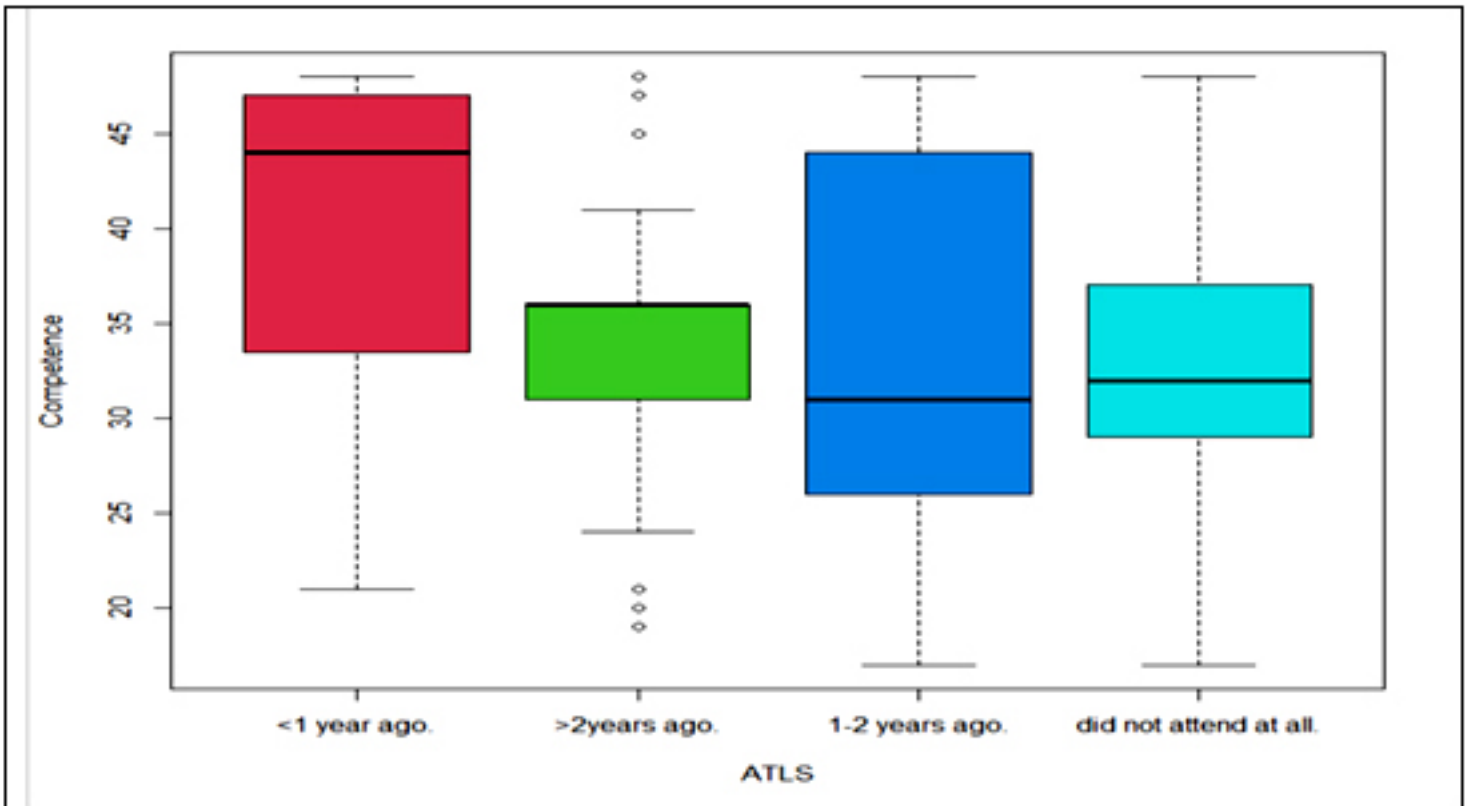

Figure 6. Physicians' emergency management competence according to their attendance of advanced trauma life support (ATLS) course

