

Medical Health Simulation Awareness and Opinion among Saudi Commission of Health Specialty Trainees in Saudi Arabia

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Abstract

Introduction: Simulation is used to create better and safer environment for the healthcare practitioners and to decrease medical errors. The Saudi Commission for Health Specialties (SCFHS) has introduced multiple simulation courses in few specialties as part of the training curricula for residents and fellows.

Objectives: The aim of this study is to assess awareness about medical simulation among SCFHS trainees and identify obstacles that prevent them from participating in such activities.

Methodology: Cross sectional study through electronic survey to residents and fellows under SCFHS from the following regions of Saudi Arabia: Riyadh, Jeddah, Eastern Province, Jizan and Northern Region. Only complete surveys are considered for analysis plus all medical simulation courses except BLS, ACLS, PALS & ATLS courses.

Result: A total of 313 SCFHS trainees responded to the electronic survey. The majority are 25-30 years of age (65%). Residents counted for 285 (91%) (R2=30% & R3=22%) and fellows for 28 (9%) (F1=2.2% & F2=1.6%). Only 151 out of the 313 participants (48.2%) have ever heard of medical simulation, while only 87 (28%) have ever practiced simulation. The majority of the trainees who are involved in simulation belong to governmental institutes 72 (83%), 15 (17%) to university institutes and none to private institutes. Around 2/3 of the trainees have simulation centers at their institution. The trainees believe medical simulation should be mandatory in undergraduate and postgraduate training, 83% and 93% respectively. The trainees' perceptions about simulation showed (64%) of them don't know where simulation can be used with a significant P-value of < 0.001, (9%) Heard negative experience from others with a significant P-value of < 0.001 & (>90%) can improve outcome of patient care, physician skills and medical knowledge with a significant P-value of < 0.001, < 0.001 & 0.029 respectively. The trainees' Perceived Obstacles about simulation showed (67%) think that Lack of time to attend or create simulation models is an obstacle with a significant P-value of < 0.001 & (67%) think that Cost of simulation courses is an obstacle as well with a significant P-value of < 0.001.

Conclusion: Medical simulation is still not widely practiced in the training of SCFHS trainees in various specialties in Saudi Arabia.

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Introduction

For variety of reasons healthcare education should include advanced technology and innovative methods for optimal training. Simulation based learning has been enthusiastically adopted by healthcare education internationally over the past years. Learning from other professions which successfully established simulated programs in their trainings, such as aviation and space exploration [1]. Simulation is the duplication of a real-life situation, replicating clinical scenarios, in a controlled environment to facilitate learning. As mentioned by The Accreditation Council on Graduate Medical Education (ACGME), stimulation has long been used as a tool to better enhance medical knowledge and practice skills for as early as second year medical students and showed greater importance for post-graduate practice of residents and fellows across the different medical fields. [2,3]. Based on studies, it has a direct effect on the communication skills and team build training of the practitioners as well as building a better and safer environment, facing complex and rare cases [4], assisting in decision making, decreasing medical errors, learning new technologies and procedures that are being introduced frequently [5], and finally having a better understanding

of others' professional roles and responsibilities [6]. On the contrary, there are many challenges that could compromise the benefits of this methodology [2]. For instance, understanding the existing types of simulations and choosing the suitable one for each practitioner to fulfill their substantial learning and augment their curriculum [7,3], having cost effective varieties of courses, and accommodating the increasing number of practitioners [3]. The Saudi Commission for Health Specialties (SCFHS) is working on introducing many simulation types as part of the training curriculum to bridge between the literal and practical knowledge.

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Methods

Study setting and design

The study was a Cross sectional study that was conducted from January till September 2017 through Google electronic survey.

Study population

Residents and fellows under Saudi Commission for Health Specialties from the following regions of Saudi Arabia: Riyadh, Jeddah, Eastern Province, Jizan and Northern Region. Only complete surveys are considered for analysis plus all medical simulation courses except BLS, ACLS, PALS & ATLS courses.

