

CLINICAL EXPOSURE AND ORGANIZATION
OF THE CRITICAL CARE ROTATION DURING
THE HAJJ PERIODS IN 1434-1435; PERSPECTIVES
OF ARABIAN SAUDI ANESTHESIOLOGY
PROGRAM RESIDENTS

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Abstract

Background: The nature of massive mass gathering during Hajj was expected to provide a challenging and stimulating working experience for anesthesiology training program residents. A new rotation arrangement was reached between the Ministry of Health and the Saudi Commission of Health Specialties to recruit anesthesia resident to provide critical care services during the Hajj seasons in 1434 and 1435.

Objectives: This study aimed to explore the perspectives of anesthesia residents on their experience working among critical care teams during Hajj seasons in 1434H and 1435H at various locations of Makkah city and Al-Mashaer.

Subjects and methods: This cross-sectional study was conducted using a self-administered questionnaire distributed to all residents (n = 35) enrolled in anesthesia residency training program of the SCFHS and participated in critical care areas as locum during the Hajj seasons of 1434H and 1435H. Data was analyzed by using the statistical package of social science.

Results: The mean score of residents agreement on being treated with respect from both nurses and administration was the highest among the surveyed item (6.13 and 6.22 respectively). It was observed that, satisfaction of the residents with the direct observations and feedback provided to them (p = 0.01), the adequacy of the services components (p = 0.01) being treated with respect by the senior doctors and nurses (p = 0.03, p = 0.002) was significantly increased in the year 1435 compared to that of the year 1434. The satisfaction was generally higher in Makkah hospitals when compared to that of Al-Mashaer (Arafat and Menna) hospitals although this difference was of no statistical significance.

Conclusion: Hajj critical care rotations in 1434 and 1435 were well perceived by anesthesia residents. They found them useful as they give them the chance to gain self-confidence and experience the provision of healthcare services for mass gathering sessions.

Keywords: anesthesiology, mass gathering, critical care, rotations, residency training, hajj perspectives on Hajj rotations.

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Introduction

The healthcare profession needs adequate medical residency training programs to increase its members' professional qualifications and to maintain patient safety¹. Over the last few years, postgraduate medical training programs have to increase training capacity to meet the increasing number of medical school graduation rates and meet national health care shortages. Therefore, the postgraduate training programs in general and the anesthesia training programs in specific are aiming to prepare competent graduates with independent specialist practice². The Saudi Commission for health Specialties (SCFHS) has an active five-year residency program to train residents to obtain certification in anesthesiology. The residency training program is divided into three junior years followed by two senior final years. The program is further subdivided into clinical rotations covering general anesthesia, critical care and subspecialties of anesthesia like cardiac anesthesia, neuroanesthesia, obstetric anesthesia and many more subspecialties and elective rotations.

Hajj (Pilgrimage) is a special season where more than two million Muslims from more than 150 countries gather every year at the holy shrine (Al-Mashaer) to perform this important ritual of Islam. Hajj is performed in Makkah and Al-Mashaer (includes Mina, Mozdalifah and Arafat) in the Kingdom of Saudi Arabia (KSA). The ritual starts on the 8th and ends on the 13th day of Dhul Hijjah, the 12th month of the lunar Islamic calendar year. Approximately 2 to 3 million pilgrims perform Hajj every year. Hajj is considered a major public health challenge that required an undivided attention from a number of governmental and non-governmental sectors in Saudi Arabia. Chief among the government sectors is the Ministry of Health (MOH) which provide free medical care to pilgrims³⁻⁵. In this decade a remarkable advancement has been made in the development of health services during Hajj seasons. The Saudi government allocated a lot of resources including health facilities, qualified personnel, materials and logistics to serve the pilgrims³.

For decades, anesthesiologists have contributed to the provision of healthcare during Hajj seasons for years through provision of anesthetic services at

operating rooms as well as support team working at the critical care units and emergency rooms. During the Hajj seasons intense health coverage of 1434H and 1435H, corresponded to October 6 to 20 2013, and September 25 to October 9, 2014 respectively, an agreement was reached with the main healthcare service provider, MOH, to recruit residents enrolled in anesthesia residency training program to cover locum duties in critical care areas. This was a great chance to increase the critical care training of the anesthesia residents and increase their self-confidence, it was considered a step to prepare residents for independent practice. This study aimed to explore the perspectives of anesthesiology training program residents on their experience working among critical care teams during Hajj seasons in 1434H and 1435H at various locations of Makkah city and field hospitals at Mena and Arafat locations.