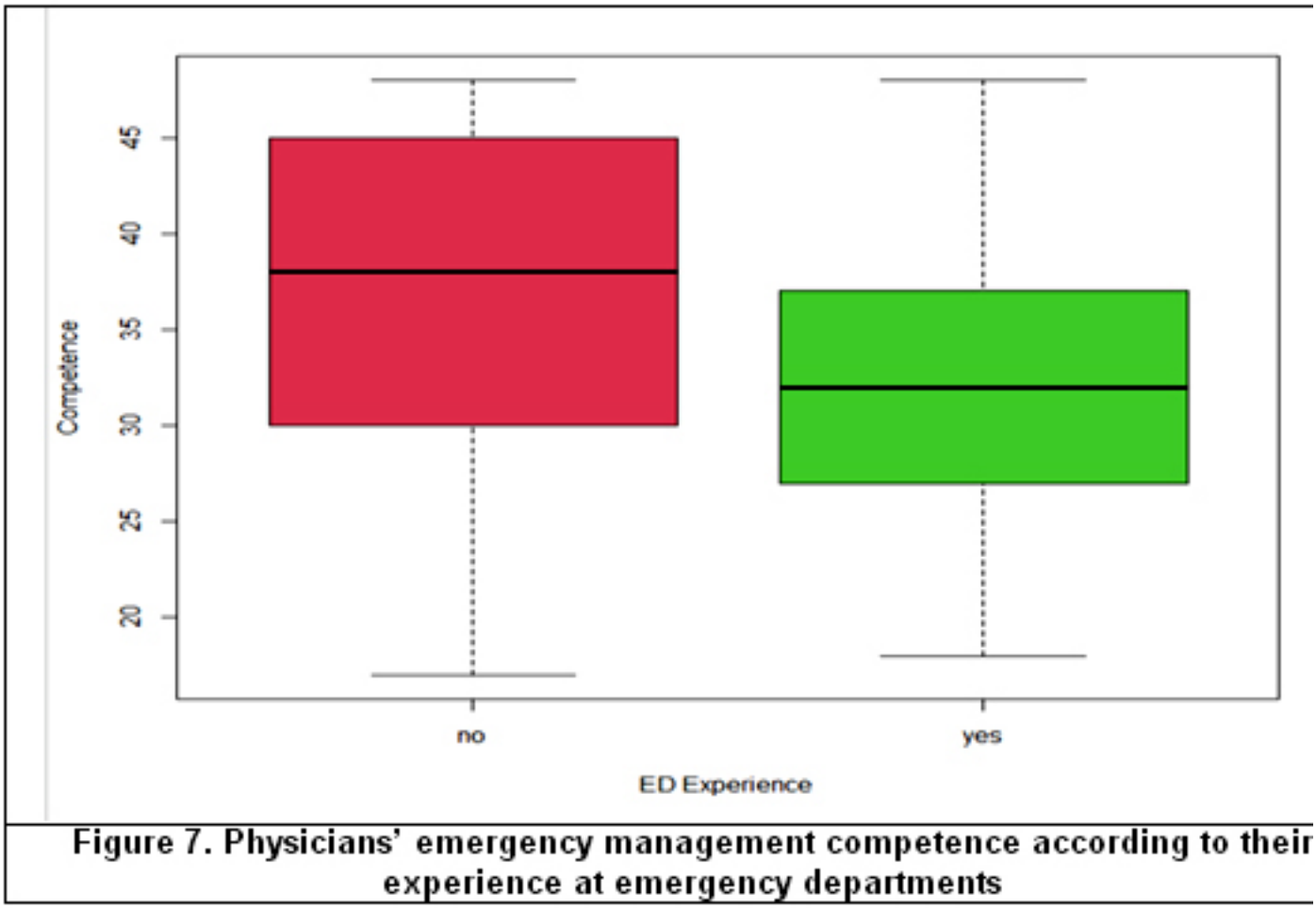

Figure 7. Physicians' emergency management competence according to their experience at emergency departments

Figure (6) shows that ATLS was associated with better emergency knowledge and competence if completed within one year than within two years (OR = 0.9071, p = 0.002), over two years (OR = 0.8694, p = 1.68X10-05), or not done at all (OR = 0.9527, p = 0.01452).

Figure (7) shows that physicians' experience in ED was associated with worse self-rating of competence in emergency cases (OR = 0.9527, p = 0.01452).