Data collection

The following data were recorded: Training title and level, trainee nationality, age and specialty, Current institute and city of the institute. Did the trainee hear about medical health simulation (MHS) and have he/she used it before as a learner or as a trainer. Dose the trainee institute have a simulation lab. The trainee perceptions, believes and obstacles about MHS. List five most common simulation courses needed for the trainee's specialty.

Statistical analysis

Categorical variables such as age group, training title, training level, specialty, etc. were presented in frequencies and percentages. Chi-square / Fisher's exact test was applied according to whether the cell expected frequency is smaller than 5, and it was used to determine the significant relationship between categorical variables. P - value < 0.05 two tailed was considered as statistically significant. All data was entered and analyzed through statistical package SPSS 22 (SPSS Inc., Chicago, IL, USA).

Results

A total number of 313 participants were involved in this study, 285 (91.1%) residents, mostly were R2 94 (30%) followed by R3 69 (22%) while 28 (8.9%) fellows; F1 and F3 with 2.2% and 1.6% respectively. 269 (85.9%) under governmental institutes, 39 (12.5) under universities and 5 (1.6%) under private institutes. Mostly located in Riyadh 172 (55%), Makkah 50 (16%), Eastern Province 45 (14.4%), Asir 19 (16.1%), Bahrain 3 and finally 1 in Jordan. All under SCFHS training. Responder's majority were specialized in Internal Medicine 48 (15.3), Orthopedic 36 (11.5%), Pediatric, Obstetrics/Gynecology and General Surgery 28 (8.9%) for each. Family Medicine 26(8.3%), ENT 13(4.2%), Dentistry 12(3.8%), Emergency Medicine for adults 10(3.2%) and rest of specialties were less than 3% (Table 1).

Only 151 (48.2%) of the total participants heard about MHS, and only 87 (57.6%) of them practiced before. 59 (67.8%) had MHS center at their institute versus 28(32.2%) who don't have a MHS center in their institute (Figure 1). The majority 39(44.8%) practiced MHS as learners 1/year while 23 (26.4%) practiced 2-3 times/year. On the other hand, as a trainer 21 (24.1%) practiced 1/year and 13 (14.9%) 2-3 times per year (Table 2). Most common specialties utilizes simulation based simulation are critical care 34.4%, emergency medicine 32% followed by anesthesia, surgery, internal medicine and obstetrics and gynecology 25.3%, 24%, 20.6%, 16% respectively. 2.3% are utilized by orthopedic and administration, least is by pulmonology and

		No. of Participants	%
Level	R2	94	30%
	R3	69	22%
	F1	7	2.2%
	F3	5	1.6%
Age	< 25	25	8.0%
	25 – 30	205	65.5%
	> 30	83	26.5%
Institute	Government	269	85.9%
	University	39	12.5%
	Private	5	1.6%
Region	Riyadh	172	55%
	Makkah	50	16%
	Eastern Province	45	14.4%
	Asir	19	16.1%
	Bahrain	3	
	Jordan	1	
Specialty	Internal Medicine	48	15.3%
	Orthopedic	36	11.5%
	Pediatric	28	8.9%
	Ob/Gyne	28	8.9%
	General Surgery	28	8.9%
	Family Medicine	26	8.3%
	ENT	13	4.2%
	Dentistry	12	3.8%
	Emergency Medicine (Adults)	10	3.2%
	Rest		< 3%

Table 1: Demographic Data.