Subjects and Methods

The study was approved by the biomedical research ethics committee at the FOM, KAU. This cross-sectional study was conducted using a self-administered, anonymous questionnaire. It included some questions about demographic data of the residents, in addition to some questions about the general and specific training information of the Hajj rotation. Residents' response was classified according to seven Likert scale and was rated from strongly disagree (1) to strongly agree (7). The reliability of the questionnaire was calculated by Cronbach's alpha and it was 0.79.

The questionnaire was distributed to all residents ($n = 36$) enrolled in anesthesia residency training program and participated in critical care areas as locum during the Hajj seasons of 1434H and 1435H, corresponded to October 13 to 18, 2013, and September 3 to 8, 2014 respectively. The response rate was 97.2% and 75.3% of the respondents were males (26 out of 35).

After data collection, it was analyzed using the statistical package of social science (SPSS) program version 16 Inc. The data were examined for normality in distribution using the Kolmogorov-Smirnov test. The quantitative data was expressed as mean and standard

deviation (SD). The Student t-test was used to test significance for quantitative data of two groups and the F-test was used to test significance for quantitative data of three groups. Person correlation coefficient test was used to study the correlation between the two quantitative parameters. $p < 0.05$ is considered significant. The qualitative data were expressed as number and percentage. The χ^2 -test was used to test significance for qualitative data. The χ^2 -test with linear trend was used for ordinal data. Significance was considered at p value less than 0.05.

Results

It was noticed that about 75% of the anesthesia residents participated in the Hajj rotation during the two seasons were male and about half of them were in the 3rd level of the anesthesia residency. The number of the residents in the rotation was doubled in the year 1435. They were coming from the three geographical regions of the kingdom namely, the eastern, western and middle regions with more or less equal distribution (Table 1).

Table 1
Demographic data of the anesthesia resident trainees participated in the Hajj rotation

Parameter		Number	Percentage
Gender	Female	9	25.7
	Male	26	75.3
Level	3 rd	5	14.3
	4 th	17	48.6
	5 th	13	37.1
Region	Central	11	31.4
	Eastern	13	37.1
	Western	11	31.4
Number of rotation/Year	1434	22	36.1
	1435	39	63.9

Table 2
Resident trainees-reported experience with training during the Hajj rotation according to gender and resident trainees level

Parameter	Gender		Resident trainees level			Total Mean \pm SD
	Male	Female	3 rd level	4 th level	5 th level	
My education needs and goals were met	4.72 \pm 1.2	5.44 \pm 0.9	4.5 \pm 0.7	5.4 \pm 1.1	4.5 \pm 1.0	5.03 \pm 1.20
There was enough direct observation and feedbacks	4.88 \pm 1.3	5.33 \pm 1.1	5.6 \pm 1.1	4.9 \pm 1.3	4.9 \pm 1.3	4.83 \pm 1.63
The services components were excessive	5.27 \pm 1.6	5.22 \pm 1.9	5.8 \pm 0.8	5.1 \pm 1.9	5.2 \pm 1.7	4.96 \pm 1.84
I was treated with respect by senior doctors	5.15 \pm 1.5	5.33 \pm 1.1	4.8 \pm 1.3	5.5 \pm 1.4	4.9 \pm 1.6	4.99 \pm 1.62
I was treated with respect by the nurse	6.58 \pm 1.0	5.78 \pm 1.7	6.6 \pm 0.5	6.5 \pm 1.1	6.2 \pm 1.7	6.13 \pm 1.35
I was treated with respect by the administration	6.38 \pm 1.3	6.11 \pm 1.1	6.2 \pm 1.3	6.6 \pm 0.8	6.0 \pm 1.6	6.22 \pm 1.18
I was evaluated in fair manner	5.58 \pm 1.7	6.11 \pm 1.2	5.2 \pm 1.5	6.4 \pm 1.0	5.5 \pm 2.0	5.76 \pm 1.64
I will recommend this site to future training	6.31 \pm 1.0	5.78 \pm 1.1	6.4 \pm 0.5	6.4 \pm 0.9	5.6 \pm 1.2	5.81 \pm 1.29

Data is presented in the form of mean \pm standard deviation (SD). The Student t-test (when comparing two groups) or F-test (when comparing three groups) was used to compare the quantitative data between the two groups. $p < 0.05$ is considered significant.