Table (1) provides the details of the demographic results and their impact on competence in handling clinical emergencies in PHC settings. The mean age of participants was 36.5±6.6 years, ranging between 25 and 62 years, and the median age was 35 years. Age did not have any significant effect in terms of perceived competence score (Unadjusted OR = 1.00002, p = 0.986). There were 342 (77.8%) male physicians compared to 100 (22.2%) female physicians. Although male physicians significantly outperformed female physicians in terms of competence rating (t = 2.4896, p = 0.01363), this difference disappeared when adjusted for the effect of other variables. We had 364 (82.7%) Saudi physicians in the survey who did not differ in terms of competence to handle emergency cases than their non-Saudi colleagues. Only 18.4% of physicians had the Arab Board in Family Medicine certification. However, they were outperformed by physicians with all other qualifications, in terms of self-rating for competence in handling emergency cases, including 330 physicians (75.1%) who were only MBBS qualified and 60 (13.3%) who were Saudi Board SBFM holders and 15 (3.3%) Family Medicine Diploma holders. Recent (i.e., <12 months) BLS training was reported by 297 physicians (67.7%), and recent ATLS training was reported by 148 physicians (32.9%), and 202 physicians (44.9%) were ACLS certified since less than a year. All physicians who attended these training courses rated themselves quite highly in terms of competence in emergency management than those who did not attend the courses or had them one or two years ago. Experience in emergency department, which was reported by 163 physicians (36.2%), was associated with worse competence in handling emergency cases (unadjusted OR = 0.8784, p <0.001).

Table (2) shows participants' self-rating in terms of competence in management of emergency cases. Those with no knowledge about cardiac compression were 11 (2.4%), compared to mouth-to-mouth breathing (37, 8.2%) or bag-and-mask resuscitation (9, 2%). IV cannula insertion would be avoided by 25 (5.6%). Those with no knowledge about cardiac compression were 11 (2.4%), compared to mouth-to-mouth breathing (37, 8.2%) or bag-and-mask resuscitation (9, 2%). IV cannula insertion would be avoided by 25 (5.6%) and intubation by 87 (19%), whereas defibrillation would not be attempted by 95 (21.1%) and ECG by 15 (3.3%). Some 31 (6.9%) rated themselves incompetent in nebulization and oxygen therapy, 14 (3.1%) in simple suture and a further 34 (7.6%) in NGT insertion. Urinary catheterization would not be attempted by 28 (6.2%) and using IV fluids by 35 (7.8%).

Table (3) shows the availability of emergency equipment at PHC settings as reported by participating physicians. The least available equipment was cervical collars 269 (59.8%), while 405 (90%) had a nebulizer in their PHC facility.

Table (4) shows that Ventolin for nebulization was present in 393 facilities (87.3%), and 304 facilities (67.6%) had activated charcoal powder.

Table (5) shows the odds ratios after adjusting for background factors simultaneously in the regression model. Clearly, when compared to ABFM certification, doctors did better if they had FM Diploma (OR = 1.1486, p = 0.03704) or MBBS (OR = 1.1529, p = 0.00371). Compared to doctors who completed BLS within the last 12 months, competence in clinical emergencies was far worse for those who did not do BLS (OR = 0.6710, p < 0.0001), or did it over two years ago (OR = 0.8796, p = 5.30X10-05). Notably there was no difference between those who did BLS last year or within two years' time frame. ATLS was associated with better emergency knowledge and competence if completed within 1 year than within two years (OR = 0.9071, p = 0.002), over two years (OR = 0.8694, p = 1.68X10-05), or not done at all (OR = 0.9527, p = 0.01452). ACLS course attendance was not associated with significant gains in terms of competence.

Experience in ED was associated with worse self-rating of competence in emergency cases (OR=0.9527, p=0.01452).

Table 1. Baseline demographic results of the physicians included in the current investigation