vascular surgery 1.14% (Table 3). According to the survey 81 (93.1%) supported MHS being mandatory at residents/fellow programs, and 72 (82.8%) in undergraduate programs compared with 6 (6.9%) who do not support MHS being mandatory in residents/fellow programs and 15 (17.2%) in undergraduate programs with statistical significant P value (Table 4). There are 3 main obstacles listed in the survey: first obstacle is related to trainer awareness to MHS, in the opinion of the responders, 64% related to lack of knowledge where simulation can be applied, 47% related to lack of knowledge of benefit from simulation, 27.6% assume simulation is not suitable and 1% related to limitation of simulation centers. Most of the responders indicated that MHS can improve outcome of patient care, physician skills, medical knowledge and team work with statistical significant P value. Second obstacles related to skills, organizational and technical limitation: in the opinion of the responders, 66.6% related to lake of time to attend simulation courses, 48% related to staff skilled in simulation, 47% related to knowledge on how to create simulation courses and 44.8% related to lack of equipment. Third obstacles related to cost limitation: in the opinion of the responders, 66.6% related to high expenses of simulation courses, while 63.2% related to the expenses of software, hardware and equipment and least 33.3% related to staff trainers (Table 5). All responders have listed five or more most common simulation courses required at their specialty (Table 6).

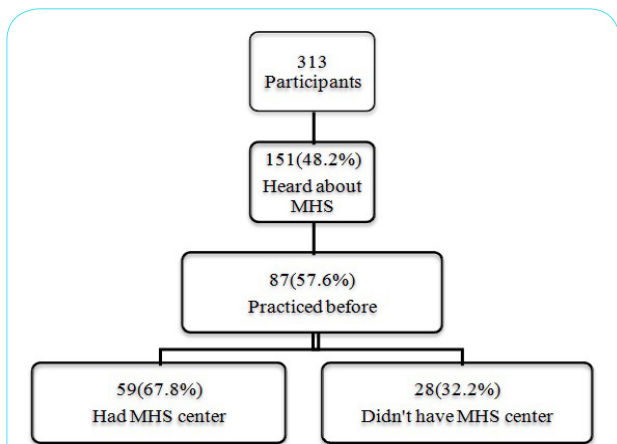


Figure 1: Demonstrated that 313 responders where 48.2% of them heard about MHS and 57.6% of them had practiced before and 67.8% had MHS centers.

	No. of participants who practiced before	%
As a learner	54	62.1%
As a trainer	16	18.4%
As both	17	19.5%

Table 2: previous participation at MHS.

Speciality			
Critical Care	30	34.4%	
Emergency Medicine	28	32%	
Anaesthesia	22	25.3%	
Surgery	21	24%	
Internal Medicine	18	20.68%	
Ob/Gyne	14	16%	
Dentistry	3	3.44%	
Administrative	2	2.3%	
Orthopedic	2	2.3%	
Pulmonology	1	1.14%	
Vascular Surgery	1	1.14%	

Table 3: Specialties utilizing simulation-based education.

	Support MHS being mandatory	Don't support MHS being mandatory
Resident/Fellowship	81 (93.1%)	6 (6.9%)
Undergraduate	72 (82.8%)	15 (17.2%)
P Value	< 0.001	< 0.002

Table 4: Decision about MHS.

Obstacle ₁ : Trainer awareness to MHS		P Value
Lack of knowledge where simulation can be applied	56(64.4%)	
Lack of knowledge of benefit of simulation	41(47.1%)	
Assume simulation is not suitable	24(27.6%)	
Heard of negative experience from others	8(9%)	
Not encouraged by their superiors and limited simulation centres	1(1.14%)	
MHS can improve outcome of patient care	85(97.7%)	< 0.001
MHS can't improve outcome of patient care	2(2.3%)	
MHS can improve physician skills	84(96.6%)	< 0.001.
MHS can't improve physician skills	3 (3.4%)	
MHS can improve physician medical knowledge	82(94.3%)	< 0.029
MHS can't improve physician medical knowledge	5(5.7%)	
MHS can improve team work	84(96.6%)	<0.001
MHS can't improve team work	3(3.4%)	
Recommend skills simulation courses to be repeated frequently through the year	83(95.4%)	< 0.006.
Didn't recommend skills simulation courses to be repeated frequently through the year	4(4.6%)	
Obstacle₂: Obstacles of skills, organizational and technical limitations for the use of MHS		
Lack of time to attend or create simulation models	58(66.6%)	
Lack of staff skills in simulation development	42(48.3%)	
Lack of knowledge on how to create simulation courses	41(47.1%)	
Lack of equipment	39(44.8%)	
Time	1(1.14%)	
Obstacle₃: Cost limitation of MHS		
Simulation courses as main obstacle	58(66.6%)	
Software, hardware and equipment	55(63.2%)	
Staff trainers	29(33.3%)	