Table 3
Resident trainees-reported experience with training during the Hajj rotation in 1434H and 1435H

Parameter	Hajj season			Region of the resident trainees			
	1434H	1435H	P value	Central	Eastern	Western	P value
My education needs and goals were met	4.67 ± 1.2	5.29 ± 1.1	0.15	4.90 ± 1.3	4.88 ± 0.8	5.11 ± 1.4	0.90
There was enough direct observation and feedbacks	4.26 ± 1.7	5.27 ± 1.2	0.01*	4.64 ± 1.2	5.31 ± 1.1	5.00 ± 1.4	0.43
The services components were excessive	4.28 ± 1.8	5.64 ± 1.6	0.01*	4.27 ± 2.0	6.08 ± 0.9	5.27 ± 1.7	0.03*
I was treated with respect by senior doctors	4.38 ± 1.8	5.36 ± 1.3	0.03*	4.73 ± 1.7	5.85 ± 0.9	4.91 ± 1.4	0.11
I was treated with respect by the nurse	5.59 ± 1.7	6.77 ± 0.5	0.002*	6.09 ± 1.8	6.54 ± 0.7	6.45 ± 1.2	0.68
I was treated with respect by the administration	6.0 ± 1.4	6.5 ± 0.8	0.33	6.09 ± 1.8	6.31 ± 0.9	6.55 ± 1.0	0.70
I was evaluated in fair manner	5.38 ± 1.9	6.27 ± 1.1	0.05	5.36 ± 2.1	6.46 ± 0.7	5.82 ± 1.6	0.23
I will recommend this site to future training	5.28 ± 1.4	6.55 ± 0.6	<0.001*	5.82 ± 1.3	6.46 ± 0.9	6.18 ± 0.9	0.33

Data is presented in the form of mean ± standard deviation (SD). The F-test was used to compare the quantitative data between the two

Table 4
Resident trainees-reported experience with training during the Hajj rotation according to training locations

Parameter	Mean ± SD			P value
	Makkha	Arafat	Menna	
My education needs and goals were met	4.96 ± 1.16	4.8 ± 1.4	5.25 ± 1.2	0.59
There was enough direct observation and feedbacks	5.1 ± 1.23	4.25 ± 1.3	4.96 ± 1.8	0.27
The services components were excessive	5.26 ± 1.68	4.19 ± 2.1	5.04 ± 1.84	0.15
I was treated with respect by senior doctors	5.2 ± 1.43	4.06 ± 1.8	5.26 ± 1.60	0.03
I was treated with respect by the nurse	6.37 ± 1.6	5.8 ± 1.68	6 ± 1.24	0.73
I was treated with respect by the administration	6.31 ± 1.3	6.19 ± 0.8	6.11 ± 1.6	0.79
I was evaluated in fair manner	5.91 ± 1.56	5.69 ± 1.74	5.76 ± 1.63	0.73
I will recommend this site to future training	6.17 ± 1.04	5.62 ± 1.58	5.44 ± 1.3	0.04

Data is presented in the form of mean ± standard deviation (SD). F-test was used to compare the quantitative data between the two groups. $p < 0.05$ is considered significant.

Table 5
correlation between resident trainees-reported experience with training during the Hajj rotation and the duration of trainin

	Duration of training	
	r	P value
There was enough direct observation and feedbacks	0.37	0.001*
The services components were excessive	0.29	0.009*
I was treated with respect by senior doctors	0.33	0.002*

Person correlation coefficient was used to study the correlation between the two parameters. $p < 0.05$ is considered significant.

The mean score of residents agreement on being treated with respect from both nurses and administration was the highest among the surveyed item (6.13 and 6.22 respectively). They agreed that they were fairly evaluated while somewhat agreed that their educational needs and goals were met. Although there was no significant difference in residents perception of the surveyed items between male and female, male residents strongly agreed more than the female residents that they were being treated with respect from both nurses and administration and they would recommend Hajj rotation for future training while the females perceived their evaluation as fair more than males (Table 2). Regarding the level of resident residents, there was no significant difference in perception of the surveyed items among the resident from different levels. Overall the perception of the 4th level residents was higher than those at the 3rd and 5th level (Table 2).