Factor	(No.)/mean	%/SD	Unadjusted OR/mean competence	Statistical test	P-value
Gender					
• Male	342	77.8%	36.01	t = 2.4896	0.014
• Female	100	22.2%	33.93		
Age (in years)	Mean:36.5	SD:6.6	1.00002	Z = 0.018	0.986
Nationality					
• Saudi	364	82.7%	35.71	t = 0.9673	0.335
• Non-Saudi	78	17.3%	34.81		
Qualification					
• Arab Board	18	4%	Reference	Reference	Reference
• Diploma	15	3.3%	1.1818	Z = 2.698	0.00698
• MBBS	330	75.1%	1.2518	Z = 5.044	<0.001
• Saudi Board	60	13.3%	1.1099	Z = 2.122	0.03388
• Others	19	4.2%	1.1599	Z = 2.524	0.01161
Attending BLS course					
• Since < 1 year	297	67.7%	Reference	Reference	Reference
• Since > 2 years	60	13.3%	0.8260	Z=-7.603	<0.001
• Since 1-2 years	79	17.6%	0.9186	Z=-3.963	<0.001
• Not attended	6	1.3%	0.6330	Z=-5.396	<0.001
Attending ACLS course					
• Since < 1 year	202	44.9%	Reference	Reference	Reference
• Since > 2 years	86	19.1%	0.8716	Z= -6.32	<0.001
• Since 1-2 years	63	14%	0.8654	Z= -5.889	<0.001
• Not attended	91	22%	0.8313	Z= -8.784	<0.001
Attending ATLS course					
• Since < 1 year	140	32.9%	Reference	Reference	Reference
• Since > 2 years	91	20.2%	0.8509	Z =-7.281	<0.001
• Since 1-2 years	77	17.1%	0.8499	Z = -.931	<0.001
• Not attended	134	29.8%	0.8125	Z=-10.41	<0.001
Experience in ED					
• Yes	163	36.2%	0.8784	Z =-7.723	<0.001
• No	278	63.8%	Reference	Reference	Reference

BLS: Basic life support; ACLS: Advanced cardiovascular life support; ATLS: Advanced trauma life support; ED: Emergency Department

Table. 2: Participants' perceived competence regarding management of emergency cases

Competence		No.	%
Cardiac compression	1= I do not know where to start	11	2.4
	2= I will do only if no one else is available	93	20.7
	3= I will attempt in most cases.	179	39.8
	4= I will attempt in all cases.	159	37.1
Mouth to mouth resuscitation	1= I do not know where to start	37	8.2
	2= I will do only if no one else is available	124	27.6
	3= I will attempt in most cases.	117	26
	4= I will attempt in all cases.	164	38.2
Bag & mask resuscitation	1= I do not know where to start	9	2
	2= I will do only if no one else is available	99	22
	3= I will attempt in most cases.	165	36.7
	4= I will attempt in all cases.	169	39.3
Inserting IV cannula	1= I do not know where to start	25	5.6
	2= I will do only if no one else is available	143	32.7
	3= I will attempt in most cases.	129	28.7
	4= I will attempt in all cases.	145	33.1
Intubation	1= I do not know where to start	87	19.3
	2= I will do only if no one else is available	142	33.3
	3= I will attempt in most cases.	103	22.9
	4= I will attempt in all cases.	110	24.4
Defibrillation	1= I do not know where to start	95	21.1
	2= I will do only if no one else is available	123	29.1
	3= I will attempt in most cases.	106	23.6
	4= I will attempt in all cases.	118	26.2
Reading ECG	1= I do not know where to start	15	3.3
	2= I will do only if no one else is available	102	22.7
	3= I will attempt in most cases.	169	39.3
	4= I will attempt in all cases.	156	34.7
Nebulisation & oxygen therapy	1= I do not know where to start	31	6.9
	2= I will do only if no one else is available	87	19.3
	3= I will attempt in most cases.	148	34.7
	4= I will attempt in all cases.	176	39.1
Simple suture	1= I do not know where to start	14	3.1
	2= I will do only if no one else is available	79	17.6
	3= I will attempt in most cases.	150	35.1
	4= I will attempt in all cases.	199	44.2
Nasogastric tube insertion	1= I do not know where to start	34	7.6
	2= I will do only if no one else is available	111	26.4
	3= I will attempt in most cases.	132	29.3
	4= I will attempt in all cases.	165	36.7
Urinary catheter insertion	1= I do not know where to start	28	6.2
	2= I will do only if no one else is available	92	20.4
	3= I will attempt in most cases.	142	33.3
	4= I will attempt in all cases.	180	40.0
Using IV fluid & medications	1= I do not know where to start	35	7.8
	2= I will do only if no one else is available	81	19.8
	3= I will attempt in most cases.	143	31.8
	4= I will attempt in all cases.	183	40.7

Table 3: Availability of emergency equipment at PHC settings as reported by participating physicians