Table 5: Obstacles for MHS.

Five most common simulation courses needed for each speciality listed by the candidates	
Speciality	Courses
Internal Medicine	Airway management courses
Pediatrics	Central line insertion
Critical Care	Lumber puncture
Emergency Medicine	Management of crisis/arrest/code
	Chest tube insertion/pleural tapping
	Mechanical ventilation courses
	Medical scenarios
	Bronchoscope
	Basics of ultrasound
	Ascitic fluid tapping
	Cardiac simulation courses
	Rapid response team
	ABG procedure
	Folly's catheter insertion
	Communication
	Toxicology
	Disaster
	CRRT
Obstetrics /Gynaecology	Basic surgical skills
	BOSS
	ALSO
	Postpartum hemorrhage
	Eclampsia
	Antepartum haemorrhage
	Laparoscopy
	Shoulder dystocia
	Instrumental delivery
	Crowdedness in labour ward
	OBERT
	Cord prolapse
	Fetal bradycardia
	Maternal collapse
Family Medicine	Basics of Ultrasound
	Clinical examination
	Identification of heart murmurs
	Basic surgical skills
	Lumber puncture
Surgery	Basic surgical skills
	BOSS
	Laparotomy and laparoscopy
	Abdominal wall surgery and hernia repair
	FAST
Anaesthesia	Airway management
	Central line insertion

Continue...

	Lumbar puncture
	Obstetric anaesthesia
	Regional anaesthesia
	Hemodynamic monitoring
	Management of crises/arrest/code
Ophthalmology	Phacoemulsification
	Corneal suture
	Refractory surgery
	Vitrectomy
Orthopaedic	Arthroscopy/Arthroplasty
	Inserting IM nailing
	Cast manoeuvre
	Management of open fracture
	Close reduction of dislocation
	AO basics and advance
	Basic surgical skills
	BOSS
ENT	Paranasal sinuses surgery
	Thyroid surgery
	Neck dissection
	Laryngoscope
	Temporal bone dissection
	Laser laryngoscope
	Bronchoscope

Table 6: Five most common simulation courses needed for each specialty listed by the candidates.

Discussion

The practice of medicine has been a growing field throughout the decades. Many modalities have been used to expand the training of residents and fellows across different specialties [1]. Simulator use that mimics a real-life situation has been one of the leading modalities in the field of medical education [3]. Not only does it help the trainees to build a strong problem-solving base, but it also strengthens their teamwork capabilities [2]. One of the main assets of simulation-based learning is to focus mainly on hand on practice rather than didactic lecturing. For that, the trainee needs to have previous theoretical knowledge on the subject itself [8]. Having simulation-based learning as part of the medical education throughout the trainees' journey amplifies many qualities. For example, the trainee will be more involved in the decision making rather than purely receiving the information as it is, which will have a direct impact on building his/her character in dealing with real life situations [7]. All the levels of medical education should have simulation as an integral part of its program. That is due to the growing impact it has on enhancing the practitioner's problem solving in clinical situations, introducing new technologies aiding with diagnosis and management, and limiting the rate of medical errors [9]. Studies have shown that high fidelity medical simulation has a direct impact on the skill of avoiding harmful actions by continues training and repetition and an effect on marked progress of the trainees [10,11]. Other studies have shown that simulation practice had a vivid impact on medical students as well, when used early on in their practice. It helped them understand the basics of hands on practice and the crucially of teamwork in the