It was observed that, satisfaction of the residents with the direct observations and feedback provided to them was significantly increased ($p = 0.01$) in the year 1435 compared to that of the year 1434. Not only that, their perception regarding the adequacy of the services components was also significantly increased ($p = 0.01$) in the year 1435. Their agreement on being treated with respect by the senior doctors and nurses were increase significantly increased ($p = 0.03$, $p = 0.002$) in the year 1435 respectively. Overall, they significantly recommended the Hajj rotation for future training higher than those of the year 1434H (Table 3). Interesting, the residents from the eastern region of the kingdom rated the services components provided as excessive significantly more than ($p = 0.03$) those from other regions (Table 3).

Regarding the training site, the satisfaction of the resident was generally higher in Makkah hospitals when compared to that of Al-Mashaer (Arafat and Menna) hospitals although this difference was of no statistical significance. Residents trained at Makkah hospitals reported that they would recommend this site for future training significantly higher ($p = 0.04$) than those who trained at Arafat and Menna. On the other hand, residents trained at Arafat reported that they were treated with respect by senior doctors significantly lower ($p = 0.03$) than the other two sites (Table 4).

There are significant positive correlation between the duration of training of the residents and they satisfaction with the amount of the direct observations and feedback provided to them ($p = 0.001$), being treated with respect by the senior doctors ($p = 0.002$) and agreement on the adequacy of the service components provided during the season ($p = 0.001$) (Table 5).

Discussion

Gathering of a large number of pilgrims during Hajj, the largest religious festivals worldwide, could compromise the health system of the host country but Saudi Arabia has extensive experience of providing health care at mass gatherings acquired through decades of managing millions of pilgrims at the Hajj⁶. It was reported that more than 25% of patients attended to the Haram medical center facilities in the year 1434 was referred to the Ajyad, Makkah and the King Abdulaziz Hospitals and others which indicated the need for more staff, patients' beds, and medicines at these locations⁷. It seemed that this problem was spotted, although not documented in published works, from the previous Hajj season in 1433H. In response to that an agreement was reached between the MOH and the SCFHS to recruit anesthesia residents to cover locum duties in critical care areas during the Hajj seasons in 1434 and 1435.

In this study, the perspectives of anesthesia residents on their training and working the Hajj seasons in 1434H and 1435H at various locations of Makkah city and Al-Mashaer were explored. Generally the experience of anesthesia training during Hajj rotation was well perceived by residents. The nature of massive mass gathering during Hajj might provide a challenging and stimulating working experience for anesthesia residents during this rotation. Hajj critical care rotation provided anesthesia residents ample opportunity to practice at the frontline.

The Hajj rotations provided resident with chances to work at various locations included established critical care units at formal hospitals in Makkah City as well as the critical care units at temporary and seasonal field hospitals. In this study it was observed that the residents were more satisfied, but of no statistical

significance, with the training at Makkah hospitals when compared to those of Al-Mashaer and this was reflected on their reporting that they will recommend Makkah for future training significantly higher than other hospitals in Al-Mashaer. The perception could be explained when understanding the difference between Makkah and Al-Mashaer hospitals. Makkah hospitals are well-equipped permanent ones, provided with infrastructure and stable, expert health providers teams who are provided with suitable comfortable accommodations and transport facilities. On the other hand, health workers at the seasonal hospital at Al-Mashaer were recruited from different areas and weren't acclimatized with each other and might following different health care systems. They were suffer from crowded accommodations, extra-workload and difficulty in transportation.

It was observed that the residents were not highly satisfied with the amount of the direct observation and feedbacks as well as the way they were treated with the senior doctors. This might be attributed to the stressful conditions under which the whole health team providers were working doing the Hajj seasons. During the hajj the working shift was lasting for 12 hours per day for consecutive 15 days with no break. In one of the recent studies conducted on Saudi residents in different specialties it was reported that stress was associated with higher workload (dealing with more patients and working more weekends), sleep deprivation (sleeping few hours and feeling un-refreshed after sleep) and dissatisfaction with colleagues⁸. This was consistent with other previous studies that identified the parameters associated with higher stress in residents, such as prolonged working hours, high patient load, critical patients assigned, night duty, poor sleep duration, and quality, poor work environment, and process failure⁹⁻¹¹. Abdulghani et al., found significantly high levels of stress among the residents of SCFHS training programs namely, Internal Medicine, Emergency Medicine and Family Medicine and they reported that high levels of stress may have an effect on their working efficiency and general physical health¹².