Equipment	Availability (No.)	Availability (%)
Side lamp with stand	338	75.1
Dressing drum	375	83.3
Dressing trays	339	75.3
Dressing table	371	82.4
Urinary catheter	327	72.7
Forceps	348	77.3
Scissors	367	81.6
Suture materials	391	86.9
Needle holder	365	81.1
Suction apparatus	308	68.4
Blades	377	83.8
IV stand	373	82.9
Splints	350	77.8
Nasogastric tubes	336	74.7
Cannulas	402	89.3
Cervical collars	269	59.8
Oxygen mask	403	89.6
Airways equipment	363	80.7
Oxygen cylinder	400	88.9
Ambu-bag	342	76.0
Nebulizer	405	90.0

Table 4: Availability of emergency medications and facilities at PHC settings as reported by physicians

Equipment	Availability (No.)	Availability (%)
Calcium chloride injection	300	66.7
Anti-histamine injection	331	73.6
Hydrocortisone injection	367	81.6
Dextrose 5%, 10%, 50%	398	88.4
Normal saline	404	89.8
Ringer lactate	404	89.8
Activated charcoal powder	304	67.6
Metoclopramide	362	80.4
Adrenaline injection	348	77.3
Ventolin for nebulization	393	87.3
Anti-tetanic serum	305	67.8
Tetanus toxoid	323	71.8
Rabies vaccine	321	71.3
Diazepam	312	69.3
Furosemide	342	76.0
Hyoscine	351	78.0
X-Ray	351	78.0
Laboratory	378	84.0
Equipped ambulance car	336	74.7

Table 5: The adjusted effect for background factors on competence of management of potential emergencies by participating doctors

Factor	Adjusted OR	95% CI of adjusted OR		P value
Age	1.0012	0.9984	1.0039	0.40938
Gender Male	1.0312	0.9889	1.0753	0.15074
Nationality Saudi	0.9569	0.9088	1.0075	0.09398
Qualification FM Diploma	1.1486	1.0084	1.3084	0.0370†
Qualification MBBS	1.1529	1.0473	1.2692	0.0037†
Qualification others	1.1158	0.9860	1.2627	0.08246
Qualification SBFM	1.0486	0.9440	1.1647	0.37613
BLS >2 years ago.	0.8796	0.8266	0.9361	<0.001†
BLS 1-2 years ago.	0.9805	0.9345	1.0288	0.42221
BLS was not attended	0.6710	0.5654	0.7964	<0.001†
ACLS >2years ago.	1.0276	0.9595	1.1005	0.43698
ACLS 1-2 years ago.	0.9465	0.8856	1.0116	0.10515
ACLS was not attended	0.9797	0.9206	1.0427	0.51916
ATLS >2years ago.	0.8694	0.8157	0.9266	<0.001†
ATLS 1-2 years ago.	0.9071	0.8527	0.9650	0.0020†
ATLS was not attended	0.8750	0.8236	0.9295	<0.001†
ED Experience	0.9527	0.9165	0.9905	0.0145†

Discussion

Our study included 450 PHC physicians in the Southwestern area of Saudi Arabia. They were of different nationalities, training backgrounds, age and gender. A significantly positive effect was observed on physicians' perceived levels of competence for recent completion of BLS and ATLS training courses.

BLS remains one of the popular courses among Saudi health professionals, and recent surveys indicated that people tend to repeat the course on an annual basis given its perceived benefits [6]. Recent studies showed that attendance at BLS training in Saudi Arabia substantially improves knowledge among medical students [7], in addition to enhanced attitudes and competence toward cardiac emergencies and better use of automated defibrillator devices [8].

On the other hand, ATLS is not as popular as BLS training, despite calls from researchers to make it so in Saudi Arabia [9]. However, to clinicians in PHC settings, knowledge of advanced life support was not linked to better prehospital emergency care than regular BLS training [10]. Family physicians were found willing to engage and implement advanced trauma management standards, and they appreciated challenges of maintaining their skills in the long run [11].

Our results provided clear evidence that family physicians' annual attendance at these courses improves their knowledge and competence and, it is certainly, cost-effective. However, we noted that attendance of ACLS course was not of substantial impact when we adjusted for other courses. Although patient survival was shown to improve theoretically with proper ACLS certification for healthcare attendants [12], a recent investigation revealed concerning results about less-than-expected performance for ACLS attendees in management of cardiac arrythmias [13].