medical field. It also helped them narrow down their interests in which kind of specialty they would like to pursue their career [6]. In order to reach the highest level of effectiveness and ensure benefit, several conditions need to be met. Starting from sharing comments to learners, providing opportunities with ongoing engagement in practice, integrating the curriculum, deliberating practice leveling the difficulty to equalize the practitioners' ability, and having a controlled environment that practitioners can detect and pick patient care errors [1,9,12,18]. There are many ways to make the simulation more appealing to the trainees. One of the theories that could be used is the gamification. Relatedness, autonomy, and internalized motivation are goals achieved by participating in different learning modalities such as gamification [13]. There are different types of simulators to fulfill the needs of each program. For example, human patient, task trainers, standardized patients and virtual reality [12]. Another type of simulation is the hybrid combined encounter, which is having a standardized patient to take history from then preform a physical examination or a procedure on a mannequin that increases the trainees' capability of preforming some physical skills and increasing his/her communication skills [15]. Moreover, some simulations on cadavers had shown a high reported benefit compared to other non-cadaveric simulation [16]. In our study, we encountered 313 participants most of them worked in governmental hospitals and universities, almost half of them 151 (48.2%) heard about MHS, and only 87 (57.6%) practiced in it before (figure 1). Those who practiced mentioned that having an MHS centre at their hospital helped them a lot. Especially with the large number of graduates from medical schools, the opportunity of practicing fundamental skills during their school training decreased.

Our data shows that critical care (34.4%) and emergency medicine (32%) were the highest specialties who utilized simulation-based education (Table 3). With most courses in MHS designed for their needs (such as intubation, mechanical ventilation, interosseous (IO), central line, lumbar puncture (LP), etc...). The participants have listed the most desired workshops per specialty that they would be most interested in attending. Those workshops would help them build a stronger data base to enrich their knowledge [3]. Another study conducted on pediatric residents at all levels, supported the efficacy of pediatric airway simulation courses which proved junior residents to score in knowledge and practical skills as high as senior residents at the end of the course [18]. From the 87 participants who practiced MHS 81 (93%) support that it should be mandatory at residents/fellow programs, and 72 (82.8%) in undergraduate programs and that implies the importance of MHS training (Table 4). Based on the updates in each field, some courses will need to be retaken every other year or so to ensure enough procedures are done to achieve competency [18]. Other studies proved the retention of both knowledge and clinical skills post simulation courses for pediatric R1 trainees [19]. Some of the obstacles encountered in our study were due to the lack of centers offering simulation workshops, as well as the limited knowledge by the trainees on where, how and when to apply. The lack of workshops in centers is secondary to either lack of skilled staff for training or limited equipment [20]. 66.6% of the participants found that the workload and the tight schedule are main withdrawers. Moreover, the benefits of participating in simulation workshops are not highly encouraged by seniors (Table 5).

Conclusion

Medical simulation is still not widely practiced in the training of SCFHS trainees in various specialties mainly because of limited awareness about such training modalities plus limited resources. Will share our data with SCFHS stake holder to introduce medical simulation courses into the curriculum of all specialties in Saudi Arabia.

Ethics Approval

The research was approved by IRB Committee at King Fahad Medical City (IRB 16-145)

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Salman Bashir, Department of Biostatistics, King Fahad Medical City.

Authors' Contributions

Study conception and design: SA, Alyousef, Ahmed H. Ibrahim

Acquisition of data: Ahmed H. Ibrahim, M. Alduhaim

Analysis and interpretation of data: Ahmed H. Ibrahim, M. Alduhaim, SH, Alyousef and M. Tawfik

Drafting of manuscript: Ahmed H. Ibrahim, M. Tawfik, SH, Alyousef and SA, Alyousef

Critical revision: SA, Alyousef, Ahmed H. Ibrahim

Competing Interests

The authors declare that they have no competing interests.

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