The satisfaction with training among the 5th level of residents was lower than those in the 3rd and 4th level, although it was of no statistically significance.

Generally the fierce competition lying ahead on the senior residents in the form of postgraduate examination, responsibility, high expectations, and suitable jobs making them less satisfied and at risk to stress as was reported by Abdulghani et al¹².

One of the fundamental observations in this study that the residents experience with training in Hajj rotations of 1435 was almost all better than that of 1434H and they significantly recommended the Hajj rotation for future training higher than those of the year 1434. It is notably that anesthesia Hajj rotation was implemented for the first time in 1434 and neither the trainers nor the supervisors were sufficiently informed about the arrangements of accommodations, transportations and distribution of work hours. In 1435, the supervisors and trainers gained experience in managing all these tissues and tried to avoid much of the reported problems in the previous year. The perception of the residents regarding the adequacy of the services components was significantly increased in the year 1435 compare to that of 1434. It is worth mention that in the Hajj season of 1434, the MOH equipped 23 hospitals to serve the pilgrims of which 8 hospitals were seasonal. A total of 4,326 hospital beds as well as 110 emergency beds were available. The MOH, as well, provided 154 health centers for the pilgrims of which 112 were seasonal¹³. In the Hajj season of 1435, the MOH added 2 permanent hospitals at Makkah and the total number of the emergency beds reached 458 and the number of the seasonal health centers reached 114 in this reason¹⁴.

Publications in mass gatherings medicine, in general, and in Hajj-related health issues, in specific, were limited in number. In order to overcome this the Saudi MOH established the Global Center for Mass Gathering Medicine in 2012 in Riyadh. This center established an overarching board chaired by the Saudi MOH with membership of experts from the University College London, Public Health England, WHO, SCFHS, and the Saudi national research funding agency King Abdulaziz City for Science and Technology. This Center aims to drive the best health promotion, prevention guidelines and practice, and health education for attendees at the Hajj and other mass gatherings through provision of a scientific evidence base⁶.

In this study some limitations were existed; first, being cross-sectional one excluded the identification of any causal association adding to that the possibility of reporting bias from self-reported data and second, was the small sample size. Further studies on future performance of residents after their Hajj rotations is currently planned.

In conclusion, Hajj critical care rotations in 1434 and 1435 were well perceived by anesthesia residents. They found them useful as it was a great chance to increase their critical care training, their self-confidence. It was considered a step to prepare residents for independent practice. The Hajj is considered a great chance for residents training not only in anesthesia, but although in other all health specially.

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Conflict of interest

The author reports no conflict of interest.

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^{*} Train-of-four
[†] Post tetanic counts
[‡] Second twitch

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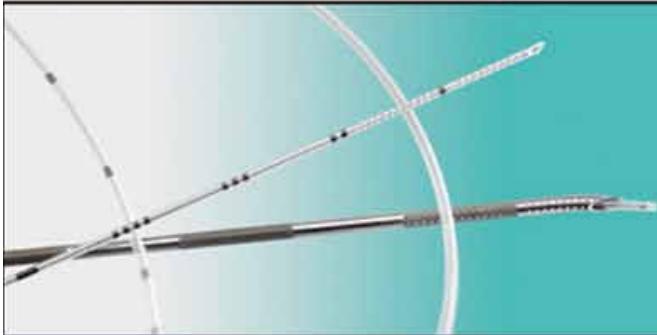
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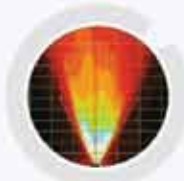
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Spray cone with a wide 62.75° average spray angle and a 36.9mm average plume width.²

References:

1. Talon M. et al., J Burn Care Research 2009; 30: 599-605.
2. MAD (Mucosal Atomization Device) Medical Atomizer In Vitro Spray Characterization, 2011



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