The ACLS is an intense course and although it is core competence for emergency room clinicians, it may fall above the standards required from family physicians. Our results show that ACLS attendance did not improve perceived competence among family physicians in Saudi Arabia. However, we would not be able to generalize the results to include actual competence in management of emergency cases in PHC settings. Further research would be required to compare such core and advanced competencies between family physicians who completed ACLS and those who did not.

Indeed, ABFM-certified physicians were the minority in our study, but they were outperformed by physicians from other qualifications when it came to perceived competence in attending to emergency cases in PHC settings. Notably, the majority of participants were fresh MBBS graduates. Therefore, one would expect them to be more familiar with advances in emergency care. However, Continuous Medical Education (CME) activities should focus more on providing advanced training in management of emergency cases for all family physicians.

Research found that such CME activities are useful and would, hopefully, improve knowledge and competence of family physicians in a variety of necessary subjects [14]. Educational interventions do improve family physicians' knowledge [15]. Hence, a focused emergency management educational intervention is warranted for PHC physicians in the southwestern area of Saudi Arabia.

One counterintuitive finding that emerged from our current investigation is the negative effect for ED experience among our physicians, in terms of their perceived emergency competence. Family physicians do gain emergency department experience, particularly in rural areas [16] similar to the southwestern area of Saudi Arabia. However, as per our findings, such experience does not seem to help their perceived competence when going back to their primary PHC clinical settings.

One explanation could be that the short-term experience in emergency medicine is counter-productive and would knock trainees' confidence. It may also be the fact that trainees with no prior emergency room experience overestimate their competence, an example of the so-called "Dunning-Kruger overconfidence" effect [17].

A recent study showed training in high-fidelity nearly real-life clinical scenarios could potentially lead to overconfidence rather than improved true competence [18]. We call for a more structured and prolonged exposure for emergency medicine in the family medicine training curriculum. However, focused educational research is required to ascertain the exact effect for emergency medicine placement. Could it be the quality of training rather than its duration?

One fifth of our sample of family physicians would not attempt use of automated external defibrillator (AED) in case of emergencies. This should raise concerns. AEDs are widely available in all urban, rural, and remote healthcare facilities, even onboard civilian aircrafts [19]. Moreover, the use of AED is part and parcel of prehospital emergency management, and all healthcare professionals should be proficient in its use. Early prehospital defibrillation is undoubtedly linked to enhanced chances of survival later on with proper advanced emergency care by specialist hospital staff [20]. Many countries encourage lay citizens to gain competency in life support using AED in public places [21].

Our findings identified a potential gap in defibrillation training among PHC-based family physicians in Southwestern Saudi Arabia. Therefore, more educational interventions and training should be devoted to this important area in clinical practice.

The current survey possesses several strengths. We recruited a large number of family physicians. The questionnaire was a well-designed and tested for self-rating of competence in managing emergency cases. However, any interpretation of our results should consider a range of limitations. There is the possibility of social desirability bias, given the self-rating nature of our survey, that would have caused overestimation of competence among family physicians [22]. Furthermore, the research team could not validate the actual attendance at life support training course as reported by participants, with some potential for recall bias that would have overestimated the effect of these courses on competence in handling emergency cases [23].

Further research should focus on actual competence in management of frequent emergencies in PHC settings rather than perceived competence. Furthermore, qualitative research should explore learning needs in terms of management of clinical emergencies of family physicians in Saudi Arabia, and follow-on research should evaluate the effect of CME-based educational intervention on achievement of such learning needs.

Conclusions

Attending BLS and ATLS courses improves perceived levels of competence among PHC physicians. Annual attendance of these courses improves PHC physicians' knowledge and competence. One explanation for the negative effect of emergency room experience on perceived competence is that the short-term experience in emergency medicine is counter-productive and would knock trainees' confidence. There is a potential gap in defibrillation training among PHC-based family physicians in the southwestern area of Saudi Arabia.

Therefore, BLS training should be an integral part of family physician core competence in handling emergency cases. It should be provided annually to PHC-based healthcare staff and attendance should be facilitated by PHC policy makers. More educational intervention and training should be devoted to defibrillation skills in clinical practice. Further research should focus on actual competence in management of frequent emergencies in PHC settings rather than perceived competence. Well-designed qualitative research should be conducted to explore self-directed learning needs in terms of management of clinical emergencies of family physicians in Saudi Arabia, and follow-on research should evaluate the effect of CME-based educational intervention on achievement of such learning needs.

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